IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

U.S. PHILIPS CORPORATION, Plaintiff, v. EASTMAN KODAK COMPANY, Defendant.	)	C.A. No. 06-251-GMS

PLAINTIFF U.S. PHILIPS CORPORATION'S MEMORANDUM IN OPPOSITION TO EASTMAN KODAK COMPANY'S MOTION TO STAY PENDING REEXAMINATION

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I. INTRODUCTION

Only now, at the eleventh hour and after suffering a disastrous setback in this Court, does Eastman Kodak Company ("Kodak") extol the virtues of reexamination. As early as March 2004, more than two years before this lawsuit was filed, Kodak identified alleged prior art that it asserts renders the patent-in-suit, U.S. Patent No. 4,901,075 ("the '075 patent"), invalid. Now, years later, on the eve of trial, after receiving an unfavorable claim construction from this Court, after completing all discovery, and after receiving all of U.S. Philips Corporation's ("Philips'") pretrial positions, Kodak has requested *ex parte* reexamination of the '075 patent based on some of this same art, while keeping its principal reference in reserve for trial.

Kodak could have filed its request for reexam years ago, even before this lawsuit was filed. Kodak's delayed reexamination request and this motion to stay are a transparent attempt to circumvent this Court's claim construction order of January 25, 2008, and certain missteps by Kodak's technical expert, by seeking an alternate route to invalidity in the USPTO, while allowing another case pending in the Southern District of New York to unfold before this case ever proceeds to trial.[1]

It is no coincidence that Kodak waited until two weeks after this Court's claim construction order to file its reexam request. Kodak's position on 24 of the 26 claim issues was rejected, rendering almost of all of its non-infringement defenses and all of its invalidity defenses

[1] Kodak appears to be cooperating with LG Electronics, the remaining defendant in *U.S. Philips Corporation v. Konica Minolta*, 06-cv-01402-BSJ-THK (S.D.N.Y), in its defense. For example, in its *Markman* briefing, Kodak's proposed constructions for all claim terms were identical to the constructions submitted by LG. (Ex. A, Final Joint Claim Chart; Ex. B, LG's Proposed Claim Constructions.) Kodak also submitted a declaration signed by its expert on infringement and invalidity that is nearly identical to a declaration signed by a different expert in the *LG* case. (Ex. C, Decl. of T. Ebrahimi; Ex. D, Decl. of J. Storer.) To date, LG has not moved to stay its proceeding pending the reexam requested by Kodak.

impotent. Kodak now seeks to stall this case in favor of obtaining an advisory opinion from the USPTO, which will not be bound by this Court's claim construction, while Kodak also hopes that the court in the *LG* case will come up with a claim construction that is at odds with this Court's.[2] Allowing Kodak's dilatory scheme would present a clear tactical disadvantage to Philips, since Kodak will not be bound by the result in either of these other proceedings.

Moreover, staying the case will not simplify issues for trial. After reexamination, the parties will be right back in this Court because it is the only forum for a complete consideration of Kodak's evidence of invalidity. Kodak did not submit any information about its primary piece of alleged prior art—the Widcom VTC-56 codec device—to the USPTO for consideration during reexam. Nor has Kodak agreed to be bound by any outcome of the reexam. And Kodak's arguments to the USPTO are contradicted by its expert's positions in this case. Indeed, Kodak seeks two bites at the apple—one in the USPTO with one set of references and arguments, and another in this Court with different references and inconsistent arguments. A stay will also remove any chances for early resolution by eliminating any incentive for Kodak to seriously consider this case on the merits for several years.

The '075 patent is presumed valid and enforceable. The USPTO has not decided whether the alleged prior art submitted by Kodak is even worthy of consideration and does not have to make that decision before trial. The possibility that the USPTO *may* grant Kodak's request to begin reexamination proceedings cannot justify a stay, especially at this late date. Even if the USPTO were to grant Kodak's request, a stay this close to trial would only result in a waste of time and resources because Philips has already expended significant resources in preparing for trial—resources it would have to expend again years from now when any reexam (if instituted) is

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[2] The *LG* court has not yet issued its claim construction.

complete. Staying this case would also unfairly prejudice Philips because all discovery has closed and trial is imminent, both parties will have filed their pretrial papers and motions *in limine* before this motion is ripe for hearing, and the parties have already begun their trial preparations.

Proceeding without waiting several years for the USPTO's analysis of only some of Kodak's validity defenses would not cause hardship or inequity to Kodak. In fact, allowing Kodak to try out selected validity defenses in the USPTO is far more inequitable, especially when the USPTO has not even granted Kodak's request. Here, all delay in seeking reexam is attributable to Kodak's tactical decision to contest validity exclusively in this Court for two years and, after losing its primary arguments because of this Court's *Markman* order and the opinions of its own expert, to seek a new forum in which this Court's order may be disregarded.

Kodak's motion to stay also flies in the face of its laches defense, which claims evidentiary prejudice is attributable to Philips' alleged delay in bringing this lawsuit. It is Philips who will suffer any supposed evidentiary prejudice caused by a stay in the proceedings now.

II. TIMELINE OF PRIOR ART KNOWLEDGE BY KODAK

1. In March 2004, Kodak and Philips met to discuss Philips' '075 patent. At that time, Kodak identified U.S. Patent No. 4,698,672 to Chen, U.S. Patent No. 4,420,771 to Pirsch, and the Widcom VTC-56 codec machine as allegedly invalidating prior art.

2. In July 2004, the parties met again and Kodak contended that all asserted claims, except claim 11, are anticipated by the Widcom VTC-56 device.

3. In September 2005, Kodak provided Philips with documents allegedly supporting Kodak's anticipation defense based on the Widcom-VTC-56 device.

4. Philips filed its Complaint on April 18, 2006, alleging infringement of the '075 patent. (D.I. 1.)

5. In its Answer, Kodak alleged that the '075 patent is invalid pursuant to 35 U.S.C. §§ 101-103, and 112. (D.I. 9.)

6. In October 2006, in a German lawsuit involving the European counterpart to the '075 patent, Kodak identified alleged prior art, including: U.S. Patent No. 4,494,151 to Liao; U.S. Patent No. 4,420,771 to Pirsch; U.S. Patent No. 4,136,363 to Saran; U.S. Patent No. 4,092,676 to Saran; U.S. Patent No. 4,363,036 to Subramaniam; U.S. Patent No. 4, 316, 222 to Subramaniam; U.S. Patent No. 3,984,833 to Van Voorhis; the Widcom VTC-56 codec machine; U.S. Patent No. 4,698,672 to Chen; "Upper Bound, Lower Bound and Run-Length Substitution Coding (the "Liao article"); and "Scene Adaptive Coder" (the "Chen and Pratt article").

7. Kodak set forth its invalidity defenses in this case and identified the references forming the basis of those defenses in its First Supplemental Responses to Philips' First Set of Interrogatories, served September 7, 2007. (Ex. E.) In that document, Kodak identified the same alleged prior art listed above from Kodak's October 2006 filing with the German court.

8. In its Sixth Supplemental Responses to Philips' First Set of Interrogatories, served November 16, 2007, Kodak identified a "Block Coding Using a Two-Dimensional Run-Length Table" paper ("the COST 211bis paper") as allegedly invalidating prior art. (Ex. F.) This document had been produced by Philips on September 4, 2007.

9. The expert report of Kodak's only invalidity expert, T. Ebrahimi, dated December 14, 2007, claims that only three references may anticipate some of the asserted claims, namely the Widcom VTC-56 device, the '672 patent to Chen, and the COST 211bis paper. (Ex. G.)

10. The expert report of T. Ebrahimi dated December 14, 2007, does not give a basis for why two of three alleged anticipatory references are "prior" art, even though the alleged prior

art '672 patent to Chen was filed after the priority date of the patent-in-suit and the COST 211bis paper is the inventor's own work and was not a printed publication. (Ex. G.)

11. On February 7, 2008, Kodak filed a request for reexamination of the '075 patent at the USPTO. (Ex. H.) In its request, Kodak identified the following references: U.S. Patent No. 4,698,672 to Chen and U.S. Patent No. 4,420,771 to Pirsch, which Kodak knew of by March 2004; U.S. Patent No. 3,984,833 to Van Voorhis, U.S. Patent No. 4,363,036 to Subramaniam, U.S. Patent No. 4, 316, 222 to Subramaniam, U.S. Patent No. 4,494,151 to Liao, U.S. Patent No. 4,136,363 to Saran, U.S. Patent No. 4,092,676 to Saran, the Liao article, and the Chen and Pratt article, which Kodak knew of by October 2006; and the COST 211bis paper; which Kodak knew of by September 2007.

12. Kodak did not submit to the USPTO any documents or argument regarding the Widcom VTC-56 codec device, which Kodak disclosed in March 2004 and which is the principal reference on which Kodak's invalidity defenses now rest.

III. LEGAL STANDARD

In ruling on a motion to stay, courts are guided by three factors: "(1) whether a stay would unduly prejudice or present a clear tactical disadvantage to the non-moving party; (2) whether a stay will simplify the issues in question and trial of the case; and (3) whether discovery is complete and whether a trial date has been set." *ARGOS v. Orthotec LLC*, 304 F. Supp. 2d 591, 598 (D. Del. 2004) (quoting *Xerox Corp. v. 3 Com Corp.*, 69 F. Supp. 404, 406 (W.D.N.Y. 1999)). Here, all three factors weigh against staying this litigation.

Further, where a stay will forestall the trial date agreed upon by the parties, judges in this district have required the party requesting the stay to make a showing of "a clear case of hardship or inequity" before the Court enters a stay order. *Dentsply Int'l, Inc. v. Kerr Manuf. Co.,* 734 F.

Supp. 656, 658 (D. Del. 1990) (citing *Gold v. Johns-Manville Sales Corp.*, 723 F.2d 1068, 1076 (3d Cir. 1983)). Kodak has made no such showing of hardship or inequity.

IV. ARGUMENT

A. Staying This Case Will Unduly Prejudice Philips and Present a Clear Tactical Disadvantage to Philips Because Kodak's Request for Reexamination Serves an Improper Dilatory Purpose

Kodak's proffered explanation as to why it chose to file a reexam request four years after it learned of prior art and almost two years after Philips brought this lawsuit is untrue. Kodak asserts that it has asked the Court to stay this action because "[b]ased on the claims constructions entered by the Court, substantial new questions of patentability have been raised . . . ." (D.I. 169, Kodak Br. at 2.) Kodak, however, has identified no such issues, nor can it, since the Court's claim construction rejected almost all of the positions that Kodak had taken for purposes of arguing invalidity. The real reason that Kodak wants to switch forums now is because the USPTO is not bound to follow this Court's claim construction during reexam. Rather, claims are given "their broadest reasonable interpretation, consistent with the specification, in reexamination proceedings." *In re Trans Texas Holdings*, 498 F.3d 1290, 1297 (Fed. Cir. 2007) (quoting *In re Yamamoto*, 740 F.2d 1569, 1571 (Fed. Cir. 1984)).

Kodak waited until two weeks after this Court's claim construction order to file its reexam request because Kodak's position on 24 of the 26 claim construction issues was rejected by this Court, crippling all of Kodak's invalidity defenses. Rather than litigate this case in accordance with the Court's decision, Kodak now seeks delay in the hope that other decision-makers, either at the USPTO or in the pending LG case, will disregard the work this Court has already performed since, unlike Kodak, they are not bound to follow this Court's claim construction. Should LG, for example, obtain a claim construction that contains Kodak's

rejected definitions of "coefficient" or "code word" while this case is on hold, LG could litigate invalidity in a different court using positions that Kodak cannot pursue here.

The cases are legion in which judges, including those in this district, have refused to stay proceedings where a party uses the reexamination process merely as a dilatory tactic, which is exactly what Kodak is doing here.[3] Courts have refused to grant a stay pending reexam where the requestor knew about prior art months before requesting reexam. In *Freeman*, for example, the court concluded that it would be improper to allow 3M to use the reexamination process to stay a case after discovery had closed because doing so "would allow a defendant to use the reexamination as a mere dilatory tactic," especially where 3M knew about all of the documents on which its examination would be based eight months before. 661 F. Supp. at 888. Similarly, in *Cognex,* the court denied a stay where a party possessed some of the documents it presented to the USPTO "for quite some time," yet waited until six months before the scheduled trial date to seek reexamination. 2007 U.S. Dist LEXIS 25555, at *6. Similarly, in *Gladish*, the court denied a stay where a party requested reexam six months after being put on notice of the prior art

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[3] *See, e.g.*, *Freeman v. Minnesota Mining & Mfg. Co.*, 661 F. Supp. 886, 888 (D. Del. 1987) (refusing to grant stay where defendant was attempting to use reexamination as "a mere dilatory tactic"); *Cognex Corp. v. Nat'l Instruments Corp.*, No. 00-442-JJF, 2001 U.S. Dist. LEXIS 25555 (D. Del. June 29, 2001) (denying stay where requestor had prior knowledge of prior art and waited until six months before trial to seek reexamination); *E. I. Du Pont de Nemours & Co. v. Phillips Petroleum Co.*, 711 F. Supp. 1205, 1208 n.9 (D. Del. 1989) ("Where such a stay could result in a tactical advantage to one party or the other, this Court will not employ its discretion to stay the ordinary course of its proceedings simply because the outcome of the Patent Office proceedings may moot the issues remanded."); *Enprotech Corp., v. Autotech Corp.*, No. 88 C 4853, 1990 U.S. Dist. LEXIS 2926, at *1-*2 (N.D. Ill. Mar. 15, 1990) (stay denied where "we are too far along the road to justify halting the journey while the defendant explores an alternate route" in the USPTO); *Gladish v. Tyco Toys, Inc.*, No. S-92 1666 WBS/JFM, 1993 U.S. Dist. LEXIS 20211 (E.D. Cal. Sept. 15, 1993) (denying stay where party knew of prior art six months before requesting reexam); *Jain v. Trimas Corp.*, No. Civ. S-04-0889, 2005 U.S. Dist. LEXIS 28950 (E.D. Cal. Sept. 27, 2005) (refusing stay where there was a clear tactical disadvantage to one party); *Remington Arms Co., Inc. v. Modern Muzzleloading, Inc.*, No. 2:97 cv 00660, 1998 WL 1037920 (M.D. N.C. Dec. 17, 1998) (denying stay where trial date was set and defendant chose not to request reexam until three months after learning of prior art and two weeks after the close of discovery).

that was the basis for a request for reexamination. 1993 U.S. Dist. LEXIS 20211, at *7. And in *Remington Arms*, the court denied a stay where the defendant was aware of certain prior art during fact discovery, yet chose not to request reexamination until five months later, after discovery closed.[4] 1998 WL 1037920, at *3.

Courts are troubled by delays of just a few months in seeking reexam after first learning of relevant prior art. Here, Kodak knew about all but one of the eleven references on which the reexam is based *years* before requesting reexam. And Kodak knew about the eleventh reference more than five months before requesting reexam. The Court should not encourage misuse of the Court's scheduling order and reexamination process by granting a stay at this late stage.

B. Staying This Case Will Not Serve Judicial Economy by Simplifying Issues for Trial

A stay will probably consume years,[5] especially if Kodak or a third party chooses to file new requests for reexamination that are then merged with the pending reexam. Moreover, a stay will provide little, if any, corresponding benefit in judicial economy by simplifying issues for trial, since Kodak has held its "best" art in reserve, will not be bound by any USPTO decision in any event, and will almost certainly seek to change its expert opinions and invalidity positions

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[4] This Court distinguished *Remington Arms* in its decision to grant a stay in *Abbott Diabetes Care v. Dexcom, Inc.*, No. 06-514 GMS, 2007 WL 2892707 (D. Del. Sept. 30, 2007), cited by Kodak. In *Abbott Diabetes*, this Court granted a stay pending reexam because it had not yet conducted a Rule 16 scheduling conference, no scheduling order was in place, no discovery had taken place, and little time had been invested in the litigation. *Id.* at *5. The procedural posture of this case is far different than that in *Abbott Diabetes*. The Court held a scheduling conference on January 24, 2007, a scheduling order has been in place and trial has been scheduled since that date, fact and expert discovery is complete, and Philips has invested over two years in the litigation.

[5] An *ex parte* reexamination takes an average of 24 months. (Ex. I, *Ex Parte* Reexamination Filing Data, dated Dec. 31, 2007, at 2.) Should Philips appeal to the Federal Circuit, a decision would not be available for another ten months, on average. (Ex. J, http://www.cafc.uscourts.gov/pdf/MedianDispTime(table)99-07.pdf (accessed 02/11/08)).

after the reexam is concluded. Courts are reluctant to stay litigation when reexamination does not resolve all prior art issues. *See, e.g.*, *Enprotech*, 1990 U.S. Dist. LEXIS 2926, at *1-*2. Any consideration by the USPTO of some of Kodak's validity defenses would not materially alter the degree to which those issues will need to be considered at trial for several reasons.

1. The USPTO Will Not Consider the Principal Art Kodak Intends to Present at Trial—the Widcom Device

Kodak has not submitted to the USPTO the principal reference on which it intends to rely at trial. Indeed, Kodak did not submit any documentation or argument regarding the Widcom VTC-56 codec device, the primary reference on which Kodak relies as the basis for its invalidity defense.[6] (Ex. G at 13-18.)

Kodak will not be prevented from litigating validity based on the Widcom device, or any other reference, at trial. Kodak requested *ex parte* reexamination, which is not subject to the estoppel associated with *inter partes* reexamination. *See* 37 C.F.R. 1.913. A requester of *inter partes* reexamination is prohibited from asserting, at a later time in a civil action in a federal court, the invalidity of any claim finally determined to be valid and patentable on any ground which the third-party requester raised or could have raised during the *inter partes* reexamination proceeding. *See* 35 U.S.C. § 315(c). Kodak is not subject to any such prohibition as a result of its request for an *ex parte* reexamination.

As a result, this Court is the only forum that is capable of giving a complete consideration and resolution of Kodak's invalidity defenses. Unless all asserted claims of the patent were cancelled as a result of reexamination, which is not statistically likely,[7] validity would remain a

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[6] This device does not fall into any of the categories of prior art that the USPTO considers during reexamination, namely, prior publications and patents.

[7] All claims are cancelled during *ex parte* reexaminations only 10% of the time. (Ex. I.)

contested issue in this action, since the reference that Kodak believes is most material to a determination of validity cannot even be considered by the USPTO.

Moreover, after reexam is complete, Kodak will no doubt want to revise its invalidity expert's positions, eliminating any possible economy derived from a stay. And Kodak and third parties are free to file additional requests for reexamination, which the USPTO would probably merge with the pending reexam, thereby dragging this litigation on indefinitely.

2. Kodak's Invalidity Positions in Its Request for Reexamination Contradict Those of Its Validity Expert for Trial

The reexam proceeding also will not finally resolve all invalidity issues because Kodak makes contradictory arguments to the USPTO from those it can make in this Court. In its request for reexamination, for example, Kodak argues that U.S. Patent No. 4,420,771 to Pirsch and U.S. Patent No. 3,984,833 to Van Voorhis each anticipate certain claims. (Ex. H at 9-12.) Its expert in this case, however, does not even contend that either the Pirsch and Van Voorhis patents are anticipatory prior art. Rather, Kodak only contends that the Pirsch and Van Voorhis patents render the '075 patent obvious in combination with other alleged prior art, the Chen and Pratt article, which was previously considered by the USPTO. (Ex. G at 13-18.) Similarly, Kodak argues to the USPTO that the Chen and Pratt article anticipates certain claims, but Kodak's own expert in this case does not support this position. Also in its request for reexam, Kodak argues that combining the Chen and Pratt article with U.S. Patent No. 3,984,833 to Van Voorhis renders obvious claims 3 and 4 of the '075 patent. (Ex. H at 62.) Kodak intends to argue at trial, however, that these two references also render claim 8 obvious. (Ex. G at 14, 16.)

In seeking at least two bites at the apple—one in the USPTO with one set of prior art references and arguments, and another in this Court with different references and arguments—Kodak has recognized that it will be unable in this Court to prove the prior art status of the two

main references on which it is relying for anticipation *before the USPTO*, namely the COST 211bis paper and U.S. Patent No. 4,698,672 to Chen. During his recent deposition in this case, Kodak's validity expert admitted he had no opinions on priority or publication and admitted that he was not even advised about and never considered any of the secondary considerations relevant to non-obviousness. (Ex. K, Deposition Tr. of T. Ebrahimi, dated Jan. 31, 2008, at 85-94.) As a result, Kodak's invalidity expert cannot opine as to whether the COST 211bis paper is even a printed publication. And, he also cannot opine as to whether Philips' patent is entitled to its September 13, 2006, priority date, thereby ruling out the '672 patent application to Chen as prior art.

Kodak now goes to the USPTO to take positions that its expert cannot support in this litigation. This Court should not now allow Kodak to evade the opinions and limitations of its own validity expert (and obtain an end-run around this Court's unfavorable claim construction) by delaying this litigation so that Kodak can try out different invalidity arguments at the USPTO.

3. Litigation and Reexamination Are Distinct Proceedings with Distinct Procedures and Kodak Has Not Agreed to be Bound by Any Decision of the USPTO

Procedural differences in reexamination proceedings and litigation affect the degree to which the reexam would dispose of remaining invalidity issues. The Federal Circuit has recognized that "litigation and reexamination are distinct proceedings, with distinct parties, purposes, procedures, and outcomes." *Ethicon, Inc. v. Quigg*, 849 F.2d 1422, 1427 (Fed. Cir. 1988) (citing *In re Etter*, 756 F.2d 852, 857 (Fed. Cir. 1985)). "The two forums take different approaches in determining invalidity and on the same evidence could quite correctly come to different conclusions." *Id.* at 1428-29.

The jury in this case is bound to apply this Court's claim construction. *Markman v. Westview Instruments*, 517 U.S. 370 (1996). The USPTO, in contrast, applies the broadest

possible claim construction during reexam and is not bound to apply this Court's claim construction. *In re Yamamoto*, 740 F.2d 1569, 1571 (Fed. Cir. 1984). This procedural difference explains why the reexam request was filed—Kodak is bound to follow this Court's order while Kodak understands and hopes that the USPTO will ignore it.

Moreover, the presumption of an issued patent's validity, which applies during litigation, is not applicable to the USPTO's consideration of claims in reexamination proceedings. *In re Etter*, 756 F.2d 852 (*en banc*); *E. I. Du Pont de Nemours & Co. v. Phillips Petroleum Co.*, 720 F. Supp. 373, 385 (D. Del. 1989). A jury, however, must apply it. *See* 35 U.S.C. § 282.

Finally, Kodak has not even agreed to be bound by any outcome of the reexam proceedings. Accordingly, substantial questions related to invalidity would remain to be litigated in this Court and the record on reexam may not materially affect these issues, even with respect to references that the USPTO considers during reexam.[8]

C. Discovery is Complete and a Trial Date Has Been Set for Over a Year

One of the most critical factors in determining whether to stay litigation pending reexam is the stage of the litigation, specifically whether discovery is complete and a trial date has been set. *See, e.g., Cognex Corp.*, No. 00-442-JJF, 2001 U.S. Dist. LEXIS 25555 (delay in trial date would "severely prejudice" non-moving party where parties conducted extensive discovery and trial date has been set).

This action was filed almost two years ago. Fact discovery closed three months ago. Expert discovery closed several weeks ago and Philips provided Kodak with all of its pretrial submissions before the reexam request was filed. Trial is now only seven weeks away. The trial

[8] In this case, Kodak is asserting invalidity based on several references that were clearly considered by the USPTO during the original examination, including the '672 Chen patent and the Chen and Pratt article.

date has been set and agreed to by the parties for over a year. The parties' final pretrial order and motions *in limine* are due to this Court in one week, before Kodak's motion to stay will be fully briefed. And the USPTO likely will not indicate whether there is even a basis to reexamine the '075 patent for some time.

Most significantly, Philips has already made decisions and expended resources that are specifically geared to the trial scheduled to begin on April 21, such as submitting its trial brief, selecting its trial exhibits, preparing and serving findings of fact and proposed jury instructions, identifying and contacting trial witnesses, and designating deposition testimony. Contrary to Kodak's assertion that "trial preparation has just recently begun" (D.I. 169, Kodak Br. at 8), trial preparations have been well underway and the final pretrial order will be submitted before briefing on this motion is complete. Significant time and resources have been spent preparing the parties' pretrial order and motions *in limine*; Philips has reserved at great expense the Hotel Dupont's trial facilities, which after a certain date will become non-refundable; and Philips has retained its graphics team and begun preparation of its trial graphics. It is difficult to imagine what litigation costs a stay would make unnecessary at this late date, apart from the costs directly associated with holding the actual trial.

In all probability, Kodak's positions will change yet again after any reexam, forcing Philips to prepare different exhibit lists, findings, and briefs for trial. The resources already expended by the Court and the parties in this matter have been huge, and reexam will require the expenditure of additional resources, not fewer. And, because the reexam will not dispose of all invalidity issues and Kodak is not bound by the result, a trial will be necessary even if every Kodak argument is rejected during reexam.

Courts generally refuse to stay litigation after (or near) the close of discovery, especially when a trial date has been set.[9] In *Cognex*, for example, the court denied a stay where discovery was scheduled to close less than three weeks before the plaintiff moved to stay, a trial date had been set, the trial would be completed before the USPTO acted, and the movant had not demonstrated a clear case of hardship or inequity. 2001 U.S. Dist. LEXIS 25555. Here, not only is all discovery already complete, a trial date has been set for over a year and the trial is likely to be completed before the USPTO even decides whether to grant Kodak's request. For these reasons, Kodak's motion to stay should be denied.

D. Kodak Has Not Shown That It Would Be Inequitable to Deny the Stay

Where a stay will forestall the trial date agreed upon by the parties, judges in this district have required the party requesting the stay to make a showing of "a clear case of hardship or inequity" before the Court enters a stay order. *Dentsply Int'l, Inc. v. Kerr Mfg. Co.*, 734 F. Supp. 656, 659 (D. Del. 1990) (quoting *Landis v. N. Am. Co.*, 299 U.S. 248, 255 (U.S. 1936) and citing *Gold v. Johns-Manville Sales Corp.*, 723 F.2d 1068, 1076 (3d Cir. 1983)). Kodak has made no such showing and, in fact, has not alleged a single hardship in proceeding to trial.

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[9] *See. e.g.*, *Cognex*, 2001 U.S. Dist. LEXIS 25555 (denying stay where discovery was scheduled to close less than three weeks before motion to stay was filed and trial was scheduled five months later); *Soverain Software LLC v. Amazon.com, Inc.*, 356 F. Supp. 2d 660, 663 (E.D. Tex. 2005) (staying the case one month before the close of discovery, based solely on speculation of what might possibly happen during reexamination, would be inefficient and inappropriate); *Wayne Automation Corp. v. R.A. Pearson Co.*, 782 F. Supp. 516 (E.D. Wash. 1991) (concluding it would not be fair to allow a party to stay action after extensive discovery was conducted and cut-off dates had been agreed to);*Output Tech. Corp. v. Dataproducts Corp.*, No. C90-1782D, 1991 U.S. Dist. LEXIS 20168 (W.D. Wash. Nov. 25, 1991) (stay denied where discovery underway, case set for trial, and movant did not make out case of hardship); *Enprotech, 1990 U.S. Dist. LEXIS 2926*, at *1-*2 (stay denied where discovery nearly complete and case set for trial); *Remington Arms*, 1998 WL 1037920 at *3 (stay not judicially efficient because discovery has closed, a trial date has been set, and both parties have submitted dispositive motions); *Digital Magnetic Sys., Inc. v. Ansley*, 213 U.S.P.Q. 290 (W.D. Okla.1982 ("Parties should not be permitted to abuse the process by applying for reexamination after protracted, expensive discovery or trial preparation.").

Proceeding without the benefit of the USPTO's analysis of Kodak's validity defenses would not cause hardship or inequity to Kodak. Indeed, allowing Kodak to try out different validity defenses in the USPTO, some of which are no longer viable in this case and will not even be heard by the Court, is far more inequitable. The USPTO has not even granted Kodak's request to begin reexamination proceedings and all delay in requesting reexam is attributable to Kodak, thereby demonstrating that all of the equities are with Philips.

E. This Case is Distinguishable from Cases Relied on by Kodak

This case is distinguishable from the cases on which Kodak relies, especially since the USPTO has not even granted Kodak's reexam request.[10] Kodak has not cited a single case in which a court granted a motion to stay prior to the USPTO's decision that a reexamination should be conducted. This is not surprising, given the inequity and unnecessary delay such a decision would create if no reexam occurred. The cases can be distinguished on other grounds as well, including the stage of the litigation and whether the particular reexam would in fact have simplified the actual issues for trial.

Kodak primarily relies on *Gioello Enterprises Ltd. v. Mattel, Inc.*, No. C.A. 99-375 GMS, 2001 WL 125340 (D. Del. Jan 29, 2001), where the defendant requested reexam five months before trial and the USPTO granted the defendant's request four months before trial. Critically, the motion to stay in *Gioello* was decided after the reexam had been instituted. Here, the USPTO has 90 days to decide whether to grant Kodak's February 7, 2008, request for reexamination. Thus, the USPTO may not act on Kodak's request until the trial is over. *See* 35

[10] The reexamination statistics Kodak cites are incorrect. For example, Kodak states that the USPTO granted 97% of *ex parte* requests in 2007. (D.I. 169, Kodak Br. at 1, 4.) In fact, the USPTO granted 92% of requests for *ex parte* reexam in 2007. (Ex. I.)

U.S.C. § 303. Until then, the parties and the Court will not know whether the USPTO believes that Kodak has even raised "substantial new questions of patentability." *See id.*

Kodak also relies on *Gioello* to support its contention that a stay will simplify the issues for trial. In that case, a stay very well may have simplified the issues because there is no indication that the *Gioello* defendant engaged in the type of gamesmanship that Kodak is attempting here by making different arguments to the USPTO than to this Court. There is also no indication that the *Gioello* defendant did not submit its principal prior art to the USPTO.

Moreover, it could be that defendant's delay in requesting reexam in *Gioello* was justified. There is no indication when the *Gioello* defendant learned of the prior art or why it waited until five months before trial to request reexam. Here, Kodak knew about ten of its eleven references *years* before requesting reexam, and waited until five months after learning of the eleventh reference to request reexam. Kodak's delay certainly is not justified, especially since Kodak has not even attempted to explain it.

Kodak also relies on *Middleton, Inc. v. Minnesota Mining and Mfg. Co.*, No 4:03-CV-40493, 2004 WL 1968669 (S.D. Iowa Aug. 24, 2004), and *Emhart Industries, Inc. v. Sankyo Seiki Co., Ltd.*, No. 85-C-7565, 1987 U.S. Dist. LEXIS 15033 (N.D. Ill. Jan 30, 1987), to support its contention that courts have stayed cases at late stages in litigation. In *Middleton*, 3M moved to stay the case only after the USPTO granted its request for reexamination, almost three months before trial was scheduled to begin. *Id.* at *1. Until then, the lawsuit moved forward in accordance with its scheduling order, despite the court's knowledge of the pending reexam request. *Id.* at *1 n.2. Also, although the *Middleton* case had been pending for eight years, the validity of the patent had only been an issue for about a year. *Id.* at *4. Here, the validity of the '075 patent has been an issue for Kodak since at least March 2004, two years before the lawsuit

was filed. And in *Middleton*, the patentee failed to show that 3M had knowledge of the prior art and could have made the request for reexamination much earlier. *Id.* at *8. Here, Philips has easily made such a showing. *See* Timeline of Kodak's Knowledge of Prior Art, above.

In *Emhart*, the USPTO granted the defendant's request for reexam nearly two months before the motion to stay was granted. Further, there was no pretrial order in place, the court had not considered any trial schedule for the case, and no trial preparations had taken place. *Id.* at *1, *8. Here, the pretrial order will be filed with the Court on March 3, 2008, trial has been scheduled since January 24, 2007, and Philips is well advanced in its trial preparation. In *Emhart*, the allegedly invalidating prior art was discovered during discovery. *Id.* As shown in the Timeline of Kodak's Knowledge of Prior Art above, that is not the case here. Kodak knew about certain prior art at least as early as March 2004 and, with the exception of one reference, about the rest before discovery began. In *Emhart*, the court found that the delay in filing the reexam was the fault of the patentee in postponing needed discovery regarding the prior art. Id. at *3. Here, Kodak has not even attempted to explain its delay, much less attribute it to Philips. Finally, in *Emhart*, the defendant assured the court that it would not later contest the issues decided by the USPTO. *Id.* at 11. Kodak has proffered no assurances in this case and has held it main defense in reserve.

Kodak relies on *Sorenson v. Black and Decker Corp.*, No. 06-cv-1572, 2007 WL 2696590 (S.D. Cal. Sept. 10, 2007), and *Ingro v. Tyco Indus., Inc.*, 227 U.S.P.Q. 69, 71 (N.D. Ill. 1985), to support its contention that, because Philips allegedly delayed filing this lawsuit and its claim is restricted to past monetary damages, Philips somehow would not be prejudiced by Kodak's delay in requesting a stay. Kodak's argument overlooks the facts underlying those decisions to grant a stay, particularly that each case was still in the early stages of discovery.

In *Sorenson*, the court granted a stay primarily because it found that "this litigation has not proceeded so far that it would be unjust to stay the action" because discovery was nowhere near completion. 2007 WL 2696590, at *4. That is not the case here, where fact discovery closed over three months ago. The *Sorenson* court also concluded that the reexamination would simplify issues for trial. *Id.* at *6. As in *Gioello,* that may well have been true because there is no indication that the *Sorenson* defendant engaged in the type of shell game Kodak is engaging in by making different arguments to the USPTO than to this Court. There is also no indication that the *Sorenson* defendant did not submit what it contended was its most significant prior art to the USPTO.

The *Ingro* court also granted a stay primarily because the case was in the early stages of discovery—only a single interrogatory and three production requests had been served. 227 U.S.P.Q. at 70. Here, Philips and Kodak have engaged in extensive discovery over the past year and both fact and expert discovery are now closed.

In sum, none of the cases cited by Kodak is factually analogous to the present case where Kodak has known about the references for years, discovery has been closed for months, a pretrial order has been submitted, and invalidity is not likely to be resolved by the reexam decision because the USPTO will not have considered a principal reference Kodak plans to rely on at trial and because Kodak has made different arguments to the USPTO than it can make in this Court.

F. Early Resolution of the Case Is Unlikely If the Stay Is Granted

A stay would stand in the way of an early resolution of this dispute between the parties. Kodak has already received a claim construction unfavorable to its infringement and invalidity positions. Rather than resolve this litigation, Kodak filed a request for reexam and motion to stay in order to see whether and how the pending *LG* case will be resolved, since LG is operating without the encumbrance of this Court's claim construction. Only by forcing Kodak to confront

the reality of trial and ultimate resolution can the Court bring the parties to end this litigation. As one court observed in denying a motion for stay pending reexam, "[f]irm trial settings resolve cases and reduce litigation costs." *Soverain Software LLC,* 356 F. Supp. 2d at 663. Staying this case pending reexam will result in extending the litigation for years, not resolving it.

G. Kodak's Delay In Seeking Reexamination Is Inconsistent with Kodak's Position in Support of Its Laches Defense

As part of its laches defense, Kodak argues that it has been prejudiced by Philips' alleged delay in bringing this lawsuit, because "relevant documents . . . are now difficult to locate and many witnesses' memories have faded." (Ex. L, Kodak's Tr. Br. at 13.) Kodak's motion to stay these proceedings, most likely for two years, flies in the face of its own position. Years from now, when this case comes back for trial after reexam, witnesses' memories presumably would be even more "faded," causing the very evidentiary prejudice of which Kodak complains.

The timing of Kodak's request for reexamination has always been entirely within Kodak's control and was timed to achieve an unfair tactical advantage.[11] Had Kodak thought that it would benefit the parties and the Court to have the USPTO consider prior art issues, it could have filed a request for reexamination years ago, even before this lawsuit was filed. Instead, Kodak waited over four years—until it was only weeks away from going before a jury with an unfavorable claim construction and clear weaknesses in its expert's position on validity—to make its request. This unexplained delay demonstrates that Kodak's real desire is to shop for a different forum because an unfavorable court ruling and the unhelpful positions of its own expert now make this Court unattractive to Kodak.

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[11] For example, Kodak indicates that the reexam may have been filed now so that Philips could not amend the claims because the patent has expired. (D.I. 169, Kodak Br. at 3, 5.)

V. CONCLUSION

Staying this case would not serve judicial economy. Rather, staying this case now, on the eve of trial, after all discovery has closed and the pretrial order is submitted, would unduly prejudice Philips and present a clear tactical disadvantage to Philips. All delay in requesting reexam is attributable to Kodak and Kodak has alleged no hardship in proceeding to trial. Accordingly, Kodak's motion to stay should be denied, given that this motion is a transparent attempt to evade unfavorable rulings of this Court by shopping in different forums.

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Dated: February 26, 2008

EXHIBIT

A

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

U.S. PHILIPS CORPORATION, Plaintiff, v. EASTMAN KODAK COMPANY, Defendant.	Civil Action No. 06-251 (GMS)

FINAL JOINT CLAIM CHART

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Pursuant to Paragraph 4 of the Final Scheduling Order (D.I. 20), the parties jointly submit this Final Joint Claim Chart.

The parties have agreed on the following constructions:

U.S. Patent No. 4,901,075, claims 3 and 11

(1) "predetermined run length" in claim 11 means "a run length determined prior to coding."

(2) "pixel" in claim 3 means "a number representing an image at a single point."

(3) "quantization" in claim 3 means "a process that substitutes a single whole number for a range of signal values."

Term/Phrase	Philips' Proposed Construction	Kodak's Proposed Construction
"coefficient" [all claims]	"a multiplication factor that results from transform coding" '075 patent, col. 1:18-23, col. 1:24-30, col. 2:23-27. W. Chen & W. K. Pratt, "Scene Adaptive Coder," IEEE Transactions on Communications, Vol. Com. 32, No. 3, (March 1984), at 225-26 ("Chen & Pratt").	"a whole number" '075 patent, claims 3, 4, 7, 8, and 11. '075 patent, 2:30-35 and Figures 2-5.
"zero coefficient" [all claims]	"a coefficient whose value is zero or approximately zero" '075 patent, col. 2:30-33.	"a whole number whose value is zero" '075 patent, claims 3, 4, 7, 8, and 11. '075 patent, 1:24-30; 2:30-33.
"non-zero coefficient" [all claims]	"a coefficient whose possible magnitudes proceed through the natural numbers without the zero" '075 patent, col. 2:33-35, col. 2:55-56 Application No. 07/096,177, Amendment, June 12, 1989, at 5.	"a whole number whose value is not zero" '075 patent, claims 3, 4, 7, 8, and 11. '075 patent, 2:30-35.

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Term/Phrase	Philips' Proposed Construction	Kodak's Proposed Construction
"code word" [all claims]	"a sequence of bits assigned to represent a particular event or events in accordance with a predefined set of rules" '075 patent, col. 3:28-32, col. 3:38-44.	"a unique representation for an event in a single code table" '075 patent, claims 3, 4, 7, 8, and 11. '075 patent, 4:55-5:2; Figs. 3-5 '075 Prosecution History, June 1, 1989 Response at pg. 6 ("However, in accordance with the instant invention, there is assigned only one codeword to the entire event. This codeword depends on the number of zero coefficients (in this case six) and the value of the non-zero coefficient. Different codewords are assigned to events having the same number of zero coefficients but different values of the non-zero coefficient.")

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Term/Phrase	Philips' Proposed Construction	Kodak's Proposed Construction
"assigning a code word to represent said non-zero coefficient and said run length" [claim 3]	Plain meaning for terms not otherwise construed, i.e., "assigning a sequence of bits to represent the non-zero coefficient and the run length of the event in accordance with a predefined set of rules" '075 patent, col. 3:28-32, col. 3:38-44.	"selecting a unique entry in the single code table for the event. From this code word, the original run length of zero coefficients and the magnitude of the non-zero coefficient can be determined, without any additional information." '075 patent, claim 3. '075 patent, 4:55- 5:2; 5:32-66; Figs. 3-5. '075 Prosecution History, June 2, 1989 Response at pp. 5-6 ("As specifically described in the claims, for example claim 11, the method comprises the step of deriving from said signal a plurality of events each comprising not only a run of zero coefficients but a run of zero coefficients having a respective run length of which is preceded or followed by at least one non-zero coefficient. In other words, we define events, and an event is constituted for example, by a run of zero coefficients and the subsequent or preceding non-zero coefficient. Consider an event 000000C where each zero indicates a zero coefficient and the "C" indicates a non-zero coefficient.

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Term/Phrase	Philips' Proposed Construction	Kodak's Proposed Construction
		According to the teaching of Fukuoka there would be assigned a code word to the run of six zeros and a further codeword to the non-zero coefficient. However, in accordance with the instant invention, there is assigned only one codeword to the entire event. This code word depends on the number of zero coefficients (in this case six) and the value of the non-zero coefficient. Different codewords are assigned to events having the same number of zero coefficients but different values of the non-zero coefficient.")
"assigning a code word to represent said run length and said non-zero coefficient" [claim 8]	Plain meaning for terms not otherwise construed, i.e., "assigning a sequence of bits to represent the run length and the non-zero coefficient of the event in accordance with a predefined set of rules" '075 patent, col. 3:28-32, col. 3:38-44.	"selecting a unique entry in the single code table for the event. From this code word, the original run length of zero coefficients and the magnitude of the non-zero coefficient can be determined, without any additional information." '075 patent, claim 8. '075 patent, 4:55- 5:2; 5:32-66; Figs. 3-5 '075 Prosecution History, June 2, 1989 Response at pp. 5-6 ("As specifically described in the claims, for example claim

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Term/Phrase	Philips' Proposed Construction	Kodak's Proposed Construction
		11, the method comprises the step of deriving from said signal a plurality of events each comprising not only a run of zero coefficients but a run of zero coefficients having a respective run length of which is preceded or followed by at least one non-zero coefficient. In other words, we define events, and an event is constituted for example, by a run of zero coefficients and the subsequent or preceding non-zero coefficient. Consider an event 000000C where each zero indicates a zero coefficient and the "C" indicates a non-zero coefficient. According to the teaching of Fukuoka there would be assigned a code word to the run of six zeros and a further codeword to the non-zero coefficient. However, in accordance with the instant invention, there is assigned only one codeword to the entire event. This code word depends on the number of zero coefficients (in this case six) and the value of the non-zero coefficient. Different codewords are assigned to events having the same number of zero coefficients but different values of the non-zero coefficient.")

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Term/Phrase	Philips' Proposed Construction	Kodak's Proposed Construction
"Huffman code word" [all claims]	"a sequence of bits assigned to represent a particular event or events in accordance with a predefined set of rules with the following characteristics: a) the code words may be of different lengths; b) no code word is a prefix of another code word; and c) the predefined set of rules strives to minimize the average code word length by exploiting the distribution of event probabilities" '075 patent, col. 1:36-45.	"a variable-length code word that identifies each unique event, where the code word is shorter for more frequently occurring events and longer for less frequently occurring events, whereby no Huffman code word is the prefix of another Huffman code word." '075 patent, claims 3, 4, 7, 8, and 11. '075 patent, 1:36-45 and Figures 3-5.
"Huffman codeword is independent of the sign of that nonzero coefficient" [claim 7]	Plain meaning for terms not otherwise construed, i.e., "the sequence of bits assigned to represent a particular event or events is independent of the sign of the non-zero coefficient"	"the Huffman codeword is separate from the single bit that only provides whether the non-zero coefficient is positive or negative" '075 patent, claim 7. '075 patent, 4:55- 5:2; Figs. 3-5

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Term/Phrase	Philips' Proposed Construction	Kodak's Proposed Construction
"the sign is coded by a separate bit" [claim 7]	"the sign can be determined solely by examining a single bit" '075 patent, Figs. 3-5.	"a single bit that only provides whether the nonzero coefficient is positive or negative" '075 patent, claims 3, 4, 7, 8, and 11. '075 patent, 4:55- 5:2; Figs. 3-5.
"event" [all claims]	"an occurrence of a run of zero coefficients and the non-zero coefficient which immediately precedes or follows that run, some occurrences being more likely than others" '075 patent, col. 2:36-44, 3:36-38.	"a run of zero coefficients and the value of the non-zero coefficient which immediately precedes or follows that run" '075 patent, claims 3, 4, 7, 8, and 11. '075 patent, 2:36-42. '075 Prosecution History, Dec. 8, 1988 Response at pg. 8 ("Widergren, however, does not disclose the encoding of events comprising a run of zero value coefficients and the subsequent or preceding non-zero coefficient. Therefore, claims 4-17 are patentable under 35 U.S.C. 102(b) over Widergren.")

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Term/Phrase	Philips' Proposed Construction	Kodak's Proposed Construction
		'075 Prosecution History, June 2, 1989 Response at pp. 5-6 ("As specifically described in the claims, for example claim 11, the method comprises the step of deriving from said signal a plurality of events each comprising not only a run of zero coefficients but a run of zero coefficients having a respective run length of which is preceded or followed by at least one non-zero coefficient. In other words, we define events, and an event is constituted for example, by a run of zero coefficients and the subsequent or preceding non-zero coefficient. Consider an event 000000C where each zero indicates a zero coefficient and the "C" indicates a non-zero coefficient. According to the teaching of Fukuoka there would be assigned a code word to the run of six zeros and a further codeword to the non-zero coefficient. However, in accordance with the instant invention, there is assigned only one codeword to the entire event. This code word depends on the number of zero coefficients (in this case six) and the value of the non-zero coefficient. Different codewords are assigned to events having the

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Term/Phrase	Philips' Proposed Construction	Kodak's Proposed Construction
		same number of zero coefficients but different values of the non-zero coefficient.")

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Term/Phrase	Philips' Proposed Construction	Kodak's Proposed Construction
"run" [all claims]	"a sequence (possibly of length zero) of successive identical particular values" '075 patent, col. 2:39-41, 4:16-18, 4:20-23, Figs. 1, 3, and 4, items 2, 5, 11, 18, 19, 27, 32, 33, 42, and 60.	"a sequence of equal value coefficients" '075 patent, claims 3, 4, 7, 8, and 11. '075 patent, 1:66- 2:2; 2:36-39 and 4:55 – 5:2. '075 Prosecution History June 2, 1989 Response at p. 5 ("In each of these methods, a run is defined as a series of equal elements, for instance a run of "zero"elements may consist of one, two, or three, or even 100 zeros. Similarly run of "one"elements may consist of one or 2 or three, etc. ones."and "In the instant invention, the coefficients are not limited to either ones or zeros, i.e., they are not merely binary.")
"run length" [all claims]	"the number (which can be zero) of identical particular values in a run" '075 patent, col. 2:39-41, 4:16-18, 4:20-23, Figs. 1, 3, and 4, items 2, 5, 11, 18, 19, 27, 32, 33, 42, and 60.	"the number of equal value coefficients in a sequence" '075 patent, claims 3, 4, 7, 8, and 11. '075 patent, 2:47-57; 4:55 – 5:2 and Figures 1-5.

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Term/Phrase	Philips' Proposed Construction	Kodak's Proposed Construction
		'075 Prosecution History June 2, 1989 Response at p. 5 ("In each of these methods, a run is defined as a series of equal elements, for instance a run of "zero"elements may consist of one, two, or three, or even 100 zeros. Similarly run of "one"elements may consist of one or 2 or three, etc. ones."and "In the instant invention, the coefficients are not limited to either ones or zeros, i.e., they are not merely binary.")

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Term/Phrase	Philips' Proposed Construction	Kodak's Proposed Construction
"transform" [claim 3]	"a mathematical operation which yields an alternative representation of a sequence or array of values" Chen & Pratt, at 225.	"A mathematical operation that converts a signal" '075 patent, claim 3. '075 patent, 1:18-23.
"transforming" [claim 8]	"performing a mathematical operation which yields an alternative representation of a sequence or array of values" Chen & Pratt, at 225.	"performing a mathematical operation that converts a signal" '075 patent, claim 8. '075 patent, 1:18-23.
"a blockwise transform of pixels" [claim 3]	"a mathematical operation that yields an alternative representation of a 2-dimensional array of pixels" Chen & Pratt, at 225.	"a mathematical operation that converts a signal representing a block of pixels" '075 patent, claim 3. '075 patent, 1:18-23.

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Term/Phrase	Philips' Proposed Construction	Kodak's Proposed Construction
"a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization" [claim 3]	"a sequence of coefficients that results from a mathematical operation that yields an alternative representation of a 2-dimensional array of pixels in a rectangular portion of an image, and subsequent quantization" Chen & Pratt, at 225-26.	"a mathematical operation that converts video frames to a sequence of whole numbers following a blockwise transformation and quantization" '075 patent, claim 3. '075 patent, 1:18-26.
"signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal" [claim 3]	"signal comprising a sequence of coefficients that results from a mathematical operation that yields an alternative representation of a 2-dimensional array of pixels in a rectangular portion of an image" Chen & Pratt, at 225.	"a signal resulting from a mathematical operation that converts video frames to a sequence of whole numbers following a blockwise transformation and quantization" '075 patent, claim 3. '075 patent, 1:18-26.

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Term/Phrase	Philips' Proposed Construction	Kodak's Proposed Construction
"transforming said signal" [claim 8]	"performing a mathematical operation which yields an alternative representation of the sequence or array of values" Chen & Pratt, at 225.	"performing a mathematical operation that converts a video signal" '075 patent, claim 8. '075 patent, 1:11-30.
"transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients" [claim 8]	"performing a mathematical operation on a sequence or array of values that yields an alternative representation comprising zero coefficients occurring in runs and non-zero coefficients" Chen & Pratt, at 225.	"performing a mathematical operation that converts video signal frames into a sequence comprising zero coefficients occurring in runs and nonzero coefficients" '075 patent, claim 8. '075 patent, 1:11-30.

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Term/Phrase	Philips' Proposed Construction	Kodak's Proposed Construction
"signal" [all claims]	"a sequence or array of values that represents information" '075 patent, col. 8:8-10, col. 2:23-27.	"a sequence of values comprised of sequential and interdependent image frames that when rapidly displayed are capable of depicting movement" '075 patent, claims 3, 4, 7, 8, and 11. '075 patent, 1:11-35. Chen, Wen-Hsiung and Pratt, William K.; Scene Adaptive Coder IEEE Transactions on Communications, vol. Com-32, No. 3, March 1984, pages 225-232 (cited in the '075 patent, 1:11-16) at pg. 229: The scene adaptive coder described herein encodes cosine transform coefficients in a simple manner. The coding process involves only thresholding, normalization, roundoff, and rate buffer equalization. The performance of the coder is quite good in terms of mean square error and subjective evaluation. Because the coding process is dependent upon the instantaneous coefficient content inside the block and the accumulated rate buffer content, it is well suited for intraframe coding of moving images. At Compression Labs, Inc., the coder has been implemented with real-time hardware to code NTSC color video at a channel rate of 1.5 Mbits/s.

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Term/Phrase	Philips' Proposed Construction	Kodak's Proposed Construction
"video signal" [claim 3]	"a sequence or array of values that represents visual information (e.g., an image)" '075 patent, col. 2:23-25. Chen & Pratt, at 225, 229. U.S. Pat. No. 4,316,222 to Subramium, at col. 1:8-12.	"a sequence of values comprised of sequential and interdependent image frames that when rapidly displayed are capable of depicting movement" '075 patent, claim 3. '075 patent, 1:11-35. Chen, Wen-Hsiung and Pratt, William K.; Scene Adaptive Coder IEEE Transactions on Communications, vol. Com-32, No. 3, March 1984, pages 225-232 (cited in the '075 patent, 1:11-16) at pg. 229: The scene adaptive coder described herein encodes cosine transform coefficients in a simple manner. The coding process involves only thresholding, normalization, roundoff, and rate buffer equalization. The performance of the coder is quite good in terms of mean square error and subjective evaluation. Because the coding process is dependent upon the instantaneous coefficient content inside the block and the accumulated rate buffer content, it is well suited for intraframe coding of moving images. At Compression Labs, Inc., the coder has been implemented with real-time hardware to code NTSC color video at a channel rate of 1.5 Mbits/s.

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Term/Phrase	Philips' Proposed Construction	Kodak's Proposed Construction
"for transmission at a reduced bit rate" [claim 3]	"for transmission with fewer bits per pixel" '075 patent, col. 1:11-17, col. 1:60-65, col. 3:13-17. Chen & Pratt, at 225.	"for transmission with 12% fewer bits as compared to the Chen method" Otherwise, indefinite under 35 U.S.C. § 112. '075 patent, claim 3. '075 patent, 1:11-57; 3:13-17
"for transmission at a reduced bandwidth" [claim 8]	"for transmission with fewer bits per pixel" '075 patent, col. 1:11-17, col. 1:60-65, col. 3:13-17. Chen & Pratt, at 225.	"for transmission with 12% less bandwidth as compared to the Chen method" Otherwise, indefinite under 35 U.S.C. § 112. '075 patent, claim 8. '075 patent, 1:11-57; 3:13-17

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Term/Phrase	Philips' Proposed Construction	Kodak's Proposed Construction
"determining whether the run length of each event exceeds a predetermined run length" [claim 11]	Plain meaning for terms not otherwise construed, i.e., "determining whether the number (which can be zero) of identical particular values in the run occurring in each event exceeds a run length determined prior to coding"	"selecting an event and then determining whether the number of consecutive equal value coefficients exceeds the predetermined run length" '075 patent, claim 11. '075 patent, 3:53-61; 4:3-13 and 6:28-34
"splitting said respective event into a plurality of sections" [claim 11]	Plain meaning for terms not otherwise construed, i.e., "splitting the respective occurrence of a run of zero coefficients and the non-zero coefficient which immediately precedes or follows that run, some occurrences being more likely than others, into two or more sections"	"dividing a single event into two or more sub-events" '075 patent, claim 11. '075 patent, 3:53 -4:45.

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Term/Phrase	Philips' Proposed Construction	Kodak's Proposed Construction
"assigning a code word to each section" [claim 11]	Plain meaning for terms not otherwise construed, i.e., "assigning to each section a sequence of bits to represent a particular event or events in accordance with a predefined set of rules"	"selecting a unique entry in the single code table for each sub-event" '075 patent, claim 11. '075 patent, 4:55-65; 5:32-66; Figs. 3-5 '075 Prosecution History, June 2, 1989 Response at pp. 5-6 ("As specifically described in the claims, for example claim 11, the method comprises the step of deriving from said signal a plurality of events each comprising not only a run of zero coefficients but a run of zero coefficients having a respective run length of which is preceded or followed by at least one non-zero coefficient. In other words, we define events, and an event is constituted for example, by a run of zero coefficients and the subsequent or preceding non-zero coefficient. Consider an event 000000C where each zero indicates a zero coefficient and the "C" indicates a non-zero coefficient.

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Term/Phrase	Philips' Proposed Construction	Kodak's Proposed Construction
		According to the teaching of Fukuoka there would be assigned a code word to the run of six zeros and a further codeword to the non-zero coefficient. However, in accordance with the instant invention, there is assigned only one codeword to the entire event. This code word depends on the number of zero coefficients (in this case six) and the value of the non-zero coefficient. Different codewords are assigned to events having the same number of zero coefficients but different values of the non-zero coefficient.")
"coding" [all claims]	Plain meaning, i.e., "to put in encoded form"	"converting from one form to another based on a set of rules" '075 patent, claims 3, 4, 7, 8, and 11. '075 patent, 1:17-35.

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EXHIBIT

B

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

U.S. PHILIPS CORPORATION,

Plaintiff

v.

KONICA MINOLTA HOLDINGS, INC.
KONICA MINOLTA PHOTO IMAGING, INC.,
KONICA MINOLTA PHOTO IMAGING U.S.A., INC.,

LG ELECTRONICS, INC., and
LG ELECTRONICS MOBILECOMM U.S.A., INC.

Defendants.

Civil Action No. 06-CV-1402 (BSJ) (THK)

REFERRED TO MAGISTRATE JUDGE KATZ

PROPOSED CLAIM CONSTRUCTIONS

Term / Phrase	**Claim(s)**	**LGE's Proposed Construction**	**Philips' Proposed Constructions**
"signal"	3	"a sequence of values corresponding to sequential and interdependent moving images that when rapidly displayed are capable of depicting movement"	"a sequence or array of values that represents information"
"video signal"	8	"a sequence of values corresponding to sequential and interdependent moving images that when rapidly displayed are capable of depicting movement"	"a sequence or array of values that represents visual information (e.g., an image)"
"event"	3, 8	"a run of zero coefficients and the value of the non-zero coefficient which immediately precedes or follows that run"	"an occurrence of a run of zero coefficients and the non-zero coefficient which immediately precedes or follows that run, some occurrences being more likely than others"

Term / Phrase	Claim(s)	LGE's Proposed Construction	Philips' Proposed Constructions
"coding"	3, 8	"converting from one form to another based on a set of rules"	Plain meaning
"code word"	3, 8	"a unique representation in a single code table for an event"	"a sequence of bits assigned to represent a particular event or events in accordance with a predefined set of rules"
"assigning a code word to represent said non-zero coefficient and said run length"	3	"selecting a unique entry in the single code table that corresponds to the event"	Plain meaning
"assigning a code word to represent said run length and said non-zero coefficient"	8	"selecting a unique entry in the single code table that corresponds to the event"	Plain meaning
"for transmission at a reduced bit rate"	3	Indefinite under 35 U.S.C. § 112, ¶ 2, otherwise: "for transmission with 12% less bit rate compared to the Chen method"	"for transmission with fewer bits per pixel"
"for transmission at a reduced bandwidth"	8	Indefinite under 35 U.S.C. § 112, ¶ 2, otherwise: "for transmission with 12% less bandwidth compared to the Chen method"	"for transmission with fewer bits per pixel"
"coefficient"	3, 8	"a whole number"	"a multiplication factor that results from transform coding"
"zero coefficient"	3, 8	"a whole number whose value is zero"	"a coefficient whose value is zero or approximately zero"
"non-zero coefficient"	3, 8	"a whole number whose value is greater than zero"	"a coefficient whose possible magnitudes proceed through the natural numbers without the zero"
"Huffman code word"	4	"a variable-length code word that identifies each unique event, where the code word is shorter for more frequently occurring events and longer for less frequently occurring events, whereby no Huffman	"a sequence of bits assigned to represent a particular event or events in accordance with a predefined set of rules with the following characteristics: a) the code words may be of different lengths; b) no code

Term / Phrase	Claim(s)	LGE's Proposed Construction	Philips' Proposed Constructions
		code word is the prefix of another Huffman code word"	word is a prefix of another code word; and c) the predefined set of rules strives to minimize the average code word length by exploiting the distribution of event probabilities"
"Huffman codeword is independent of the sign of that non-zero coefficient"	7	"the Huffman codeword is separate from the single bit that only provides whether the non-zero coefficient is positive or negative"	Plain meaning
"the sign is coded by a separate bit"	7	"a single bit that only provides whether the non-zero coefficient is positive or negative"	"the sign can be determined solely by examining a single bit"
"run"	3, 8	"a sequence of equal value coefficients"	"a sequence (possibly of length zero) of successive identical particular values"
"run length"	3, 8	"the number of equal value coefficients in a sequence"	"the number (which can be zero) of identical particular values in a run"
"transform"	3	"a mathematical operation that converts a signal"	"a mathematical operation which yields an alternative representation of a sequence or array of values"
"transforming"	8	"performing a mathematical operation that converts a signal"	"performing a mathematical operation which yields an alternative representation of a sequence or array of values"
"transforming said signal"	8	"performing a mathematical operation that converts a video signal"	"performing a mathematical operation which yields an alternative representation of a sequence or array of values"
"transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients"	8	"performing a mathematical operation that converts a video signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients"	"performing a mathematical operation on a sequence or array of values that yields an alternative representation comprising zero coefficients occurring in runs and non-zero coefficients"
"a sequence of	3	"a mathematical operation	"a sequence of coefficients

Term / Phrase	Claim(s)	LGE's Proposed Construction	Philips' Proposed Constructions
coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization"		that converts video signals to a sequence of whole numbers following a blockwise transformation and quantization"	that result from a mathematical operation that yields an alternative representation of a 2-dimensional array of pixels in a rectangular portion of an image, and subsequent quantization"
"signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal"	3	"a sequence of coefficients resulting from a mathematical operation that converts video signals to a sequence of whole numbers following a blockwise transformation and quantization"	"signal comprising a sequence of coefficients that result from a mathematical operation that yields an alternative representation of a 2-dimensional array of pixels in a rectangular portion of an image"
"determining whether the run length of each event exceeds a predetermined run length"	11	"selecting an event and then determining whether the number of consecutive zero coefficients exceeds the predetermined run length"	Plain meaning
"splitting said respective event into a plurality of sections"	11	"dividing a single event into two or more sub-events"	Plain meaning
"assigning a code word to each section"	11	"selecting a unique entry in the single code table for each sub-event"	Plain meaning

The following table sets forth the terms and claim elements that the parties believe should be construed, and on which they have reached agreement on the proposed construction.

Term / Phrase	Claim(s)	Agreed Proposed Construction
"predetermined run length"	11	"a run length determined prior to coding"
"quantization"	3	"a process that substitutes a single whole number for a range of signal values"
"pixel"	3	"a number representing an image at a single point"

Exhibit 2

EXHIBIT

C

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

U.S. PHILIPS CORPORATION, Plaintiff, v. EASTMAN KODAK COMPANY, Defendant.	)	Civil Action No. 06-00251-GMS

DECLARATION OF PROFESSOR TOURADJ EBRAHIMI IN SUPPORT OF EASTMAN KODAK COMPANY'S OPENING CLAIM CONSTRUCTION BRIEF

I, Professor Touradj Ebrahimi, declare:

1. I submit this declaration in support of Eastman Kodak Company's Opening Claim Construction Brief.

I. BACKGROUND

2. I am a Professor of Image Processing at the Swiss Federal Institute of Technology (EPFL), in Lausanne, Switzerland, involved in teaching and research in the field of Multimedia Signal Processing. Before joining EPFL as a faculty member in 1994, I was with AT&T Bell Laboratories Research Center in Holmdel, NJ, USA, where I worked on video compression techniques for communication. Prior to that, I was with Sony Corporation in Tokyo, Japan, working at its Corporate Research Center in the area of image and video compression for storage applications. I hold a Masters of Science Degree from EPFL in Electrical Engineering with specialization in Image Processing, and a PhD from the same University on Video Compression.

3. During my career I have been closely involved in various projects on image and video compression among which many in relationship with standardization. I am the Head of the Swiss Delegation to JPEG, MPEG and SC29 which is the body overseeing the work of these two standards. I have been and continue to be the chair of various technical subgroups within the JPEG and MPEG standardization committees, among which include chairman of requirements in

JPEG, editor of the secure JPEG 2000 standard, and editor of the MPEG-4 video standard. I also chaired the joint Ad Hoc Group between ISO/IEC and ITU-T experts in charge of examining proposals for inclusion of new amendments to the JPEG image compression standard.

4. I have received several awards and distinctions in the area of image and video compression standardization. Examples include four ISO certificates for outstanding contributions to JPEG 2000, Secure JPEG 2000, JPEG 2000 reference software, and the MPEG-4 video standard. I have received the first prize for best publication of the IEEE Transactions on Consumer Electronics in 2000 for a paper describing the JPEG 2000 standard.

5. I have authored or co-authored more than 150 publications (books, book chapters, journal papers, conference proceedings), and hold several patents.

6. I regularly teach courses at graduate levels in European Universities (Switzerland, France, and Italy) on image and video compression which include detailed description of JPEG compression standard.

7. Additional information about my experience with data compression techniques is set forth in my curriculum vitae, which is attached as Appendix A to this Declaration.

8. I have been asked by Eastman Kodak Company to read the '075 patent, the prosecution history and the cited prior art, and to utilize my years of experience and to provide my opinions as to what a person of ordinary skill in the art would have understood certain claim limitations to mean in the claims of U.S. Patent No. 4,901,075 (the '075 Patent). Those limitations are: "video signal," "signal," "for transmission at a reduced bit rate," "for transmission at a reduced bandwidth" and "Huffman codeword."

9. The opinions expressed in this Declaration are based on my review of the '075 patent, the prosecution history of the '075 Patent, certain prior art cited during prosecution of the '075 patent, and my experience in the data compression field, including my understanding of what one of ordinary skill in the art of the claimed invention would have known in the 1986 through 1987 timeframe, as this period includes the filing dates of the patent applications upon which the '075 patent claims priority.

10. All of the facts set forth herein are known to me personally, and if called as a witness, I could and would testify competently thereto. I reserve the right to supplement this Declaration based upon any additional information that comes to my attention during this litigation.

II. OPINIONS

A. Level of skill in the art

11. After reading the '075 patent and its prosecution history, it is my opinion that a person of ordinary skill in the art in the 1986-1987 time frame would have been an engineer having a masters degree in electrical engineering plus at least two years of experience in the field of digital signal compression.

B. "Signal" and "Video Signal"

12. After reading the '075 patent and its prosecution history, it is my opinion that a person of ordinary skill in the art would have understood at the relevant time that the claims of the '075 patent are directed solely to the encoding of video signals; that is, encoding of a sequence of values corresponding to sequential and interdependent moving images that when rapidly displayed are capable of depicting movement. There is nothing in the '075 patent that discloses encoding of anything other than video signals. In light of the patent and its intrinsic evidence, a person of ordinary skill would accordingly understand that " video signal" (claim 3) and "signal" (claim 8) in the context of the '075 patent refer to signals representing video and not still images.

13. My analysis of the claims starts with the specification of the patent. The patent begins, in the Background of the Invention, with a discussion of an article entitled "Scene Adaptive Encoder" by Wen-Hsiung Chen and William K. Pratt (the Chen Article). This section first introduces " video" and " video signal," by reference to the signal discussed in the Chen Article. The patent clarifies the scope of these elements, stating that the Chen Article " describes a coding process of video signals for the purpose of transmitting video pictures of satisfactory quality at a minimum possible bit rate. " ('075 Patent, col. 1, ll. 11-17.)

14. The patent describes that it improves on the coding method described in the Chen Article by taking advantage of the observation when coding video signals, the probability of a zero run and a non-zero coefficient amplitude together is smaller than the product of probability of zero runs multiplied by the probability of non-zero amplitudes. ('075 Patent, col. 2, l. 43-col. 3, l. 25.) This observation simply means that there exists a statistical dependency between the run of zero coefficients and the amplitude of the non-zero coefficient that follows such a run.

15. It was well known before 1986 that in situations when there are statistical dependencies between two messages, Huffman coding of a message defined as the combination of two

statistically dependent messages produces higher compression efficiency when compared to independent Huffman coding of each message separately, as taught in the Chen Article.

16. The remainder of the patent and prosecution history reinforces the understanding that the purported improvements of the '075 patent are improvements to the video signal coding method described in the Chen Article. Further, there is no discussion in '075 Patent related to encoding any type of signal other than a video signal.

17. Because the '075 patent compares its coding method as an improvement to that disclosed in the Chen Article, a person of skill in the art would look to that article to determine its scope. This is reflected in both the Abstract and the Summary of the Chen 1984 article. The Abstract states:

> Excellent results are demonstrated for coding of color images at 0.4 bits/pixel corresponding to **real-time color television transmission** over a 1.5 Mbit/s channel.

(Chen Article, p. 225 (emphasis added).) The Summary concludes with a very specific description of the video signal being coded as "moving images" and specifically names the industry standard NTSC for the real-time video television signal being coded:

> The performance of the coder is quite good in terms of mean square error and subjective evaluation. Because the coding process is dependent upon the instantaneous coefficient content inside the block and the accumulated rate buffer content, it is well suited for **intraframe coding of moving images**. At Compression Labs, Inc., the coder has been implemented with **real-time hardware to code NTSC color video** at a channel rate of 1.5 Mbits/s.

(Chen Article, p. 229 (emphasis added).) Thus, it would be clear to a person of ordinary skill in the art that the Chen Article is directed solely to encoding of video signals, specifically the encoding of real-time color television video signals.

18. Finally, there is a significant technical reason that a person of ordinary skill would believe the '075 Patent is limited to coding of video signals. The patent expressly states that "coefficients having values of more than 136 do not occur." ('075 Patent, col. 4, ll. 49-54.) To a person of ordinary skill in the art, this statement makes it very clear that the patent is limited to coding video signals. Using 136 values is reasonable for video signals. But only 136 coefficient values is inappropriate for still image compression. For example, the JPEG standard which Philips is accusing of infringement in this case allows for coefficient values greater than one

thousand. A person of ordinary skill would not expect to be limited to only 136 values for encoding still images.

19. In order to understand why 136 values is appropriate for video and not for still images, it is helpful to understand how video encoding operated at the relevant timeframe (this video encoding process continues to operate similarly even today, but a person of ordinary skill would look to the process and the hardware that was in place at the time the patent was filed to understand the scope of the claim terms). There are two aspects of video encoding from that timeframe that make 136 values appropriate: first, video had a much lower resolution and quality than still images, and second, encoding of video typically was just of the difference between the frames, not of each frame.

20. On the first point, it is important to understand that video is comprised of multiple frames. These frames are displayed rapidly in sequence, typically at 30 frames per second (for example, for television). The human eye perceives this rapid sequence of frames as continuous motion. Because of the number of frames required for video, and further because in the 1986 timeframe it was a significant technical challenge to transmit video over then existing communications systems, the resolution and quality of the video frames used necessarily had to be relatively low. It was necessary to have this lower quality simply because the processing hardware of that timeframe did not have the speed to process higher quality video, and because the communications lines (e.g., telephones lines) could not support the capacity needed for higher quality video. The key point to understand, is that lower quality equates to a smaller range of numbers needed for coding of video. The reason is that as part of the process of converting these video frames to digital data (1' s and 0' s), the processing (e.g., the Discrete Cosine Transform and Quantization discussed in the '075 patent) lowers quality so that smaller whole numbers result that can be more easily compressed / coded for transmission (e.g., by the runlength / Huffman coding method discussed in the background of the '075 patent). Thus a maximum of 136 values would have been understood by one of ordinary skill in the art to be entirely appropriate for video signal processing in that timeframe.

21. On the second point, coding of video signals typically processes only the differences between successive frames. To do this, the video coding system would take the difference between one frame and the next (for example, when transmitting TV at 30 frames per second), and encode only the differences during the timeframe of 1/30th of a second that occurred between the two frames. For example, a frame displaying a person talking might look very

similar from one frame to the next over this short interval. The background may not have changed at all, and the face might have only changed a small amount to the extent the lips of the person talking changed in that 1/30th of a second. Only these differences would be encoded, and to the extent there were small changes from one video frame to the next, many would be zero or whole numbers close to zero. Accordingly, only a small range of values was necessary to encode video signals. This further supports that the understanding of a person of skill in the art at that time that a system limited to 136 coefficient values would have been appropriate for coding video signals.

22. By contrast, still image processing did not require the same real-time encoding limitations required for video signals. This allowed for processing and compression of higher resolution / quality still images. As a result of starting with higher quality still images, and the lack of a need to transmit these still images over limited communications lines of that time, after the conversion of these still images to digital data (as above), the person of ordinary skill would have not expected a range of values that would be limited to the 136 values imposed by the '075 patent.

23. Thus, when the person of ordinary skill reads in the 075 patent that " coefficients having values of more than 136 do not occur," that person would conclude that the claimed coding method was directed only to coding video signals and that is was not appropriate for a useful coding of still images.

24. The '075 patent repeatedly uses the term "video signal" and "signal" for the alleged invention interchangeably with the video signal described in the Chen Article. Nowhere does the '075 patent define "signal" or " video signal" differently.

25. In summary, a person of ordinary skill in the art, when reading the claims in light of the patent specification and intrinsic evidence, would have understood at the relevant time that the "video signal" of claim 3 and the "signal" of claim 8 must refer to the same type of video signal as disclosed in the Chen Article.

C. " For Transmission at a Reduced Bit Rate" (claim 3)
" For Transmission at a Reduced Bandwidth" (claim 8)

26. The preambles of claim 3 and claim 8 include claim elements that are ambiguous and would not have been understood by those skilled in the art because there are no disclosures within the '075 patent or its prosecution history to determine what is meant by the phrases

"reduced bit rate" and " reduced bandwidth." Alternately, these phrases might be construed relative to the encoding method of the Chen 1984 article against which the claimed encoding method purportedly provides a 12% reduction.

1. Both Claim Phrases Should be Found Indefinite

27. Neither the patent nor the file history provide the person of ordinary skill in the art with information sufficient to determine whether the claimed coding method provides for transmission at a reduced " bit rate" or " bandwidth."

28. "Reduced" is a relative term: this reduction must be in comparison to a reference value. "Transmission" and "bit rate," in the context of the '075 patent's video signal, refer to the transfer speed of data per unit of time, that is, how fast the bits of encoded video data are transferred in a given time interval. An analogy might be that a small pipe lets a given amount of water flow (transmits water) per unit second and a pipe that is twice as large lets twice as much water flow over the same time period. Applying this to transmission of information, in 1986, a 1200 bps modem could transfer data at 1200 bits per second over a telephone line. By contrast, in 1986, a 2400 bps modem could transfer twice as many bits per second, over the same telephone line.

29. In order to determine what " for transmission at a reduced bit rate" means in the context of the '075 patent, the person of ordinary skill in the art must be able to perform a comparison between the transmitted bit rate of the alleged invention and the transmitted bit rate of the system that is accused of infringement. But if the person of ordinary skill does not know the transmission channels that are used by both methods, a reduced bit rate (i.e., a slower speed) can be shown simply by using a slower type of transmission channel (or hardware). For example, the '075 patent claims to improve the bit rate over the Chen method by 12%. If a video signal encoded by the Chen method is transmitted using a 2400 bps modem and the same video signal is encoded using the '075 patent method and transmitted using the 1200 bps modem, the '075 patent method will transmit the video signal at a reduced bit rate, regardless of the reduction attributable to the claimed coding method. In other words, the signal transferred over the 1200 bps modem will be " transmitted at a reduced bit rate." But, the claimed invention should not be covering admitted prior art. The scope of the claim should cover coding methods that " improve" over Chen, and without additional detail, not disclosed in the patent, this comparison cannot be made.

30. A person of ordinary skill would know that determining " transmission at a reduced bit rate" requires knowing information that is not disclosed anywhere in the patent. For example, in order to determine the bit rate being compared against, it requires knowing the transmission rate of the equipment, the transmission rate of the medium (wires, atmosphere, telephone lines, etc.) and how the signals are packaged (modulated) for transmission. In other words, to determine if an accused device is transmitting at a reduced bit rate, the accused device must be compared to a transmission bit rate recited in the claim. There must be a "reference" to compare against, in order to determine if the transfer rate of the claimed coding method is reduced.

31. Because there is no disclosure of a reference coding bit rate, and further because there is no disclosure of the transmitted bit rate produced by the claimed method, it would not have been possible for a person of ordinary skill to determine if the claimed coding method produced a transmission that offered " a reduced bit rate."

32. There is a similar lack of disclosure problem for "bandwidth" as there is for "bit rate." "Bandwidth" is the actual space in a frequency spectrum through which data is sent. The frequency spectrum used for all communications are partitioned into smaller portions which are assigned to each different type of communication (e.g. radio, TV, etc). Within each portion, for example in the TV portion, there are further divisions into smaller adjacent frequency ranges, each range corresponding to a channel on a TV. The width of the frequency used to transmit one TV channel (i.e., one video signal) corresponds to that channel' s bandwidth.

33. For another example, AM radio has stations, each of which has a bandwidth. When you tune the radio to a particular radio station on the AM dial, you do this by selecting a number on the AM dial that corresponds to the middle of the segment (bandwidth) of the frequency range that AM station is transmitted on. That is, there is a portion of frequencies above and below that center point over which the signal is transmitted. The length (width) of this segment is the bandwidth used by that radio station.

34. In order to determine whether an accused system meets the limitation " for transmission at a reduced bandwidth," the person of ordinary skill in the art must know what size bandwidth qualifies as a " reduced bandwidth." Is a bandwidth reduced by a certain percentage ? Is a bandwidth reduced by a certain amount of frequency? The '075 patent is silent on this.

35. Because there is no disclosure of any bandwidths in the patent, there is no way to determine when a sufficient reduction in bandwidth is achieved. In fact, there is not even a

disclosure of the bandwidth used by the claimed coding method. Nor would a person of ordinary skill in the art be able to determine the bandwidth used or the amount reduced after performing the claimed coding method of the '075 patent.

36. Moreover, the term " bandwidth" is never used in the patent, other than in claim 8. Accordingly there is no disclosure in the '075 patent sufficient to inform a person of ordinary skill how to effect a reduction in bandwidth using the claimed encoding method.

2. To the Extent These Claim Elements Are Not Indefinite, They Should Be Construed as a 12% Reduction as Compared to the Chen Method

37. To find meaning for transmission at a " reduced bit rate" and " reduced bandwidth," a person of ordinary skill in the art might go to the only basis for comparison or reference in the patent. That sole comparison is against the Chen Article. A person of ordinary skill in the art might interpret transmission at a reduced bit rate as a reduction of 12% compared to the bit rate used by Chen to transmit video signals. Similarly, a person of ordinary skill in the art might interpret transmission at a reduced bandwidth as utilizing a bandwidth that is 12% smaller than the bandwidth used by Chen to transmit video signals in the Chen Article.

D. "Huffman Codeword"

38. Huffman coding is a type of coding named after David Huffman, the author of a paper in which a type of variable length coding was first described. In 1952, Huffman proposed a method to build minimum redundancy codes which produce optimal results in terms of compression if messages to which bits are to be assigned are independent, if each message is assigned to an integer number of bits, and if their frequency (probability) of occurrence is known. Since then, Huffman codewords have been widely used in data compression.

39. "Huffman codeword" is a term that had an ordinary and customary meaning to one of ordinary skill in the art. At the time the '075 Patent was filed, one of ordinary skill in the art would understand that "Huffman coding" meant "a variable-length code word that identifies each unique event, where the code word is shorter for more frequently occurring events and longer for less frequently occurring events, whereby no Huffman code word is the prefix of another Huffman code word."

I declare under penalty of perjury under the laws of the Unites States of America and the State of Delaware that the foregoing is true and correct.

Date: Oct 8th, 2007

Prof. Touradj Ebrahimi

EXHIBIT

D

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

U.S. PHILIPS CORPORATION, Plaintiff v. KONICA MINOLTA HOLDINGS, INC. KONICA MINOLTA PHOTO IMAGING, INC., KONICA MINOLTA PHOTO IMAGING U.S.A., INC., LG ELECTRONICS, INC., and LG ELECTRONICS MOBILECOMM U.S.A., INC. Defendants.	Civil Action No. 06-CV-1402 (BSJ) (THK) REFERRED TO MAGISTRATE JUDGE KATZ

DECLARATION OF DR. JAMES A. STORER IN SUPPORT OF LG ELECTRONICS, INC.'S AND LG ELECTRONICS MOBILECOMM U.S.A., INC.'S OPENING CLAIM CONSTRUCTION BRIEF

I, Dr. James A. Storer, declare:

1. I submit this declaration in support of LG Electronics, Inc.'s and LG Electronics MobileComm U.S.A., Inc.'s Opening Claim Construction Brief.

2. I am a tenured professor of Computer Science in the Computer Science Department at Brandeis University in Waltham, Massachusetts, where I have taught for 25 years. I served as Chairman of the Computer Science Department at Brandeis University from 1994 to 2003.

3. I received my undergraduate degree in mathematics and computer science in 1975 from Cornell University. I received my Ph.D. from the Department of Computer Science and Electrical Engineering at Princeton University in 1979. The topic of my Ph.D. thesis was data

compression. It was entitled "Data Compression: Methods and Complexity Issues." Upon receiving my Ph.D. in 1979, I worked at Bell Labs in Murray Hill, New Jersey, where I conducted data compression research.

4. My expertise and the courses that I teach lie in the area of data compression (including data, text, still images and video), and related compression areas, and I have published extensively in these areas for more than 30 years.

5. I founded the annual IEEE Data Compression Conference in 1991, where I have been the conference chair for the past 17 years. This is one of the leading international conferences for data compression, and is one of the only conferences dedicated solely to data compression, including still image and video compression. Throughout this period, I have been responsible for overseeing the paper review process, as well as editing the annual proceedings.

6. I have authored, co-authored, or edited a number of books and textbooks in the field of data compression, including: (1) "Hyperspectral Image Compression," (2) "An Introduction to Data Structures and Algorithms," (3) "Data Compression: Methods and Theory," (4) "Image and Text Compression," and (5) "Proceedings of Compression and Complexity." I have also authored or co-authored more than 125 papers and technical reports in the field of data compression including still image and video compression and transmission.

7. I am a named inventor on four patents on data compression.

8. I am a member of the Association for Computer Machinery (ACM) and IEEE Computer Society, which are the main professional and scientific organizations for computer scientists.

9. In addition to chairing the IEEE Data Compression Conference, I have served as a reviewer for over 25 different academic journals, numerous conferences and technical meetings, the majority of which have related to data compression.

10. I have also served as a guest editor for the following journals: The Proceedings of the IEEE, The Journal of Visual Communication and Image Representation, and Information Processing Management.

11. I have served as a program committee member for the following conferences: The IEEE International Symposium on Information Theory, The Conference on Combinatorial Pattern Matching, The Conference for Information Theory and Statistical Learning, The Conference on Information and Knowledge Management, The International Conference on String Processing, Information Retrieval, and Sequences.

12. I have regularly attended the relevant conferences in the field of data compression for over 30 years, which cover the topics of still image and video compression and transmission. Examples of these conference can be found in the attached curriculum vitae.

13. Additional information about my experience with data compression techniques is set forth in my curriculum vitae, which is attached as Appendix A to this Declaration.

I. SCOPE OF THE WORK

14. I have been asked by Defendants to read the '075 patent, the prosecution history and the cited prior art, and to utilize my years of experience and to provide my opinions as to what a person of ordinary skill in the art would have understood certain claim elements to mean in the claims of U.S. Patent No. 4,901,075 ("the '075 Patent"). Those elements are: "video signal," "signal," "for transmission at a reduced bit rate" and "for transmission at a reduced bandwidth."

15. The opinions expressed in this Declaration are based on my review of the '075 patent, the prosecution history of the '075 Patent, certain prior art cited during prosecution of the '075 patent, and my experience in the data compression field, including my understanding of what one of ordinary skill in the art of the claimed invention would have known in the 1986 through 1987 timeframe, as this period includes the filing dates of the patent applications upon which the '075 patent claims priority.

16. All of the facts set forth herein are known to me personally, and if called as a witness, I could and would testify competently thereto. I reserve the right to supplement this Declaration based upon any additional information that comes to my attention during this litigation.

II. CLAIM ELEMENTS

A. "Video Signal" and "Signal"

17. After reading the '075 patent and its prosecution history, it is my opinion that a person of ordinary skill in the art would have understood at the relevant time that the claims of the '075 patent are directed solely to the encoding of video signals; that is, encoding of a sequence of values corresponding to sequential and interdependent moving images that when rapidly displayed are capable of depicting movement. There is nothing in the '075 patent that discloses encoding of anything other than video signals. In light of the patent and its intrinsic evidence, a person of ordinary skill would accordingly understand that "video signal" (claim 3) and "signal" (claim 8) in the context of the '075 patent refer to signals representing video and not still images.

18. My analysis of the claims starts with the specification of the patent. The patent begins, in the Background of the Invention, with a discussion of the Chen 1984 article.[1] This section first introduces "video" and "video signal," by reference to the signal discussed in the Chen 1984 article. The patent clarifies the scope of these elements, stating that the Chen 1984 article "describes a coding process of **video signals for the purpose of transmitting video pictures** of satisfactory quality at a minimum possible bit rate. " (Ex. A, '075 patent at 1:15-17) (emphasis added.)

19. The Background of the Invention sets the stage for how a person of ordinary skill in the art would have understood the meaning of "coding" when reading the '075 patent. The remainder of the patent and intrinsic evidence reinforces that understanding, and clarifies that the purported improvements of the '075 patent are over the coding method disclosed in the Chen 1984 article. Specifically, those improvements are to methods for encoding real-time video signals. Moreover, no where in the '075 patent is there a disclosure of encoding any other type of a signal other than a video signal.

20. Because the '075 patent compares its coding method as an improvement to that disclosed in the Chen 1984 article, a person of skill in the art would look to that article to determine its scope. It would be clear to such a person that the Chen 1984 article is directed solely to encoding of real-time video, specifically the encoding of real-time color television video signals. This is reflected in both the Abstract and the Summary of the Chen 1984 article. The Abstract states:

> Excellent results are demonstrated for coding of color images at 0.4 bits/pixel corresponding to **real-time color television transmission** over a 1.5 Mbit/s channel.

[1] Chen, Wen-Hsiung and William K. Pratt, *Scene Adaptive Encoder*, IEEE Trans. On Comm'ns, Vol. COM-32, No. 3, pp. 225-33 (Mar. 1984) (*See* Declaration of Peter J. Kirk, Ex. B.)

(Ex. B, Chen 1984 article at 225) (emphasis added.) The Summary concludes with a very specific description of the video signal being coded as "moving images" and specifically names the industry standard NTSC for the real-time video television signal being coded:

> The performance of the coder is quite good in terms of mean square error and subjective evaluation. Because the coding process is dependent upon the instantaneous coefficient content inside the block and the accumulated rate buffer content, it is well suited for **intraframe coding of moving images**. At Compression Labs, Inc., the coder has been implemented with **real-time hardware to code NTSC color video** at a channel rate of 1.5 Mbits/s.

(*Id.* at 229) (emphasis added.)

21. The patent then supports this understanding to the person of ordinary skill in the art that its improvement is to the Chen article's real-time coding of video. The Detailed Description Of The Invention refers to "video signal," stating that Fig. 1 shows the frequency distribution of values for a transformed "video signal." (Ex. A, '075 patent at 2:49-51.) The patent then compares its improvement to the coding of this "video signal" in Fig. 1 to the "coding method described in the opening paragraph" of the patent:

> An additional bit rate reduction of 12% is obtained when coding video signals in accordance with the above-mentioned two dimensional coding table [Fig. 1] as compared with the coding method described in the opening paragraph [Chen 1984 article].

(*Id.* at 3:13-17.) This cited "opening paragraph" does not disclose a coding method at all—rather, it is two sentences that disclose the general *field* of the '075 patent, which is bit rate reduction:

> The invention relates to a method of and a circuit arrangement **for bit rate reduction**. Bit rate reduction is carried out when coding a signal, which comprises a series of digital signal values and has a signal value A, occurring most frequently in runs.

(*Id.* at 1:6-10) (emphasis added.) Moreover, the opening paragraph generally describes "the invention." It would make no sense to compare the 12% reduction of the invention *with the invention itself* in this opening paragraph. Thus one of ordinary skill in the art would assume that the coding of video signals that the claimed invention is being compared against is actually the coding method disclosed in the second paragraph, which describes the coding of video in the Chen 1984 article.

22. The Summary of the Invention similarly states that the coding of the claimed invention is for a "signal" of the kind referenced in the opening paragraph:

> It is an object of the invention to provide a coding method for a signal of the kind mentioned in the opening paragraph....

(*Id.* at 1:60-62.) Because the "opening paragraph" generically mentions "a signal" but never describes what kind of a signal, a person of ordinary skill in the art would assume this reference to the opening paragraph also meant the second paragraph and must refer to the video signal described in to the Chen 1984 article.

23. Finally, there is a significant technical reason that a person of ordinary skill would believe the '075 patent is restricted to coding of video. The patent expressly states that "coefficients having values of more than 136 do not occur." (Ex. A, '075 patent at 4:49-54.) To a person of ordinary skill in the art, this statement is very significant. Using 136 values is reasonable for video signals. However, 136 values is inappropriate for still image compression. For example, the JPEG standard which Philips is accusing of infringement in this case allows values of more than **one thousand**. A person of ordinary skill would not expect to be limited to only 136 values to accurately encode still images.

24. In order to understand why 136 values is appropriate for video and not for still images, it is helpful to understand how video encoding operated at the relevant timeframe (this

video encoding process continues to operate similarly even today, but a person of ordinary skill would look to the process and the hardware that was in place at the time the patent was filed to understand the scope of the claim terms). There are two aspects of video encoding from that timeframe that make 136 values appropriate: first, video had a much lower resolution and quality than still images, and second, encoding of video typically was just of the difference between the frames, not of each frame.

25. On the first point, it is important to understand that video is comprised of multiple frames. These frames are displayed rapidly in sequence, typically at 30 frames per second (for example, for television). The human eye perceives this rapid sequence of frames as continuous motion. Because of the number of frames required for video, and further because in the 1986 timeframe it was a significant technical challenge to transmit video over then existing communications systems, the resolution and quality of the video frames used necessarily had to be relatively low. It was necessary to have this lower quality simply because the processing hardware of that timeframe did not have the speed to process higher quality video, and because the communications lines (e.g., telephones lines) could not support the capacity needed for higher quality video. The key point to understand, is that lower quality equates to a smaller range of numbers needed for coding of video. The reason is that as part of the process of converting these video frames to digital data (1's and 0's), the processing (e.g., the Discrete Cosine Transform and Quantization discussed in the '075 patent) lowers quality so that smaller whole numbers result that can be more easily compressed / coded for transmission (e.g., by the runlength / Huffman coding method discussed in the background of the '075 patent). Thus a maximum of 136 values would have been understood by one of ordinary skill in the art to be entirely appropriate for video signal processing in that timeframe.

26. On the second point, coding of video signals typically processes only the differences between successive frames. To do this, the video coding system would take the difference between one frame and the next (for example, when transmitting TV at 30 frames per second), and encode only the differences during the timeframe of $1/30^{th}$ of a second that occurred between the two frames. For example, a frame displaying a person talking might look very similar from one frame to the next over this short interval. The background may not have changed at all, and the face might have only changed a small amount to the extent the lips of the person talking changed in that $1/30^{th}$ of a second. Only these differences would be encoded, and to the extent there were small changes from one video frame to the next, many would be zero or whole numbers close to zero. Accordingly, only a small range of values was necessary to encode video signals. This further supports that the understanding of a person of skill in the art at that time that a system limited to values of at most 136 would have been appropriate for video coding.

27. By contrast, still image processing did not require the same real-time encoding limitations required for video signals. This allowed higher resolution / quality still images. As a result of starting with higher quality still images, and the lack of a need to transmit these still images over limited communications lines of that time, after the conversion of these still images to digital data (as above), the person of ordinary skill would not have expected a range of values that would be limited to the 136 values imposed by the '075 patent.

28. Thus, when the person of ordinary skill reads in the '075 patent that "coefficients having values of more than 136 do not occur," that person would conclude that the claimed coding method was directed only to video images and not still images.

29. The '075 patent repeatedly uses the term "video signal" for the alleged invention interchangeably with the "video signal" described in the Chen 1984 article. Nowhere does the '075 patent define "video signal" differently.

30. In summary, a person of ordinary skill in the art, when reading the claims in light of the patent specification and intrinsic evidence, would have understood at the relevant time that the "video signal" of claim 3 and the "signal" of claim 8 must refer to the same type of video signal as disclosed in the Chen 1984 article.

B. "For Transmission at a Reduced Bit Rate" (claim 3)

"For Transmission at a Reduced Bandwidth" (claim 8)

31. The preambles of claim 3 and claim 8 include claim elements that are ambiguous and would not have been understood by those skilled in the art because there are no disclosures within the '075 patent or its prosecution history to determine what is meant by the phrases "reduced bit rate" and "reduced bandwidth." Alternately, these phrases might be construed relative to the encoding method of the Chen 1984 article against which the claimed encoding method purportedly provides a 12% reduction.

1. Both Claim Phrases Should be Found Indefinite

32. Neither the patent nor the intrinsic evidence provide the person of ordinary skill in the art with information sufficient to determine whether the claimed coding method provides for transmission at a reduced "bit rate" or "bandwidth."

33. "Reduced" is a relative term: this reduction must be in comparison to a reference value. "Transmission" and "bit rate," in the context of the '075 patent's video signal, refer to the transfer speed of data per unit of time, that is, how fast the bits of encoded video data are

transferred in a given time interval. An analogy might be that a small pipe lets a given amount of water flow (transmits water) per unit second and a pipe that is twice as large lets twice as much water flow over the same time period. Applying this to transmission of information, in 1986, a 1200 bps modem could transfer data at 1200 bits per second over a telephone line. By contrast, in 1986, a 2400 bps modem could transfer twice as many bits per second, over the same telephone line.

34. In order to determine what "for transmission at a reduced bit rate" means in the context of the '075 patent, the person of ordinary skill in the art must be able to perform a comparison between the **transmitted bit rate** of the alleged invention and the **transmitted bit rate** of the system that is accused of infringement. But if the person of ordinary skill does not know the transmission channels that are used by both methods, a reduced bit rate (i.e., a slower speed) can be shown simply by using a slower type of transmission channel (or hardware). For example, the '075 patent claims to improve the bit rate over the Chen method by 12%. If a video signal encoded by the Chen method is transmitted using a 2400 bps modem and the same video signal is encoded using the '075 patent method and transmitted using the 1200 bps modem, the '075 patent method will transmit the video signal at a reduced bit rate, regardless of the reduction attributable to the claimed coding method. In other words, the signal transferred over the 1200 bps modem will be "transmitted at a reduced bit rate." But, the claimed invention should not be covering admitted prior art. The scope of the claim should cover coding methods that "improve" over Chen, and without additional detail, not disclosed in the patent, this comparison cannot be made.

35. A person of ordinary skill would know that determining "transmission at a reduced bit rate" requires knowing information that is not disclosed anywhere in the patent. For

example, in order to determine the bit rate being compared against, it requires knowing the transmission rate of the equipment, the transmission rate of the medium (wires, atmosphere, telephone lines, etc.) and how the signals are packaged (modulated) for transmission. In other words, to determine if an accused device is transmitting at a reduced bit rate, the accused device must be compared to a transmission bit rate recited in the claim. There must be a "reference" to compare against, in order to determine if the transfer rate of the claimed coding method is reduced.

36. Because there is no disclosure of a reference coding bit rate, and further because there is no disclosure of the transmitted bit rate produced by the claimed method, it would not have been possible for a person of ordinary skill to determine if the claimed coding method produced a transmission that offered "a reduced bit rate."

37. There is a similar lack of disclosure problem for "bandwidth" as there is for "bit rate." "Bandwidth" is the actual space in a frequency spectrum through which data is sent. The frequency spectrum used for all communications are partitioned into smaller portions which are assigned to each different type of communication (e.g. radio, TV, etc). Within each portion, for example in the TV portion, there are further divisions into smaller adjacent frequency ranges, each range corresponding to a channel on a TV. The width of the frequency used to transmit one TV channel (i.e., one video signal) corresponds to that channel's bandwidth.

38. For another example, FM radio has stations, each of which has a bandwidth. When you tune the radio to a particular radio station on the FM dial, you do this by selecting a number on the FM dial that corresponds to the middle of the segment (bandwidth) of the frequency range that FM station is transmitted on. That is, there is a portion of frequencies

above and below that center point over which the signal is transmitted. The length (width) of this segment is the bandwidth used by that radio station.

39. In order to determine whether an accused system meets the limitation "for transmission at a reduced bandwidth," the person of ordinary skill in the art must know what size bandwidth qualifies as a "reduced bandwidth." Is a bandwidth reduced by a certain percentage ? Is a bandwidth reduced by a certain amount of frequency? The '075 patent is silent on this.

40. Because there is no disclosure of any bandwidths in the patent, there is no way to determine when a sufficient reduction in bandwidth is achieved. In fact, there is not even a disclosure of the bandwidth used by the claimed coding method. Nor would a person of ordinary skill in the art be able to determine the bandwidth used or the amount reduced after performing the claimed coding method of the '075 patent.

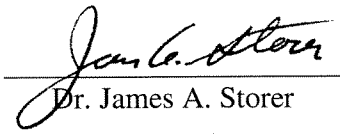
41. Moreover, the term "bandwidth" is never used in the patent, other than in claim 8. Accordingly there is no disclosure in the '075 patent sufficient to inform a person of ordinary skill how to effect a reduction in bandwidth using the claimed encoding method.

2. To the Extent These Claim Elements Are Not Indefinite, They Should Be Construed as a 12% Reduction as Compared to the Chen Method

42. To find meaning for transmission at a "reduced bit rate" and "reduced bandwidth," a person of ordinary skill in the art might go to the only basis for comparison or reference in the patent. That sole comparison is against the Chen 1984 article. A person of ordinary skill in the art might interpret transmission at a reduced bit rate as a reduction of 12% compared to the bit rate used by Chen to transmit video signals. Similarly, a person of ordinary skill in the art might interpret transmission at a reduced bandwidth as utilizing a bandwidth that

is 12% smaller than the bandwidth used by Chen to transmit video signals in the Chen 1984 article.

I declare under penalty of perjury under the laws of the Unites States of America and the State of New York that the foregoing is true and correct. Executed this 21st day of September, 2007, at Waltham, Massachusetts.



Dr. James A. Storer

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

U.S. PHILIPS CORPORATION, Plaintiff, v. EASTMAN KODAK COMPANY, Defendant.	Civil Action No. 06-00251-GMS

DEFENDANT EASTMAN KODAK COMPANY'S FIRST SUPPLEMENTAL RESPONSES TO PLAINTIFF U.S. PHILIPS CORPORATION'S FIRST SET OF INTERROGATORIES (Nos. 2-3)

Pursuant to Rule 33 of the Federal Rules of Civil Procedure, Defendant Eastman Kodak Company ("Kodak") hereby supplements its responses to the First Set of Interrogatories ("Interrogatories") (Nos. 2-3) propounded by Plaintiff U.S. Philips Corporation ("Philips") as follows:

PRELIMINARY STATEMENTS

1. This First Supplemental Response to Interrogatory Nos. 2 and 3 supersedes and replaces Defendant Eastman Kodak Company's Responses to Plaintiff U.S. Philips Corporations Interrogatory Nos. 2 and 3 served on April 6, 2007.

2. Kodak's responses to Philips' Interrogatories are made to the best of Kodak's present knowledge, information and belief. Kodak reserves the right to supplement and amend these responses should future investigation indicate that such supplementation or amendment is necessary. Kodak's responses should in no way be considered prejudicial in relation to further discovery, research, analysis or production of evidence.

3. Kodak's responses are made solely for the purpose of and in relation to this action. Each response is given subject to all appropriate objections including, but not limited to, objections concerning privilege, competency, relevancy, materiality, propriety and admissibility. All objections are reserved and may be interposed at any time.

4. Until the Court enters a protective order in this case, Kodak will not provide Philips with any Kodak or third-party confidential, trade secret, or proprietary business, technical, marketing or financial information.

5. Kodak incorporates by reference each and every general objection set forth below into each and every specific response. From time to time a specific response may repeat a general objection for emphasis or some other reason. The failure to include any general objection in any specific response shall not be interpreted as a waiver of any general objection to that response.

6. By responding to Philips' Interrogatories, Kodak does not waive any objection that may be applicable to: (a) the use, for any purpose, by Philips of any information or documents given in this response to Philips' Interrogatories; or (b) the admissibility, relevancy or materiality of any of the information or documents at issue in this case.

GENERAL OBJECTIONS

1. Kodak objects to each and every Interrogatory, and to Philips' instructions and definitions, to the extent that they purport to impose additional burdens or duties on Kodak that exceed the scope of reasonable and permissible discovery under the Federal Rules of Civil Procedure, the Local Civil Rules for the District of Delaware, or the Individual Rules of the Judge(s) hearing this matter.

2. Kodak objects to each and every Interrogatory to the extent they seek information protected by attorney-client privilege, the work product immunity doctrine, or any other applicable law, protection or doctrine. The production of any privileged information or

document by Kodak is unintentional, and Kodak does not intend to waive any applicable objection or privilege as a result of such production or disclosure.

3. Kodak objects to each and every Interrogatory to the extent it is overly broad or unduly burdensome or oppressive, particularly when the Interrogatory is unduly burdensome in view of Kodak's cost necessary to investigate weighed against Philips' need for the information.

4. Kodak objects to each and every Interrogatory to the extent it requires Kodak to make a legal conclusion and/or render an expert opinion.

5. Kodak objects to each and every Interrogatory as overly broad and unduly burdensome to the extent it is unlimited in temporal scope or otherwise not limited to a time frame that is relevant to this litigation and the patent in suit. Pursuant to 35 U.S.C. § 286, Philips is not entitled to recover for any infringement that allegedly occurred more than six years prior to the filing of the original Complaint on April 18, 2006. Kodak limits its interrogatory responses to the time period set forth in the specific responses and objections.

6. Kodak objects to each and every Interrogatory to the extent it seeks information already in Philips' possession or available in the public domain. Such information is as readily available to Philips as it is to Kodak.

7. Kodak objects to each and every Interrogatory to the extent it seeks information that is not in the possession, custody, or control of Kodak.

8. Kodak objects to each and every Interrogatory to the extent it seeks information that Kodak is not permitted to disclose pursuant to confidentiality obligations or agreements with third parties.

9. Kodak objects to each and every Interrogatory to the extent it seeks confidential, trade secret, or proprietary business, technical, marketing, or financial information. As noted above in Kodak's Preliminary Statements, Kodak will not provide such information until a suitable protective order has been entered by the Court.

10. Kodak objects to each and every Interrogatory to the extent it seeks information that is neither relevant to the issues in the lawsuit nor is reasonably calculated to lead to the discovery of admissible evidence.

11. Kodak objects to Philips' Definition No. 1 ("you" and "your") as overly broad and unduly burdensome to the extent it requests Kodak to produce documents maintained by other companies or entities. Kodak will produce only those documents in its possession, custody, or control.

12. Kodak objects to Philips' Instruction No. 2 as overly broad in time. Except as set forth below, Kodak will not separately identify the document, communication or item for which it claims privilege. Rather, Kodak will identify its privileged documents in the form of a privilege log. However, Kodak will not disclose, produce or include on a privilege log any documents or things created or dated after the filing of Philips' original Complaint on April 18, 2006.

SPECIFIC OBJECTIONS AND RESPONSES

Kodak hereby supplements its responses to Interrogatories 2 and 3 as follows:

INTERROGATORY NO. 2:

For every claim of the patent-in-suit that YOU allege is invalid or unenforceable, and separately for each claim so identified, state each fact known by YOU that supports, refutes, or relates to YOUR allegations of invalidity and unenforceability; identify each person who has knowledge about the subject matter of this interrogatory; and identify each document and thing relating to the subject matter of this interrogatory.

FIRST SUPPLEMENTARY RESPONSE TO INTERROGATORY NO. 2:

Kodak objects to this Interrogatory to the extent it calls for legal conclusions or expert opinion. Kodak further objects to this Interrogatory as seeking information protected by the attorney-client privilege, the work product immunity doctrine and/or other applicable privileges

or protections. Kodak objects to this Interrogatory as compound because it contains discrete subparts that require separate and distinct responses. Kodak objects to this Interrogatory as overly broad and unduly burdensome. Kodak further objects to this Interrogatory to the extent it seeks to impose additional burdens or duties on Kodak that exceed the scope of reasonable and permissible discovery under the Federal Rules of Civil Procedure, the Local Civil Rules for the District of Delaware, or the Individual Rules of the Judge(s) hearing this matter. This Interrogatory is premature in light of the expert discovery schedule agreed to by the parties and reflected in the Court's scheduling order. This Interrogatory is also premature because it seeks Kodak's contentions and analysis before Kodak has completed discovery relating to invalidity, before Kodak has conducted expert discovery on invalidity, and before the Court has issued a claim construction ruling. Subject to these objections and the general objections set forth above, Kodak responds as follows:

Invalidity Chart For U.S. Patent No. 4,494,151 to Liao

U.S. 4,901,075 CLAIM ELEMENTS	U.S. Patent No. 4,494,151 to Liao
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	Liao states that, "*There is a need for electronic systems for compacting data so that the information contained within said data may be stored in less memory space or transmitted at a higher rate.*" *See Col. 1:14-17.* Liao also discloses that one technique (to transmit at higher speed or reduce the bitrate) is the use of a simple run length code. *See Col. 1:18-21.* Liao also discloses that "*The object of the invention, therefore, is to provide a modified run-length encoding circuit which allows the efficient encoding/decoding of binary data at high data rates.*" *See Col. 2:15-19.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	Liao discloses, with reference to Figure 3 that, "*The majority of bits output are white or 0 bits since the scanned document usually is text*" when referring to the output bits from a raster input scanner 30 which are input to a predictor 31 that usually further reduces the number of 1 bits. *See Figure 3 and Col. 3:42-54.* Thus, in Liao, "*Because the data is first processed by a predictor, there is an increased likelihood of the encoder input comprising long strings of 0s.*" *See Col. 1:62-64.*

U.S. 4,901,075 CLAIM ELEMENTS	U.S. Patent No. 4,494,151 to Liao
	The sequence of predictive values "0" and "1" values from an image predictor 31 as shown in Figures 2 and 3 are input to an encoder 32. *See Figures 2 and 3.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	In Liao, "The encoder maximizes the compression of these strings by grouping the input data into data words comprising an uninterrupted line of nibbles containing all 0s, regardless of how many that may be, followed by a terminating nibble having at least one 1 bit. A first code word portion is assigned to the number of all-zero nibbles, and a second code word portion is assigned to the data pattern of the terminating nibble. The final code word is the combination of the first and second code word portions." *See Col. 1:64 – Col. 2:5.*
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	The code words assigned to each portion is shown in Figure 1A and the code words are of variable length wherein the code words are shorter than the original data and the more frequently occurring run lengths are assigned to short code words. *See Figure 1A and Col. 6:20- 44.* In Liao, "*In Example 1, the first string comprises 31 all-zero nibbles and a terminating nibble of 1000. XεA and 26≤Y≤63 so a Type 3A output word is called for. In this case, 11,nnnnnnn,bbbb =11,011111 (31 all-zero nibbles), 1000 (actual bit pattern).*" *See Figure 2 and Col. 3:13-18.* Thus, the different signal value (a terminating nibble such as "1000") and a preceding run of all zero nibbles (such as 31 all-zero nibbles) are coded using a codeword.
11. The method of claim 8, comprising the additional steps of: determining whether the run length of each event exceeds a predetermined run length and if so, splitting said respective event into a plurality of sections so that each of said sections has a run length below said predetermined run length, and assigning a code word to each section.	Liao discloses that "*If there are 64 or more all-zero nibbles before a non-zero terminating nibble, the data string is converted into a first part comprising a number of sets of 64 all-zero nibbles and a second part comprising the remaining 0 to 63 all-zero nibbles and the terminating nibble.*" *See Col. 3:2-7.* Thus, when a run of non-zero nibbles together with the terminating nibble exceeds a predetermined length (more than 64 all-zero nibbles), the run of non-zero nibbles and the terminating nibble are split into sections (the first and second parts) wherein the length of each section is below a predetermined value (64 all-zero nibbles), and each section has a codeword assigned to the section.

Invalidity Chart For Henry H. J. Liao, "Upper Bound, Lower Bound and Run-Length Substitution Coding", NTC '77 Conference Record, Vol. 3, pp. 49:3-1 to 49:3-6 (1977) (the "Liao Article")

US 4,901,075 CLAIM ELEMENTS	Liao Article
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	The Liao Article discusses several bounds of "bandwidth compression for run-length coding." *See pg. 49:3-1, left column, Abstract.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	The Liao Article discusses run-length coding for a facsimile image that is converted into a sequence of binary digits (1's and 0's) which directly represent black and white picture elements. *See pg. 49:3-1, left column, first paragraph of Introduction.* The Liao Article also discusses image data run-length coding after a set of prediction error values are determined. *See pg. 49:3-1, left column, first paragraph of Introduction.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	The prediction error values are determined in which the run-length of prediction errors constitute a majority of single bit runs (B) and a few other short runs. *See pg. 49:3-2, left column, first paragraph of Maximum Entropy Lower Bound section.* The prediction errors are recorded as "B" and correct predictions are recorded as "W" so that a message set for these prediction values in shown in Table 1 that have runs of W followed by B. *See pg. 49:3-2, left column, first paragraph of Maximum Entropy Lower Bound section and Table 1.*
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	The Liao Article states that, "The best code assignment will be the set of codes with the shortest average length, i.e., the minimum redundancy code. Huffman's coding is a systematic procedure for constituting such as code with minimum redundancy." *See pg. 49:3-1, left column, second paragraph of Introduction section.* The Liao Article also contains a table with a run-length substitution code that is a Huffman code that represents a run of W values (zero to nine) followed by a B value. *See pg. 49:3-3, left and right columns, Run-Length Substitution section, Table 2 and pg. 49:3-6, Table 5.* Table 5 shows the frequency of each run-length and the Huffman length assigned to each run-length based on the frequency. In these tables, Huffman codes are formed from the prediction error values (the sequence of signal values).
11. The method of claim 8, comprising the additional steps of: determining whether the	The Liao Article discloses that in run-length substitution, "a fixed number of runs is picked from the entire message set." *See pg. 49:3-3, left column, first paragraph of Run-Length Substitution section.* The Liao Article further discloses that, "Runs without codes can be

US 4,901,075 CLAIM ELEMENTS	Liao Article
run length of each event exceeds a predetermined run length and if so, splitting said respective event into a plurality of sections so that each of said sections has a run length below said predetermined run length, and assigning a code word to each section.	represented by two or more shorter runs with codes. For example, in Table 2, the run-length 4W is selected and 5W+B is not selected, the run 5W+B is substituted by 4W + (W+B)." *See pg. 49:3-3, left and right columns, first paragraph of Run-Length Substitution section and Table 2.*

Invalidity Chart for U.S. Patent No. 4,420,771 to Pirsch

US 4,901,075 CLAIM ELEMENTS	Pirsch Patent
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	Pirsch discloses a method for encoding multi-level signals. *See Title and Col. 1:60- 2:8 and 2:34-50.* Pirsch also discloses that multi-level signal encoding results in reducing redundancy in the signal and reducing the amount of data needed to represent the signal and the object of the present invention is to enable more efficient encoding of a multi-level signal. *See Col. 1:45-57.* Pirsch states that "The present invention relates generally to a technique for encoding multi-level signal and, in particular, to a form of run-length coding of such signals when one of the levels occurs much more frequently than all of the other possible levels." *See Col. 1, lines 6-10.* In addition, Pirsch discloses that the system is used for encoding error prediction values wherein "a large number of the error values will have values at or near ZERO." These large number of error values "form the "frequent value" inputs to the encoder.." *See Col. 2, lines 39-45.* The error prediction values may be quantized. *See Col. 3, lines 2-5.* Pirsch discloses that "multi-level signals derived from other sources may be processed in accordance with the instant invention and that advantageous results will be achieved as long as a heavy bias exists in favor of a given most frequent value." and "the present invention is useful

US 4,901,075 CLAIM ELEMENTS	Pirsch Patent
	with any series of input samples or words capable of having at least M different values." *See Col. 2, lines 45-50 and Col. 11, lines 9-24.*
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	In the preferred embodiment of Pirsch, run length codes for frequent values (FRL), run length codes for non-frequent values (NFRL) and codes for the non-frequent value (NFV) are generated. *See Figure 3, Col. 1:60- Col. 2:9, Col. 7:5- Col. 8:15 and Table 4.* Pirsch provides "The definition of a "run" stated previously, namely, a series of consecutive inputs having the same value, can also be modified, if desired, without diminishing the advantages of the present invention. Specifically, an alternative definition of a run may be a series of consecutive words of like value as well as the next (subsequent) word of different value." (Emphasis added) *See Col. 11, lines 25-43.*
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	Pirsch discloses a method for encoding multi-level signals in which runs of the "frequent values" and the next subsequent value are encoded by a coder 191 using a variable length codes with an example of the codes for encoding the non-frequent values shown in Table 4. *See Col. 1:60- Col. 2:9, Col. 7:5- Col. 8:15 and Table 4.*
4. The method of claim 3, wherein said code words are Huffman code words.	The runs of the "frequent values" and the less frequent values are encoded by a coder 191 using a variable length Huffman code with an example of the Huffman codes for encoding the non-frequent values shown in Table 4. *See Col. 1:60- Col. 2:9, Col. 7:5- Col. 8:15 and Table 4.*
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	Pirsch discloses a method for encoding multi-level signals. *See Title and Col. 1:60- 2:8 and 2:34-50.* Pirsch also discloses that multi-level signal encoding results in reducing redundancy in the signal and reducing the amount of data needed to represent the signal and the object of the present invention is to enable more efficient encoding of a multi-level signal. *See Col. 1:45-57.* Pirsch states that "The present invention relates generally to a technique for encoding multi-level signal and, in particular, to a form of run-length coding of such signals when one of the levels occurs much more frequently than all of the other possible levels." *See Col. 1, lines 6-10.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and	In the example of Pirsch given in Col. 11:31-43, only binary values are given. However, it is apparent that, in encoding method disclosed in Pirsch, that the other signal

US 4,901,075 CLAIM ELEMENTS	Pirsch Patent
non-zero coefficients;	values can also take other values than "1" since Pirsch deals with "multi-level" coding, i.e. coding of signals with at least three values. *See Col. 11:9-14: "M≥3".* In addition, Pirsch provides that "it is to be clearly understood that multi-level signals derived from other sources may be processed ..." and "that advantageous results will be achieved as long as a heavy bias exists in favor of a given most frequent value." *See Col. 2:25-50.* In addition, Pirsch discloses that the system is used for encoding error prediction values wherein "a large number of the error values will have values at or near ZERO." These large number of error values "form the "frequent value" inputs to the encoder.." *See Col. 2, lines 39-45.* The error prediction values may be quantized. *See Col. 3, lines 2-5.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	In the preferred embodiment of Pirsch, run length codes for frequent values (FRL), run length codes for non-frequent values (NFRL) and codes for the non-frequent value (NFV) are generated. *See Figure 3, Col. 1:60- Col. 2:9, Col. 7:5- Col. 8:15 and Table 4.* Pirsch provides "The definition of a "run" stated previously, namely, a series of consecutive inputs having the same value, can also be modified, if desired, without diminishing the advantages of the present invention. Specifically, an alternative definition of a run may be a series of consecutive words of like value as well as the next (subsequent) word of different value." (Emphasis added) *See Col. 11, lines 25-43.*
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	The runs of the "frequent values" and the next subsequent value are encoded by a coder 191 using a variable length code with an example of the codes for encoding the non-frequent values shown in Table 4. *See Col. 1:60- Col. 2:9, Col. 7:5- Col. 8:15 and Table 4.*

Invalidity Chart for U.S. Patent 4,136,363 to Saran

U.S. 4,901,075 CLAIM ELEMENTS	Saran Patent
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	Saran discloses a system and method for encoding a video signal generated based on a scan of a document wherein the video signal includes black terminated white runs (in difference modulated and unmodulated signals) that are run length encoded using a code to reduce redundancies and compress binary video signals. *See Col. 1:67 – Col. 2:38; Col. 3:31-34; Col. 4:50- Col. 5:7; Col. 9:7-26 and Col. 9:27-45.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	In Saran, a raster input scanner converts the information content of an original document into a corresponding video signal which is in turn converted into a raw binary video signal which is then difference modulator using a difference modulator 31. *See Col. 4:50-59 and Col. 5:56-62.* The difference modulator generates difference modulated picture elements and unmodulated picture elements of opposite logic levels (i.e., "1" and "0"). *See Col. 6:9-19.* An example of the series of difference modulated and unmodulated picture elements are shown lines a-c of Figure 4. "0" is the signal value (A) occurring most frequently in runs. *See Col. 9:7-17.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	As shown in Figure 4, black terminated white runs are derived (a run of "0" different modulated signals with a "1"). *See Col. 9:7-26 and Figure 4.*
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	Saran discloses that the codewords formed for the black terminated white runs (a run of zeros with a "1" at the end), such as 3W+B and 6W+B as shown in Figure 4, are the codewords "10111" and "11010" respectively. *See Col. 9:7-26 and Figure 4.* These codewords are residue codes e. *See Col. 13:1-16 and Figure 4.*
11. The method of claim 8, comprising the additional steps of: determining whether the run length of each event exceeds a predetermined run length and if so, splitting said respective event into a plurality of sections so that each of said sections has a run	Saran discloses that, "For conserving on the storage capacity required of the memory banks 62,63 and 64,65, a block length multiple plus run length residue code format is utilized in encoding the black terminated white runs of difference modulated and unmodulated picture elements. The advantage of that format is, as shown in FIG. 4, that black terminated white runs in excess of a predetermined block length are represented by a block length multiple

U.S. 4,901,075 CLAIM ELEMENTS	Saran Patent
length below said predetermined run length, and assigning a code word to each section.	code d plus, if the run happens to be a noninteger multiple of the block length, a run length residue code e." *See Col. 13:1-16.* Thus, for black terminated white runs that exceed a predetermined length, Saran uses a block length multiple code d and a run length residue code e (both Huffman codewords) for encoding the black terminated white runs that exceed the predetermined length. In the example shown in Figure 4 of Saran, a black terminated white run of 258W+B is encoded as eight 32W Huffman codes ("10011001") and then a 2W+B Huffman code ("1010") to form 9 sections with each section being less than a predetermined value (a run length of 33 in this example) and each section has a Huffman codeword assigned to the section.

Invalidity Chart For U.S. Patent No. 4,092,676 to Saran

U.S. 4,901,075 CLAIM ELEMENTS	Saran Patent
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	Saran discloses a system and method for encoding a video signal generated based on a scan of a document wherein the video signal includes black terminated white runs (in difference modulated and unmodulated signals) that are run length encoded using a code to reduce redundancies and compress binary video signals. *See Col. 1:67 – Col. 2:38; Col. 3:31-34; Col. 4:50- Col. 5:7; Col. 9:7-26 and Col. 9:27-45.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	In Saran, a raster input scanner converts the information content of an original document into a corresponding video signal which is in turn converted into a raw binary video signal which is then difference modulator using a difference modulator 31. *See Col. 4:50-59 and Col. 5:56-62.* The difference modulator generates difference modulated picture elements and unmodulated picture elements of opposite logic levels (i.e., "1" and "0"). *See Col. 6:9-19.* An example of the series of difference modulated and unmodulated picture elements are shown lines a-c of Figure 4. *See Col. 9:7-17.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by	As shown in Figure 4, black terminated white runs are derived (a run of "0" different modulated signals with a "1"). *See Col. 9:7-26 and Figure 4.*

U.S. 4,901,075 CLAIM ELEMENTS	Saran Patent
at least one non-zero coefficient, and	
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	Saran discloses that the codewords formed for the black terminated white runs (a run of zeros with a "1" at the end), such as 3W+B and 6W+B as shown in Figure 4, are the codewords "10111" and "11010" respectively. *See Col. 9:7-26 and Figure 4.* These codewords are residue codes e. *See Col. 13:1-16 and Figure 4.*
11. The method of claim 8, comprising the additional steps of: determining whether the run length of each event exceeds a predetermined run length and if so, splitting said respective event into a plurality of sections so that each of said sections has a run length below said predetermined run length, and assigning a code word to each section.	Saran discloses that, "For conserving on the storage capacity required of the memory banks 62,63 and 64,65, a block length multiple plus run length residue code format is utilized in encoding the black terminated white runs of difference modulated and unmodulated picture elements. The advantage of that format is, as shown in FIG. 4, that black terminated white runs in excess of a predetermined block length are represented by a block length multiple code d plus, if the run happens to be a noninteger multiple of the block length, a run length residue code e." *See Col. 13:1-16.* Thus, for black terminated white runs that exceed a predetermined length, Saran uses a block length multiple code d and a run length residue code e for encoding the black terminated white runs that exceed the predetermined length. In the example shown in Figure 4, a black terminated white run of 258W+B is encoded as eight 32W Huffman codes ("10011001") and then a 2W+B Huffman code ("1010") to form 9 sections with each section being less than a predetermined value (a run length of 33 in this example) and each section has a Huffman codeword assigned to the section.

Invalidity Chart for U.S. Patent No. 4,363,036 to Subramaniam

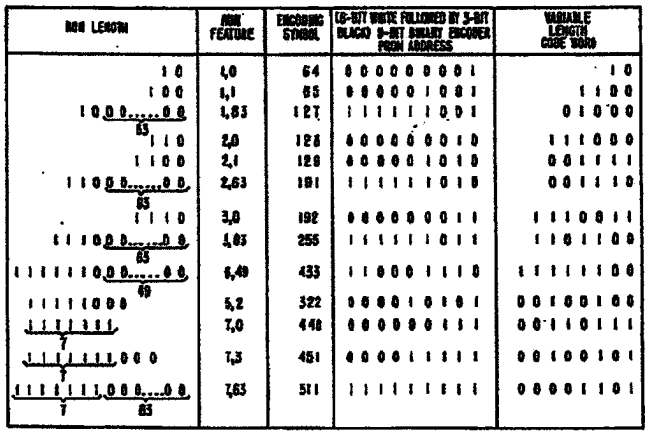
U.S. 4,901,075 CLAIM ELEMENTS	Subramaniam '036 Patent
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	A method for compressing digital data is disclosed that generates prediction error pixels from the digital data to form symbols (WB runs or BW runs) which are then coded using variable length codewords. *See Abstract, Figures 8A and 8B and Col. 3:54 – Col. 4:51.* The invention relates to data compression and in particular a novel method and apparatus for reducing the number of

U.S. 4,901,075 CLAIM ELEMENTS	Subramaniam '036 Patent
	bits of information needed to transmit a video image which reduces bandwidth requirements and storage requirements. *See Col. 1: 15-24.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	In the method, a prediction table and a window predictor transform the facsimile image into prediction error values with "0" values and "1" values with minimum redundancy. *See Col. 2:56-58.* The window predictor consists of 13 pixels with pixels in the current scan line and 3 previous scan lines (a block) as shown in Figure 4B. *See Col. 9:40-44.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	Once the digital image is scanned and prediction errors are determined, run lengths are determined wherein the run lengths are: 1) white-black (WB) runs; and 2) black-white (BW) runs wherein each run has two sections called a black half and a white half. *See Col. 10:45-59 and Figures 8A and 8B.* As shown in Figures 8A and 8B, "01", "001", "0001" and "127 0's and a "1", "10", "100" and "1 with 63 0's" are examples of the run lengths.

FIG-8A

M1=128, M2=4

RUN LENGTH	RUN FEATURE	ENCODING SYMBOL	(7-BIT WHITE FOLLOWED BY 2-BIT BLACK) 9-BIT BINARY ENCODER PROM ADDRESS	VARIABLE LENGTH CODE WORD
01	1,0	4	000000100	111
011	1,1	5	000000101	011
0111 (5)	1,3	7	000000111	10111
001	2,0	8	000001000	01001
0011 (3)	2,3	11	000001011	110000
0001	3,0	12	000001100	100111
00...001 (8) 1 (5)	8,3	35	000100011	100001
00.....001 (36) 1	36,1	153	010011001	110001100
00...001 (100) 1 (3)	100,3	403	110010011	010100000
000...00 (127)	127,0	508	111111100	010111000
000.....001 (127)	127,1	509	111111101	010001110
000.....011 (127)	127,2	510	111111110	010100001
000.....011 (127) 1 (3)	127,3	511	111111111	010100100

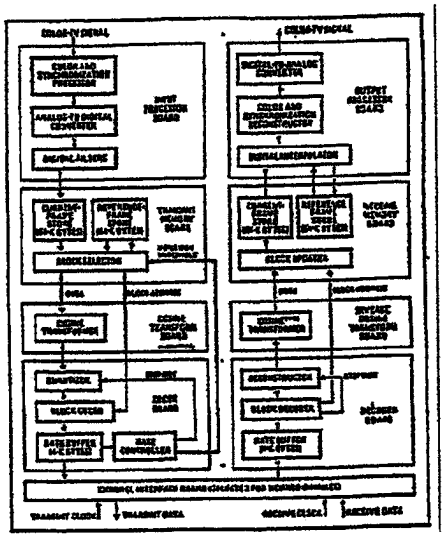
U.S. 4,901,075 CLAIM ELEMENTS	Subramaniam '036 Patent
	FIG-8B 
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	As shown in Figure 8A and 8B, each of the run lengths (including the specific examples above) is coded using a variable length code. *See Figures 8A and 8B and Col. 10:45-59.*
11. The method of claim 8, comprising the additional steps of: determining whether the run length of each event exceeds a predetermined run length and if so, splitting said respective event into a plurality of sections so that each of said sections has a run length below said predetermined run length, and assigning a code word to each section.	The method provides that, if the first half or second half of a run length exceeds the maximum length specified for that particular color, then that run length must be broken down by using both the general rule and its exception. *See Col. 11:26- Col. 12:54.*

Invalidity Chart for U.S. Patent No. 3,984,833 to Van Voorhis

U.S. 4,901,075 CLAIM ELEMENTS	Van Voorhis Patent
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	Van Voorhis discloses an apparatus for encoding extended run-length codes for the compression of digital images that are a two-dimensional array of image points. *See Col. 1:13-19.* The compression of the digital images (using run length codes) reduces the storage requirements for digital images and reduces the bandwidth required for the transmission of the digital images *See Col. 1:27-31.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	Van Voorhis discloses that an image, for a black/white image, has image points that are transformed into a single bit of information with a value of either 0 or 1 to indicate that the corresponding area of the picture is light or dark. *See Col. 1, lines 19-23.* The value zero occurs far more frequency than the other signal value one. From the examples, the value zero occurs most frequency in uninterrupted runs. For example, column 14, lines 64 to 66, mentions: *"For the purpose of the illustration, a run is defined as a one or as a string of one or more zeros and the first one following this string of zeros."*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	Van Voorhis discloses that an event may be a binary encoded representation of an alphanumeric character, an analog voltage, a run of binary video information, a run of binary image information or any other type of information capable of recognition. *See Col. 6, lines 59-65.* Van Voorhis also describes that, from the signal, runs are recognized as follows: *"In such a circumstance, the event recognizer 10 of Van Voorhis may recognize each sequence of consecutive bits of the same logic, which is denoted as a run. Runs may also be sequences of bits of one of the logic levels, or sequences of a level terminating in another level."* *See Col. 7:11-15.* Van Voorhis discloses an example of a run (See Col. 14:64-66; underlining was added): *"For the purpose of the illustration, a run is defined as a one or as a string of one or more zeros and the first one following this string of zeros."* Further examples can be found in column 15, lines 11- 32.

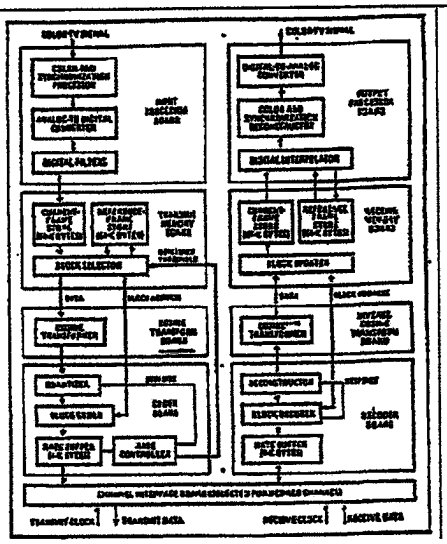
U.S. 4,901,075 CLAIM ELEMENTS	Van Voorhis Patent
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	Van Voorhis discloses coding of events where the event may include a string of one or more zeros and the first one following this string of zeros. *See Col. 14, lines 64-66.* The encoder then calculates and outputs code words for a specific class of ordinary and extended run-length codes. *See Col, 3, lines 58-61.* Examples of the codes used by the coder are shown in Tables 1 and 2. *See Col. 3, line 58 – Col. 4, line 64 and Tables 1 and 2.*

Invalidity Chart For Widcom VTC-56

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	The Widcom VTC-56 is a video codec that has the boards shown in the diagram reproduced below. *See Widcom 1984 Article, pg. 115.*  The boards include a cosine transform board and a coder board. The VTC-56 divides each frame into 8X8 blocks of pixels that are then cosine transformed. In particular, the cosine transform board performs a cosine transform that generates an array of transform coefficients that contains a DC coefficient and 63 AC coefficients with many zero-valued AC coefficients. *See Widcom 1984 Article, pg. 114.*

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
	The coefficients in the array of transform coefficients are quantized and coded. The Widcom VTC-56 performs bandwidth compression (on color video pictures) at ratios of up to 1,440:1 which is sufficient to transmit color-TV pictures through a telephone line. *See Widcom 1984 Article, pg. 113.* The cosine transform coding for the pixel-to-pixel decorrelation (performed by the cosine transform and coder board) result in a 6:1 compression ratio (*See Widcom 1984 Article, pg. 113, table*) of the color-TV pictures (converting into quantized coefficient values which are the sequence of signal values.) The bandwidth compression causes a bitrate reduction of the sequence of signal values.
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	The events encoded by the VTC-56 include runs of zero AC coefficients followed by an AC coefficient having an absolute value of one (RL1) and runs of zero AC coefficients followed by an AC coefficient having an absolute value greater than one (RL0). *See VTC-56B Coder Theory of Operation at 4.* These events are then encoded with a code word wherein more frequently occurring values are represented by short code words and less frequently occurring values are represented by longer code words. *See Widcom 1984 Article at pg. 114.* In the VTC-56, the codewords are selected from several different tables based on the entropy of the image being encoded. In particular, there are six different tables that are used to code the AC coefficients wherein each table is optimized for a particular entropy level of the image to be coded. The table is selected based on a calculation of a standard deviation of the computed transform coefficients. *See VTC-56B Coder Theory of Operation at 3.*
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	In the VTC-56, event that include: 1) runs of zero AC coefficients followed by an AC coefficient having an absolute value of one (RL1); and 2) runs of zero AC coefficients followed by an AC coefficient having an absolute value greater than one (RL0) are encoded using a Huffman code word. *See Widcom 1984 Article at pg. 114.* The AC coefficients in the array of quantized transform coefficients are encoded in which runs of zero AC coefficients followed by a non-zero AC coefficient are encoded. In the VTC-

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
	56, runs are zero valued AC coefficients are encoded: *"Because there are so many zero-valued coefficients, the final code is further compressed by coding run lengths instead of transmitting long runs of 0 bits." See Widcom 1984 Article, p. 114.*
4. The method of claim 3, wherein said code words are Huffman code words.	The code words are Huffman codewords. In the VTC-56, the Huffman codeword is selected from several different tables based on the entropy of the image being encoded. In particular, there are six different tables that are used to code the AC coefficients wherein each table is optimized for a particular entropy level of the image to be coded. The table is selected based on a calculation of a standard deviation of the computed transform coefficients.
7. A method as claimed in claim 4, characterized in that the Huffman codeword is independent of the sign of that non-zero coefficient which succeeds or precedes the run of zero-coefficients and in that the sign is coded by a separate bit.	The VTC-56 codes the AC coefficient magnitudes with the Huffman code words above so that the Huffman codewords are independent of the sign of that coefficient. The coder board then sends the sign separately from the code for the AC coefficient magnitude. *See VTC-56B Coder Theory of Operation at 3.*
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	The Widcom VTC-56 is a video codec that has the boards shown in the diagram reproduced below. *See Widcom 1984 Article, pg. 115.*

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
	 The boards include a cosine transform board and a coder board The Widcom VTC-56 performs bandwidth compression (on color video pictures) at ratios of up to 1,440:1 which is sufficient to transmit color-TV pictures through a telephone line. *See Widcom 1984 Article, pg. 113.* The cosine transform coding for the pixel-to-pixel decorrelation (performed by the cosine transform and coder board) result in a 6:1 compression ratio (*See Widcom 1984 Article, pg. 113, table*) of the color-TV pictures (converting into quantized coefficient values which are the sequence of signal values.) The bandwidth compression causes a bitrate reduction of the sequence of signal values.
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	The boards of the VTC-56 include a cosine transform board. The VTC-56 divides each frame into 8X8 blocks of pixels that are then cosine transformed. In particular, the cosine transform board performs a cosine transform that generates an array of transform coefficients that contains a DC coefficient and 63 AC coefficients with many zero-valued AC coefficients. *See Widcom 1984 Article, pg. 114.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient,	The events encoded by the VTC-56 include runs of zero AC coefficients followed by an AC coefficient having an absolute value of one (RL1) and runs of zero AC coefficients followed by an AC coefficient having an absolute value greater than one (RL0). *See VTC-56B Coder Theory of Operation at 4*

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
and	
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	These events are then encoded with a code word wherein more frequently occurring values are represented by short code words and less frequently occurring values are represented by longer code words. The code words are Huffman codewords. *See Widcom 1984 Article at pg. 114.* In the VTC-56, the Huffman codeword is selected from several different tables based on the entropy of the image being encoded. In particular, there are six different tables that are used to code the AC coefficients wherein each table is optimized for a particular entropy level of the image to be coded. The table is selected based on a calculation of a standard deviation of the computed transform coefficients. *See VTC-56B Coder Theory of Operation at 3*

Invalidity Chart for U.S. Patent No. 4,698,672 to Chen et al. (the "Chen Patent")

U.S. 4,901,075 CLAIM ELEMENTS	Chen Patent
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	Chen discloses a coding system for reducing redundancy. *See Title.* Chen discloses "methods and apparatus for processing signals to remove redundant information thereby making the signals more suitable for transfer through a limited bandwidth medium." Chen is specifically related to methods and apparatus useful in video compression systems. *See Abstract, Figures 1-4 and Col. 1, lines 15-20.* Prior to coding in a coder 14, a forward processor 52 processes the spatial domain input signals to form processed signals which typically are transform domain signals arranged in blocks of transform domain coefficients. *See Figure 1 and Col. 4, lines 45-49.* The signals to be coded in Chen are multiple values where the multivalued digital numbers X(k) are typically the integers 0, 1, 2, 3, 4,.... Chen discloses that, in one example of the digital numbers, the highest frequency of occurrence is the value 0, the next highest frequency of occurrence is the value 1 and the other values greater than 1 (namely 2, 3, 4, 5 and so on) occur less frequently. *See Col. 3, lines 22-26.*

U.S. 4,901,075 CLAIM ELEMENTS	Chen Patent
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	The coder 14 may perform runlength coding of the types R and R'. *See Col. 5, lines 32-36.* "The first type, R, is utilized when the runlength of 0's is followed by the next most frequently occurring value (1 in the usual case) ..." *See Col. 5, lines 36-38.* "Whenever the first type, R, of run-length coding is employed, no coding of the second value (usually 1) is required because an amplitude of 1 is implied by the use of the first type, R, of run-length coding." *See Col. 5, lines 45-49.*
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	The type, R, is coded with One's Redundancy (OR) coding or scene adaptive coding using Huffman codes. *See Col. 13, line 37- Col. 17, line 48 and Tables 6-9.* The type R encodes the run length of the zero coefficient and the following amplitude of 1.
4. The method of claim 3, wherein said code words are Huffman code words.	The type, R, is coded with One's Redundancy (OR) coding or scene adaptive coding using Huffman codes. *See Col. 13, line 37- Col. 17, line 48 and Tables 6-9.*
7. A method as claimed in claim 4, characterized in that the Huffman codeword is independent of the sign of that non-zero coefficient which succeeds or precedes the run of zero-coefficients and in that the sign is coded by a separate bit.	In Chen, as shown in Tables 6 and 7, the coding tables assume that a separate sign bit, not in the tables is used to indicate the sign of each value coded in the manner indicated in Table 5. *See Col. 18, lines 3-17.*
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	Chen discloses a coding system for reducing redundancy. *See Title.* Chen discloses "methods and apparatus for processing signals to remove redundant information thereby making the signals more suitable for transfer through a limited bandwidth medium. Chen is specifically related to methods and apparatus useful in video compression systems. *See Abstract, Figures 1-4 and Col. 1, lines 15-20.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	Prior to coding in a coder 14, a forward processor 52 processes the spatial domain input signals to form processed signals which typically are transform domain signals arranged in blocks of transform domain coefficients. *See Figure 1 and Col. 4, lines 45-49.* The signals to be coded in Chen are multiple values where

U.S. 4,901,075 CLAIM ELEMENTS	Chen Patent
	the multivalued digital numbers X(k) are typically the integers 0, 1, 2, 3, 4,…. Chen discloses that, in one example of the digital numbers, the highest frequency of occurrence is the value 0, the next highest frequency of occurrence is the value 1 and the other values greater than 1 (namely 2, 3, 4, 5 and so on) occur less frequently. *See Col. 3, lines 22-26.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	The coder 14 may perform runlength coding of the types R and R'. *See Col. 5, lines 32-36.* "The first type, R, is utilized when the runlength of 0's is followed by the next most frequently occurring value (1 in the usual case) …" *See Col. 5, lines 36-38.* "Whenever the first type, R, of run-length coding is employed, no coding of the second value (usually 1) is required because an amplitude of 1 is implied by the user of the first type, R. of run-length coding." *See Col. 5, lines 45-49.*
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	The type, R, is coded with One's Redundancy (OR) coding or scene adaptive coding using Huffman codes. *See Col. 13, line 37- Col. 17, line 48 and Tables 6-9.* The type R encodes the run length of the zero coefficient and the following amplitude of 1.

Invalidity Chart For
U.S. Patent No. 4,494,151 to Liao in View of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder", IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

It would be obvious under 35 U.S.C. § 103 to combine the coding technique taught in U.S. Patent No. 4,494,151 to Liao with the use of transform coefficients in image and video coding as taught by the Chen Article because: 1) both Liao and the Chen Article are in the field of image compression; 2) DCT coefficients were well known; and 3) using DCT coefficients with the coding scheme of Liao would be a predictable variation.

U.S. 4,901,075 CLAIM ELEMENTS	U.S. Patent No. 4,494,151 to Liao	Chen Article
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent	Liao states that, "There is a need for electronic systems for compacting data so that the information contained within said data may be stored in less memory space or transmitted at a higher rate." *See Col. 1:14-17.* Liao also discloses that one technique (to transmit at higher speed or reduce the	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. The Chen Article discloses that discrete

U.S. 4,901,075 CLAIM ELEMENTS	U.S. Patent No. 4,494,151 to Liao	Chen Article
quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	bitrate) is the use of a simple run length code. *See Col. 1:18-21.* Liao also discloses that "*The object of the invention, therefore, is to provide a modified run-length encoding circuit which allows the efficient encoding/decoding of binary data at high data rates.*" *See Col. 2:15-19.* The uncoded signal values in Liao is a sequence of predictive values "0" and "1" values from an image predictor 31 as shown in Figures 2 and 3 which are input to an encoder 32. See Figures 2 and 3. Liao discloses, with reference to Figure 3 that, "*The majority of bits output are white or 0 bits since the scanned document usually is text*" when referring to the output bits from a raster input scanner 30 which are input to a predictor 31 that usually further reduces the number of 1 bits. *See Figure 3 and Col. 3:42-54.* Thus, in Liao, "*Because the data is first processed by a predictor, there is an increased likelihood of the encoder input comprising long strings of 0s.*" *See Col. 1:62-64.*	cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227.*
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	In Liao, "*The encoder maximizes the compression of these strings by grouping the input data into data words comprising an uninterrupted line of nibbles containing all 0s, regardless of how many that may be, followed by a terminating nibble having at least one 1 bit. A first code word portion is assigned to the number of all-zero nibbles, and a second code word portion is assigned to the data pattern of the terminating nibble. The final code word is the combination of the first and second code word portions.*" *See Col. 1:64 –*	

U.S. 4,901,075 CLAIM ELEMENTS	U.S. Patent No. 4,494,151 to Liao	Chen Article
	Col. 2:5.	
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	The code words assigned to each portion is shown in Figure 1A and the code words are of variable length and wherein the code words are shorter than the original data and the more frequently occurring run lengths are assigned to short code words. *See Figure 1A and Col. 6:20- 44.* Thus, Liao discloses that a series of Huffman codewords are formed from the signal values. In Liao, *"In Example 1, the first string comprises 31 all-zero nibbles and a terminating nibble of 1000. X&A and 26≤Y≤63 so a Type 3A output word is called for. In this case, 11,nnnnnnn,bbbb =11,011111 (31 all-zero nibbles), 1000 (actual bit pattern)." See Figure 2 and Col. 3:13-18.* Thus, a terminating nibble such as "1000" and a preceding run of all zero nibbles (such as 31 all-zero nibbles) are coded using a codeword.	
4. The method of claim 3, wherein said code words are Huffman code words.	The code words assigned to each portion is shown in Figure 1A and the code words are of variable length which are Huffman codewords. *See Figure 1A and Col. 6:20- 44.*	

Invalidity Chart for U.S. Patent 4,136,363 to Saran in View of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder," IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

It would be obvious under 35 U.S.C. § 103 to combine the coding technique taught in U.S. Patent No. 4,136,363 to Saran with the use of transform coefficients in image and video coding as taught by the Chen Article because: 1) both Saran and the Chen Article are in the field of image compression; 2) DCT coefficients were well known; and 3) using DCT coefficients with the coding scheme of Saran would be a predictable variation.

U.S. 4,901,075 CLAIM ELEMENTS	Saran Patent	Chen Article
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	Saran discloses a system and method for encoding a video signal generated based on a scan of a document wherein the video signal includes black terminated white runs (in difference modulated and unmodulated signals) that are run length encoded using a code to reduce redundancies and compress binary video signals. *See Col. 1:67 – Col. 2:38; Col. 3:31-34; Col. 4:50-Col. 5:7; Col. 9:7-26 and Col. 9:27-45.* In Saran, a raster input scanner converts the information content of an original document into a corresponding video signal which is in turn converted into a raw binary video signal which is then difference modulator using a difference modulator 31. *See Col. 4:50-59 and Col. 5:56-62.* The difference modulator generates difference modulated picture elements and unmodulated picture elements of opposite logic levels (i.e., "1" and "0"). See 6:9-19. An example of the series of difference modulated and unmodulated picture elements are shown lines a-c of Figure 4. "0" is the signal value (A) occurring most frequently in runs. *See Col. 9:7-17.*	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227*

U.S. 4,901,075 CLAIM ELEMENTS	Saran Patent	Chen Article
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	As shown in Figure 4, black terminated white runs are derived (a run of "0" different modulated signals with a "1"). *See Col. 9:7-26 and Figure 4.*	
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	Saran discloses that the codewords formed for the black terminated white runs (a run of zeros with a "1" at the end), such as 3W+B and 6W+B as shown in Figure 4, are the codewords "10111" and "11010" respectively. *See Col. 9:7-26 and Figure 4.* These codewords are residue codes e. *See Col. 13:1-16 and Figure 4.*	
4. The method of claim 3, wherein said code words are Huffman code words.	Saran discloses that, "Thus, it should be recalled that the basic Huffman rule for taking advantage of variable length run length message codes is that the code assigned to any given run length should be no longer than the code assigned to any less probable run length. *See Col. 2:27-38 and Col. 9:39-43.*	

Invalidity Chart For U.S. Patent Nos. 4,092,676 to Saran in View of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder," IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

It would be obvious under 35 U.S.C. § 103 to combine the coding technique taught in U.S. Patent No. 4,092,676 to Saran with the use of transform coefficients in image and video coding as taught by the Chen Article because: 1) both Saran and the Chen Article are in the field of image compression; 2) DCT coefficients were well known; and 3) using DCT coefficients with the coding scheme of Saran would be a predictable variation.

U.S. 4,901,075 CLAIM ELEMENTS	Saran Patent	Chen Article
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	Saran discloses a system and method for encoding a video signal generated based on a scan of a document wherein the video signal includes black terminated white runs (in difference modulated and unmodulated signals) that are run length encoded using a code to reduce redundancies and compress binary video signals. *See Col. 1:67 – Col. 2:38; Col. 3:31-34; Col. 4:50-Col. 5:7; Col. 9:7-26 and Col. 9:27-45.* In Saran, a raster input scanner converts the information content of an original document into a corresponding signal which is in turn converted into a raw binary video signal which is then difference modulator using a difference modulator 31. *See Col. 4:50-59 and Col. 5:56-62.* The difference modulator generates difference modulated picture elements and unmodulated picture elements of opposite logic levels (i.e., "1" and "0"). *See Col. 6:9-19.* An example of the series of difference modulated and unmodulated picture elements are shown lines a-c of Figure 4. "0" is the signal value (A) occurring most frequently in runs. *See Col. 9:7-17.*	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227.*

U.S. 4,901,075 CLAIM ELEMENTS	Saran Patent	Chen Article
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	As shown in Figure 4, black terminated white runs are derived (a run of "0" different modulated signals with a "1"). *See Col. 9:7-26 and Figure 4.*	
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	Saran discloses that the codewords formed for the black terminated white runs (a run of zeros with a "1" at the end), such as 3W+B and 6W+B as shown in Figure 4, are the codewords "10111" and "11010" respectively. *See Col. 9:7-26 and Figure 4.* These codewords are residue codes e. *See Col. 13:1-16 and Figure 4.*	
4. The method of claim 3, wherein said code words are Huffman code words.	Saran discloses that, "Thus, it should be recalled that the basic Huffman rule for taking advantage of variable length run length message codes is that the code assigned to any given run length should be no longer than the code assigned to any less probable run length. *See Col. 2:27-38 and Col. 9:39-43.*	

Invalidity Chart for U.S. Patent No. 4,316,222 to Subramaniam in view of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder," IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

It would be obvious under 35 U.S.C. § 103 to combine the coding technique taught in U.S. Patent No. 4,316,222 to Subramaniam with the use of transform coefficients in image and video coding as taught by the Chen Article because: 1) both Subramaniam and the Chen Article are in the field of image compression; 2) DCT coefficients were well known; and 3) using DCT coefficients with the coding scheme of Subramaniam would be a predictable variation.

U.S. 4,901,075 CLAIM ELEMENTS	Subramaniam Patent	Chen Article
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	A method is disclosed for reducing the number of bits of information when transmitting a video image. *See Col. 1:7-11.* In the method, an image is divided into a series of rows of data elements of different types, such as black and white colors, so that a series of digital elements (white areas generate a "0" output and black areas generate a "1" output) are generated which correspond to the sequence of signal values. *See Col. 2:30-38.* When working with documents, the image processor 10 converts the original image data into long strings of 0's followed by short strings of 1's and short strings of 1's followed by long strings of 0's. *See Col. 2:62-66.*	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression of video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227.*

<table>
<tr><th>U.S. 4,901,075 CLAIM ELEMENTS</th><th>Subramaniam Patent</th><th>Chen Article</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and</td><td>From the image signals, runs length symbols are located and these runs are white-black (WB) runs and black-white (BW) runs. See Col. 2:66- Col. 3:8.

In the preferred implementation, the WB run has a white half run 1 to 511 pixels and the black half run is 0 to 7 pixels and the BW run has black half run of 1 to 7 pixels and a white half run of 0 to 511 pixels. See Col. 3:4-8.</td><td></td></tr>
<tr><td>(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.</td><td>As shown in Figures 2A and 2B (reproduced below), the encoder codes “01”, “001”, 511 0s followed by a 1, “10”, “100” and a 1 followed by 511 zeros with the variable length code words “111”, “01001”, “010001110”, “10”, “1100” and “01000” respectively wherein a series of 0s or 1s are followed by a single bit of the other value.
<table>
<tr><th>RUN LENGTH</th><th>RUN FEATURE</th><th>ENCODING SYMBOL</th><th>BINARY PROM ADDRESS</th><th>VARIABLE LENGTH CODE WORD</th></tr>
<tr><td>01</td><td>1,0</td><td>8</td><td>1000</td><td>111</td></tr>
<tr><td>011</td><td>1,1</td><td>9</td><td>1001</td><td>011</td></tr>
<tr><td>01111111</td><td>1,6</td><td>14</td><td>1110</td><td>1010</td></tr>
<tr><td>011111111</td><td>1,7</td><td>15</td><td>1111</td><td>10111</td></tr>
<tr><td>001</td><td>2,0</td><td>16</td><td>10000</td><td>01001</td></tr>
<tr><td>0011111111</td><td>2,6</td><td>22</td><td>10110</td><td>11001</td></tr>
<tr><td>0011111111</td><td>2,7</td><td>23</td><td>10111</td><td>110000</td></tr>
<tr><td>0001</td><td>3,0</td><td>24</td><td>11000</td><td>100111</td></tr>
<tr><td>00…001 11…11
6 7</td><td>8,7</td><td>71</td><td>1000111</td><td>100001</td></tr>
<tr><td>00…0 11
139</td><td>139,1</td><td>1113</td><td>10001010001</td><td>110001100</td></tr>
<tr><td>00…0 1111111
500 7</td><td>500,7</td><td>4007</td><td>11111010011111</td><td>010101000</td></tr>
<tr><td>000…00
511</td><td>511,0</td><td>4088</td><td>111111111000</td><td>010111000</td></tr>
<tr><td>0000 1
511</td><td>511,1</td><td>4089</td><td>111111111001</td><td>010001110</td></tr>
<tr><td>00…0 111111
511</td><td>511,6</td><td>4094</td><td>111111111110</td><td>001010001</td></tr>
<tr><td>00…00 111111
511</td><td>511,7</td><td>4095</td><td>111111111111</td><td>001010100</td></tr>
</table></td><td></td></tr>
</table>

<table>
<tr><th>U.S. 4,901,075 CLAIM ELEMENTS</th><th>Subramaniam Patent</th><th>Chen Article</th></tr>
<tr><td></td><td>
<table>
<tr><th>RUN LENGTH</th><th>RUN FEATURE</th><th>ENCODING SYMBOL</th><th>BINARY PROM ADDRESS</th><th>VARIABLE LENGTH CODE WORD</th></tr>
<tr><td>10</td><td>1,0</td><td>512</td><td>1000</td><td>10</td></tr>
<tr><td>100</td><td>1,1</td><td>513</td><td>10000</td><td>1100</td></tr>
<tr><td>10 00000···00 511</td><td>1,511</td><td>1023</td><td>1111111111</td><td>01000</td></tr>
<tr><td>110</td><td>2,0</td><td>1024</td><td>10000000000</td><td>111000</td></tr>
<tr><td>1100</td><td>2,1</td><td>1025</td><td>10000000001</td><td>001111</td></tr>
<tr><td>110 00···000 511</td><td>2,511</td><td>1535</td><td>10111111111</td><td>001110</td></tr>
<tr><td>1110</td><td>3,0</td><td>1536</td><td>11000000000</td><td>1110010</td></tr>
<tr><td>1110 000···00 510</td><td>3,510</td><td>2046</td><td>11111111110</td><td>1101110</td></tr>
<tr><td>1110 00···00 511</td><td>3,511</td><td>2047</td><td>11111111111</td><td>1101100</td></tr>
<tr><td>110 0000 199</td><td>2,199</td><td>1223</td><td>10011000111</td><td>1111100</td></tr>
<tr><td>11111000</td><td>5,2</td><td>2562</td><td>10100000010</td><td>00100100</td></tr>
<tr><td>11111110</td><td>7,1</td><td>3585</td><td>11100000001</td><td>00110111</td></tr>
<tr><td>111111000</td><td>7,3</td><td>3587</td><td>11100000011</td><td>00100101</td></tr>
<tr><td>111111 00·0·0 511</td><td>7,511</td><td>4095</td><td>11111111111</td><td>0000110</td></tr>
</table>
See Figures 2A and 2B.

Subramaniam provides that, "the run length symbols are used to address an encoder PROM (programmable read-only memory) in which a series of variable-length code words are stored. These code words are assigned to their corresponding symbol addresses based upon their frequency of occurrence." See Col. 2:1-6. An example of the codewords are shown in Figures 2A and 2B (reproduced above).
</td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>4. The method of claim 3, wherein said code words are Huffman code words.</td><td>The variable length codes may be Huffman codes. See Col. 1:21-22.</td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:</td><td>A method is disclosed for reducing the number of bits of information when transmitting a video image. See Col. 1:7-11. In the method, an image is divided into a series of rows of data elements of different types, such as black and white colors, so that a series of digital elements (white areas generate a "0" output and black areas generate a "1" output) are generated which correspond to the sequence of signal values. See Col. 2:30-38.</td><td>Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth</td></tr>
</table>

U.S. 4,901,075 CLAIM ELEMENTS	Subramaniam Patent	Chen Article
		compression for video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generated DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	When working with documents, the image processor 10 converts the original image data into long strings of 0's followed by short strings of 1's and short strings of 1's followed by long strings of 0's. *See Col. 2:62-66.*	
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	From the image signals, runs length symbols are located and these runs are white-black (WB) runs and black-white (BW) runs. *See Col. 2:66- Col. 3:8.* As can be seen the value "0" is the signal value (A) occurring most frequently in runs. In the preferred implementation, the WB run has a white half run 1 to 511 pixels and the black half run is 0 to 7 pixels and the BW run has black half run of 1 to 7 pixels and a white half run of 0 to 511 pixels. *See Col. 3:4-8.*	

<table>
<tr><th>U.S. 4,901,075 CLAIM ELEMENTS</th><th>Subramaniam Patent</th><th>Chen Article</th></tr>
<tr><td>(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.</td><td>As shown in Figures 2A and 2B (reproduced below), the encoder codes "01", "001", 511 0s followed by a 1, "10", "100" and a 1 followed by 511 zeros with the variable length code words "111", "01001", "010001110", "10", "1100" and "01000" respectively wherein a series of 0s or 1s are followed by a single bit of the other value.
<table>
<tr><th>RUN LENGTH</th><th>RUN FEATURE</th><th>ENCODING SYMBOL</th><th>BINARY PROM ADDRESS</th><th>VARIABLE LENGTH CODE WORD</th></tr>
<tr><td>01</td><td>1,0</td><td>8</td><td>1000</td><td>111</td></tr>
<tr><td>011</td><td>1,1</td><td>9</td><td>1001</td><td>011</td></tr>
<tr><td>01111111</td><td>1,6</td><td>14</td><td>1110</td><td>1010</td></tr>
<tr><td>011111111</td><td>1,7</td><td>15</td><td>1111</td><td>10111</td></tr>
<tr><td>001</td><td>2,0</td><td>16</td><td>10000</td><td>01001</td></tr>
<tr><td>0011111111</td><td>2,6</td><td>22</td><td>10110</td><td>11001</td></tr>
<tr><td>0011111111</td><td>2,7</td><td>23</td><td>10111</td><td>110000</td></tr>
<tr><td>0001</td><td>3,0</td><td>24</td><td>11000</td><td>100111</td></tr>
<tr><td>00…00 (8) 11…11 (7)</td><td>8,7</td><td>71</td><td>1000111</td><td>100001</td></tr>
<tr><td>00…0 (139) 11</td><td>139,1</td><td>1115</td><td>10001011001</td><td>110001100</td></tr>
<tr><td>00…0 (500) 1111111 (7)</td><td>500,7</td><td>4007</td><td>11111010011</td><td>010101000</td></tr>
<tr><td>000…00 (511)</td><td>511,0</td><td>4088</td><td>11111111000</td><td>010111000</td></tr>
<tr><td>0000 (511) 1</td><td>511,1</td><td>4089</td><td>11111111001</td><td>010001110</td></tr>
<tr><td>00…0 (511) 111111</td><td>511,6</td><td>4094</td><td>11111111110</td><td>001010001</td></tr>
<tr><td>00…00 (511) 111111</td><td>511,7</td><td>4095</td><td>11111111111</td><td>001010100</td></tr>
</table>
<table>
<tr><th>RUN LENGTH</th><th>RUN FEATURE</th><th>ENCODING SYMBOL</th><th>BINARY PROM ADDRESS</th><th>VARIABLE LENGTH CODE WORD</th></tr>
<tr><td>10</td><td>1,0</td><td>512</td><td>1000</td><td>10</td></tr>
<tr><td>100</td><td>1,1</td><td>513</td><td>10000</td><td>1100</td></tr>
<tr><td>10 00000…00 (511)</td><td>1,511</td><td>1025</td><td>11111111111</td><td>01000</td></tr>
<tr><td>110</td><td>2,0</td><td>1024</td><td>10000000000</td><td>111000</td></tr>
<tr><td>1100</td><td>2,1</td><td>1025</td><td>10000000001</td><td>001111</td></tr>
<tr><td>110 00…000 (511)</td><td>2,511</td><td>1536</td><td>10111111111</td><td>001110</td></tr>
<tr><td>1110</td><td>3,0</td><td>1536</td><td>11000000000</td><td>111010</td></tr>
<tr><td>1110 000…00 (510)</td><td>3,510</td><td>2046</td><td>11111111110</td><td>110110</td></tr>
<tr><td>1110 00…00 (511)</td><td>3,511</td><td>2047</td><td>11111111111</td><td>110100</td></tr>
<tr><td>110 0000 (199)</td><td>2,199</td><td>1223</td><td>10011000111</td><td>11111100</td></tr>
<tr><td>11111000</td><td>5,2</td><td>2562</td><td>10100000010</td><td>00100100</td></tr>
<tr><td>11111110</td><td>7,1</td><td>3585</td><td>11100000001</td><td>00110111</td></tr>
<tr><td>111111000</td><td>7,3</td><td>3587</td><td>11100000011</td><td>00100101</td></tr>
<tr><td>1111111 00…0…0 (511)</td><td>7,511</td><td>4095</td><td>11111111111</td><td>00001101</td></tr>
</table>
See Figures 2A and 2B.

Subramaniam provides that, "the run length symbols are used to address an encoder PROM</td><td></td></tr>
</table>

U.S. 4,901,075 CLAIM ELEMENTS	Subramaniam Patent	Chen Article
	(programmable read-only memory) in which a series of variable-length code words are stored. These code words are assigned to their corresponding symbol addresses based upon their frequency of occurrence." *See Col. 2:1-6.* An example of the codewords are shown in Figures 2A and 2B (reproduced above).	
11. The method of claim 8, comprising the additional steps of: determining whether the run length of each event exceeds a predetermined run length and if so, splitting said respective event into a plurality of sections so that each of said sections has a run length below said predetermined run length, and assigning a code word to each section.	The method provides that, if the first half or second half of a run length exceeds the maximum length specified for that particular color, then that run length must be broken down by using both the general rule and its exception. *See Col. 3:44- Col. 4:68.*	

Invalidity Chart for U.S. Patent No. 3,984,833 to Van Voorhis In View of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder," IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

It would be obvious under 35 U.S.C. § 103 to combine the coding technique taught in U.S. Patent No. 3,984,833 to Van Voorhis with the use of transform coefficients in image and video coding as taught by the Chen Article because: 1) both Van Voorhis and the Chen Article are in the field of image compression; 2) DCT coefficients were well known; and 3) using DCT coefficients with the coding scheme of Van Voorhis would be a predictable variation.

U.S. 4,901,075 CLAIM ELEMENTS	Van Voorhis Patent	Chen Article
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	Van Voorhis discloses an apparatus for encoding extended run-length codes for the compression of digital images that are a two-dimensional array of image points. *See Col. 1:13-19.* The compression of the digital images (using run length codes) reduces the storage requirements for digital images and reduces the bandwidth required for the transmission of the digital images *See Col. 1:27-31.* The value zero occurs far more frequency than the signal value one. From the examples, the value zero occurs most frequency in uninterrupted runs. For example, column 14, lines 64 to 66, mentions: *"For the purpose of the illustration, a run is defined as a one or as a string of one or more zeros and the first one following this string of zeros."* Van Voorhis discloses that an image, for a black/white image, has image points that are converted into a single bit of information with a value of either 0 or 1 to indicate that the corresponding area of the picture is light or dark. *See Col. 1, lines 19-23.*	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression in video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used for image and video coding to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227.*
(a) deriving from said signal, a plurality of	Van Voorhis discloses that an event may be a binary encoded	

U.S. 4,901,075 CLAIM ELEMENTS	Van Voorhis Patent	Chen Article
events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	representation of an alphanumeric character, an analog voltage, a run of binary video information, a run of binary image information or any other type of information capable of recognition. *See Col. 6, lines 59-65.* Van Voorhis also describes that, from the signal, runs are recognized as follows: "*In such as circumstance, the event recognizer 10 of Van Voorhis may recognize each sequence of consecutive bits of the same logic , which is denoted as a run. Runs may also be sequences of bits of one of the logic levels, or sequences of a level terminating in another level.*" *See Col. 7:11-15.* Van Voorhis discloses an example of a run (See Col. 14:64-66; underlining was added): *"For the purpose of the illustration, a run is defined as a one or as a string of one or more zeros and the first one following this string of zeros."* Further examples can be found in col. 15, lines 11- 32.	
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	Van Voorhis discloses coding of events where the event may include a string of one or more zeros and the first one following this string of zeros. *See Col. 14, lines 64-66.* The encoder then calculates and outputs code words for a specific class of ordinary and extended run-length codes. *See Col, 3, lines 58-61.* Examples of the codes used by the coder are shown in Tables 1 and 2. *See Col. 3, line 58 – Col. 4, line 64 and Tables 1 and 2.*	

U.S. 4,901,075 CLAIM ELEMENTS	Van Voorhis Patent	Chen Article
4. The method of claim 3, wherein said code words are Huffman code words.	Van Voorhis describes a coding method wherein the relative frequencies of the occurrence for the various runs and special situations may be measured in a sample of images and the relative frequencies are used to calculate code word lengths that are ordered and bounded. The coding method places regular events approximately in order of decreasing relative frequency. *See Col, 5, lines 3-56.*	

Invalidity Chart For Henry H. J. Liao, "Upper Bound, Lower Bound and Run-Length Substitution Coding", NTC '77 Conference Record, Vol. 3, pp. 49:3-1 to 49:3-6 (1977) (the "Liao Article") in View of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder", IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

It would be obvious under 35 U.S.C. § 103 to combine the coding technique taught in the Liao Article with the use of transform coefficients in image and video coding as taught by the Chen Article because: 1) both the Liao Article and the Chen Article are in the field of image compression; 2) DCT coefficients were well known; and 3) using DCT coefficients with the coding scheme of the Liao Article would be a predictable variation.

US 4,901,075 CLAIM ELEMENTS	Liao Article	Chen Article
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method	The Liao Article discusses several bounds of "bandwidth compression for run-length coding." *See pg. 49:3-1, left column, Abstract.* The Liao Article discusses run-length coding for a facsimile signal quantized into a sequence of binary digits (1's and 0's) which directly represent black and white picture elements. *See pg. 49:3-1, left column, first paragraph of Introduction.* The Liao Article also discusses image data run-length coding after a set of prediction errors are generated. *See pg. 49:3-1, left column, first paragraph of Introduction.* Thus, the Liao Article	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generated DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See 225-227.*

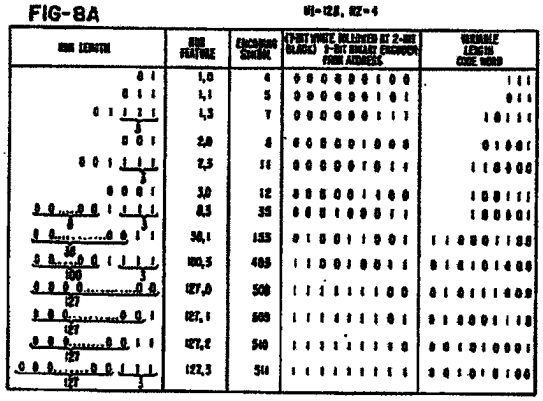
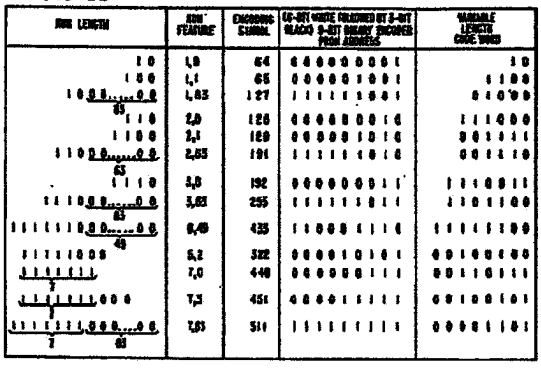
US 4,901,075 CLAIM ELEMENTS	Liao Article	Chen Article
comprising the steps of:	discusses bandwidth compression (bit rate reduction) bounds for run length coding of a sequence of binary digits or predictive error values.	
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	The Liao Article, the prediction error values are determined in which the run-length of prediction errors constitute a majority of single bit runs (B) and a few other short runs. *See pg. 49:3-2, left column, first paragraph of Maximum Entropy Lower Bound section.* The prediction errors are recorded as "B" and correct predictions are recorded as "W" so that a message set for these prediction values in shown in Table 1 that have runs of W followed by B. *See pg. 49:3-2, left column, first paragraph of Maximum Entropy Lower Bound section and Table 1.*	
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	The Liao Article states that, "The best code assignment will be the set of codes with the shortest average length, i.e., the minimum redundancy code. Huffman's coding is a systematic procedure for constituting such as code with minimum redundancy." *See pg. 49:3-1, left column, second paragraph of Introduction section.* The Liao Article also contains a table with a run-length substitution code that is a Huffman code that represent a run of W values (zero to nine) followed by a B value. *See pg. 49:3-3, left and right columns, Run-Length Substitution section, Table 2 and pg. 49:3-6, Table 5.* Table 5 shows the frequency of each run-length and the Huffman length assigned to each run-length based on the frequency. In these tables, Huffman codes are formed from the prediction error values.	

US 4,901,075 CLAIM ELEMENTS	Liao Article	Chen Article
4. The method of claim 3, wherein said code words are Huffman code words.	The Liao Article also contains a table with a run-length substitution code that is a Huffman code that represent a run of W values (zero to nine) followed by a B value. *See pg. 49:3-3, left and right columns, Run-Length Substitution section, Table 2 and pg. 49:3-6, Table 5.* Table 5 shows the frequency of each run-length and the Huffman length assigned to each run-length based on the frequency. In these tables, Huffman codes are formed from the prediction error values.	

Invalidity Chart for U.S. Patent No. 4,363,036 in View of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder", IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

It would be obvious under 35 U.S.C. § 103 to combine the coding technique taught in U.S. Patent No. 4,363,036 to Subramaniam with the use of transform coefficients in image and video coding as taught by the Chen Article because: 1) both Subramaniam and the Chen Article are in the field of image compression; 2) DCT coefficients were well known; and 3) using DCT coefficients with the coding scheme of Subramaniam would be a predictable variation.

U.S. 4,901,075 CLAIM ELEMENTS	Subramaniam '036 Patent	Chen Article
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal	A method for compressing digital data is disclosed that generates prediction error pixels from the digital data to form symbols (WB runs or BW runs) which are then coded using variable length codewords. *See Abstract, Figures 8A and 8B and Col. 3:54 – Col. 4:51.* The invention relates to data compression and in particular a novel method and apparatus for reducing the number of bits of information needed to transmit a video image which reduces bandwidth requirements and storage requirements. *See Col. 1: 15-24.* In the method, a prediction table and a window	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that

U.S. 4,901,075 CLAIM ELEMENTS	Subramaniam '036 Patent	Chen Article
comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	predictor transform the facsimile image into prediction error values with "0" values and "1" values with minimum redundancy. *See Col. 2:56-58.* The window predictor consists of 13 pixels with pixels in the current scan line and 3 previous scan lines (a block) as shown in Figure 4B. *See Col. 9:40-44.*	are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227.*
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	Once the digital image is scanned and prediction errors are determined, run lengths are determined wherein the run lengths are: 1) white-black (WB) runs; and 2) black-white (BW) runs wherein each run has two sections called a black half and a white half. *See Col. 10:45-59 and Figures 8A and 8B.* FIG-8A  FIG-8B 	

U.S. 4,901,075 CLAIM ELEMENTS	Subramaniam '036 Patent	Chen Article
	As shown in Figures 8A and 8B, "01", "001", "0001" and "127 0's and a "1", "10", "100" and "1 with 63 0's" are examples of the run lengths.	
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	As shown in Figure 8A and 8B, each of the run lengths (including the specific examples above) is coded using a variable length code. *See Figures 8A and 8B and Col. 10:45-59.*	
4. The method of claim 3, wherein said code words are Huffman code words.	The variable length codes are Huffman codes. *See Col 1:31-3, Col. 10:45-59 and Figures 8A and 8B.*	

Kodak refers Philips to the individuals identified in Kodak's initial disclosures and Kodak's document production. Kodak's investigation into this Interrogatory is ongoing. Kodak will supplement and/or amend this response as circumstances and its ongoing investigation warrant.

INTERROGATORY NO. 3:

For every claim of the patent-in-suit that YOU allege is invalid over prior art under 35 U.S.C. §§ 102 or 103, describe in a claim chart, separately for each claim so identified, how each and every claim limitation is disclosed or suggested by specific teachings in identified items of prior art; identify each person who has knowledge about the subject matter of this interrogatory; and identify each document and thing relating to the subject matter of this interrogatory.

FIRST SUPPLEMENTARY RESPONSE TO INTERROGATORY NO. 3:

Kodak objects to this Interrogatory to the extent it calls for legal conclusions or expert opinion. Kodak further objects to this Interrogatory as seeking information protected by the attorney-client privilege, the work product immunity doctrine and/or other applicable privileges or protections. Kodak objects to this Interrogatory as compound because it contains discrete subparts that require separate and distinct responses. Kodak objects to this Interrogatory as overly broad and unduly burdensome. This Interrogatory is premature in light of the expert discovery schedule agreed to by the parties and reflected in the Court's scheduling order. This Interrogatory is also premature because it seeks Kodak's contentions and analysis before Kodak has completed discovery relating to invalidity, before Kodak has conducted expert discovery on invalidity, and before the Court has issued a claim construction ruling. Subject to these objections and the general objections set forth above, Kodak responds as follows:

Invalidity Chart For U.S. Patent No. 4,494,151 to Liao

U.S. 4,901,075 CLAIM ELEMENTS	U.S. Patent No. 4,494,151 to Liao
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	Liao states that, "*There is a need for electronic systems for compacting data so that the information contained within said data may be stored in less memory space or transmitted at a higher rate.*" *See Col. 1:14-17.* Liao also discloses that one technique (to transmit at higher speed or reduce the bitrate) is the use of a simple run length code. *See Col. 1:18-21.* Liao also discloses that "*The object of the invention, therefore, is to provide a modified run-length encoding circuit which allows the efficient encoding/decoding of binary data at high data rates.*" *See Col. 2:15-19.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	Liao discloses, with reference to Figure 3 that, "*The majority of bits output are white or 0 bits since the scanned document usually is text*" when referring to the output bits from a raster input scanner 30 which are input to a predictor 31 that usually further reduces the number of 1 bits. *See Figure 3 and Col. 3:42-54.* Thus, in Liao, "*Because the data is first processed by a predictor, there is an increased likelihood of the encoder input comprising long strings of 0s.*" *See Col. 1:62-64.*

U.S. 4,901,075 CLAIM ELEMENTS	U.S. Patent No. 4,494,151 to Liao
	The sequence of predictive values "0" and "1" values from an image predictor 31 as shown in Figures 2 and 3 are input to an encoder 32. *See Figures 2 and 3.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	In Liao, "The encoder maximizes the compression of these strings by grouping the input data into data words comprising an uninterrupted line of nibbles containing all 0s, regardless of how many that may be, followed by a terminating nibble having at least one 1 bit. A first code word portion is assigned to the number of all-zero nibbles, and a second code word portion is assigned to the data pattern of the terminating nibble. The final code word is the combination of the first and second code word portions." *See Col. 1:64 – Col. 2:5.*
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	The code words assigned to each portion is shown in Figure 1A and the code words are of variable length wherein the code words are shorter than the original data and the more frequently occurring run lengths are assigned to short code words. *See Figure 1A and Col. 6:20- 44.* In Liao, "*In Example 1, the first string comprises 31 all-zero nibbles and a terminating nibble of 1000. X&A and 26≤Y≤63 so a Type 3A output word is called for. In this case, 11,nnnnnnn,bbbb =11,011111 (31 all-zero nibbles), 1000 (actual bit pattern).*" *See Figure 2 and Col. 3:13-18.* Thus, the different signal value (a terminating nibble such as "1000") and a preceding run of all zero nibbles (such as 31 all-zero nibbles) are coded using a codeword.
11. The method of claim 8, comprising the additional steps of: determining whether the run length of each event exceeds a predetermined run length and if so, splitting said respective event into a plurality of sections so that each of said sections has a run length below said predetermined run length, and assigning a code word to each section.	Liao discloses that "*If there are 64 or more all-zero nibbles before a non-zero terminating nibble, the data string is converted into a first part comprising a number of sets of 64 all-zero nibbles and a second part comprising the remaining 0 to 63 all-zero nibbles and the terminating nibble.*" *See Col. 3:2-7.* Thus, when a run of non-zero nibbles together with the terminating nibble exceeds a predetermined length (more than 64 all-zero nibbles), the run of non-zero nibbles and the terminating nibble are split into sections (the first and second parts) wherein the length of each section is below a predetermined value (64 all-zero nibbles), and each section has a codeword assigned to the section.

Invalidity Chart For Henry H. J. Liao, "Upper Bound, Lower Bound and Run-Length Substitution Coding", NTC '77 Conference Record, Vol. 3, pp. 49:3-1 to 49:3-6 (1977) (the "Liao Article")

US 4,901,075 CLAIM ELEMENTS	Liao Article
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	The Liao Article discusses several bounds of "bandwidth compression for run-length coding." *See pg. 49:3-1, left column, Abstract.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	The Liao Article discusses run-length coding for a facsimile image that is converted into a sequence of binary digits (1's and 0's) which directly represent black and white picture elements. *See pg. 49:3-1, left column, first paragraph of Introduction.* The Liao Article also discusses image data run-length coding after a set of prediction error values are determined. *See pg. 49:3-1, left column, first paragraph of Introduction.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	The prediction error values are determined in which the run-length of prediction errors constitute a majority of single bit runs (B) and a few other short runs. *See pg. 49:3-2, left column, first paragraph of Maximum Entropy Lower Bound section.* The prediction errors are recorded as "B" and correct predictions are recorded as "W" so that a message set for these prediction values in shown in Table 1 that have runs of W followed by B. *See pg. 49:3-2, left column, first paragraph of Maximum Entropy Lower Bound section and Table 1.*
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	The Liao Article states that, "The best code assignment will be the set of codes with the shortest average length, i.e., the minimum redundancy code. Huffman's coding is a systematic procedure for constituting such as code with minimum redundancy." *See pg. 49:3-1, left column, second paragraph of Introduction section.* The Liao Article also contains a table with a run-length substitution code that is a Huffman code that represents a run of W values (zero to nine) followed by a B value. *See pg. 49:3-3, left and right columns, Run-Length Substitution section, Table 2 and pg. 49:3-6, Table 5.* Table 5 shows the frequency of each run-length and the Huffman length assigned to each run-length based on the frequency. In these tables, Huffman codes are formed from the prediction error values (the sequence of signal values).
11. The method of claim 8, comprising the additional steps of:	The Liao Article discloses that in run-length substitution, "a fixed number of runs is picked from the entire message set." *See pg. 49:3-3, left column, first paragraph of Run-Length Substitution section.*

US 4,901,075 CLAIM ELEMENTS	Liao Article
determining whether the run length of each event exceeds a predetermined run length and if so, splitting said respective event into a plurality of sections so that each of said sections has a run length below said predetermined run length, and assigning a code word to each section.	The Liao Article further discloses that, "Runs without codes can be represented by two or more shorter runs with codes. For example, in Table 2, the run-length 4W is selected and 5W+B is not selected, the run 5W+B is substituted by 4W + (W+B)." *See pg. 49:3-3, left and right columns, first paragraph of Run-Length Substitution section and Table 2.*

Invalidity Chart for U.S. Patent No. 4,420,771 to Pirsch

U.S. 4,901,075 CLAIM ELEMENTS	Pirsch Patent
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	Pirsch discloses a method for encoding multi-level signals. *See Title and Col. 1:60- 2:8 and 2:34-50.* Pirsch also discloses that multi-level signal encoding results in reducing redundancy in the signal and reducing the amount of data needed to represent the signal and the object of the present invention is to enable more efficient encoding of a multi-level signal. *See Col. 1:45-57.* Pirsch states that "The present invention relates generally to a technique for encoding multi-level signal and, in particular, to a form of run-length coding of such signals when one of the levels occurs much more frequently than all of the other possible levels." *See Col. 1, lines 6-10.* In addition, Pirsch discloses that the system is used for encoding error prediction values wherein "a large number of the error values will have values at or near ZERO." These large number of error values "form the "frequent value" inputs to the encoder.." *See Col. 2, lines 39-45.* The error prediction values may be quantized. *See Col. 3, lines 2-5.* Pirsch discloses that "multi-level signals derived from other sources may be processed in accordance with the instant invention and that advantageous results will be achieved as long as a heavy bias exists in favor of a given

U.S. 4,901,075 CLAIM ELEMENTS	Pirsch Patent
	most frequent value." and "the present invention is useful with any series of input samples or words capable of having at least M different values." *See Col. 2, lines 45-50 and Col. 11, lines 9-24.*
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	In the preferred embodiment of Pirsch, run length codes for frequent values (FRL), run length codes for non-frequent values (NFRL) and codes for the non-frequent value (NFV) are generated. *See Figure 3, Col. 1:60- Col. 2:9, Col. 7:5- Col. 8:15 and Table 4.* Pirsch provides "The definition of a "run" stated previously, namely, a series of consecutive inputs having the same value, can also be modified, if desired, without diminishing the advantages of the present invention. Specifically, an alternative definition of a run may be a series of consecutive words of like value as well as the next (subsequent) word of different value." (Emphasis added) *See Col. 11, lines 25-43.*
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	Pirsch discloses a method for encoding multi-level signals in which runs of the "frequent values" and the next subsequent value are encoded by a coder 191 using a variable length codes with an example of the codes for encoding the non-frequent values shown in Table 4. *See Col. 1:60- Col. 2:9, Col. 7:5- Col. 8:15 and Table 4.*
4. The method of claim 3, wherein said code words are Huffman code words.	The runs of the "frequent values" and the less frequent values are encoded by a coder 191 using a variable length Huffman code with an example of the Huffman codes for encoding the non-frequent values shown in Table 4. *See Col. 1:60- Col. 2:9, Col. 7:5- Col. 8:15 and Table 4.*
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	Pirsch discloses a method for encoding multi-level signals. *See Title and Col. 1:60- 2:8 and 2:34-50.* Pirsch also discloses that multi-level signal encoding results in reducing redundancy in the signal and reducing the amount of data needed to represent the signal and the object of the present invention is to enable more efficient encoding of a multi-level signal. *See Col. 1:45-57.* Pirsch states that "The present invention relates generally to a technique for encoding multi-level signal and, in particular, to a form of run-length coding of such signals when one of the levels occurs much more frequently than all of the other possible levels." *See Col. 1, lines 6-10.*
(a) transforming said signal into a sequence comprising zero	In the example of Pirsch given in Col. 11:31-43, only binary values are given. However, it is apparent that, in

U.S. 4,901,075 CLAIM ELEMENTS	Pirsch Patent
coefficients occurring in runs and non-zero coefficients;	encoding method disclosed in Pirsch, that the other signal values can also take other values than "1" since Pirsch deals with "multi-level" coding, i.e. coding of signals with at least three values. *See Col. 11:9-14: "M≥3".* In addition, Pirsch provides that "it is to be clearly understood that multi-level signals derived from other sources may be processed ..." and "that advantageous results will be achieved as long as a heavy bias exists in favor of a given most frequent value." *See Col. 2:25-50.* In addition, Pirsch discloses that the system is used for encoding error prediction values wherein "a large number of the error values will have values at or near ZERO." These large number of error values "form the "frequent value" inputs to the encoder.." *See Col. 2, lines 39-45.* The error prediction values may be quantized. *See Col. 3, lines 2-5.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	In the preferred embodiment of Pirsch, run length codes for frequent values (FRL), run length codes for non-frequent values (NFRL) and codes for the non-frequent value (NFV) are generated. *See Figure 3, Col. 1:60- Col. 2:9, Col. 7:5- Col. 8:15 and Table 4.* Pirsch provides "The definition of a "run" stated previously, namely, a series of consecutive inputs having the same value, can also be modified, if desired, without diminishing the advantages of the present invention. Specifically, an alternative definition of a run may be a series of consecutive words of like value as well as the next (subsequent) word of different value." (Emphasis added) *See Col. 11, lines 25-43.*
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	The runs of the "frequent values" and the next subsequent value are encoded by a coder 191 using a variable length code with an example of the codes for encoding the non-frequent values shown in Table 4. *See Col. 1:60- Col. 2:9, Col. 7:5- Col. 8:15 and Table 4.*

Invalidity Chart for U.S. Patent 4,136,363 to Saran

U.S. 4,901,075 CLAIM ELEMENTS	Saran Patent
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps	Saran discloses a system and method for encoding a video signal generated based on a scan of a document wherein the video signal includes black terminated white runs (in

U.S. 4,901,075 CLAIM ELEMENTS	Saran Patent
of:	difference modulated and unmodulated signals) that are run length encoded using a code to reduce redundancies and compress binary video signals. *See Col. 1:67 – Col. 2:38; Col. 3:31-34; Col. 4:50- Col. 5:7; Col. 9:7-26 and Col. 9:27-45.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	In Saran, a raster input scanner converts the information content of an original document into a corresponding video signal which is in turn converted into a raw binary video signal which is then difference modulator using a difference modulator 31. *See Col. 4:50-59 and Col. 5:56-62.* The difference modulator generates difference modulated picture elements and unmodulated picture elements of opposite logic levels (i.e., "1" and "0"). *See Col. 6:9-19.* An example of the series of difference modulated and unmodulated picture elements are shown lines a-c of Figure 4. "0" is the signal value (A) occurring most frequently in runs. *See Col. 9:7-17.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	As shown in Figure 4, black terminated white runs are derived (a run of "0" different modulated signals with a "1"). *See Col. 9:7-26 and Figure 4.*
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	Saran discloses that the codewords formed for the black terminated white runs (a run of zeros with a "1" at the end), such as 3W+B and 6W+B as shown in Figure 4, are the codewords "10111" and "11010" respectively. *See Col. 9:7-26 and Figure 4.* These codewords are residue codes e. *See Col. 13:1-16 and Figure 4.*
11. The method of claim 8, comprising the additional steps of: determining whether the run length of each event exceeds a predetermined run length and if so, splitting said respective event into a plurality of sections so that each of said sections has a run length below said predetermined run length, and assigning a code word to each section.	Saran discloses that, "For conserving on the storage capacity required of the memory banks 62,63 and 64,65, a block length multiple plus run length residue code format is utilized in encoding the black terminated white runs of difference modulated and unmodulated picture elements. The advantage of that format is, as shown in FIG. 4, that black terminated white runs in excess of a predetermined block length are represented by a block length multiple code d plus, if the run happens to be a noninteger multiple of the block length, a run length residue code e." *See Col. 13:1-16.* Thus, for black terminated white runs that exceed a predetermined length, Saran uses a block length multiple

U.S. 4,901,075 CLAIM ELEMENTS	Saran Patent
	code d and a run length residue code e (both Huffman codewords) for encoding the black terminated white runs that exceed the predetermined length. In the example shown in Figure 4 of Saran, a black terminated white run of 258W+B is encoded as eight 32W Huffman codes ("10011001") and then a 2W+B Huffman code ("1010") to form 9 sections with each section being less than a predetermined value (a run length of 33 in this example) and each section has a Huffman codeword assigned to the section.

Invalidity Chart For U.S. Patent No. 4,092,676 to Saran

U.S. 4,901,075 CLAIM ELEMENTS	Saran Patent
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	Saran discloses a system and method for encoding a video signal generated based on a scan of a document wherein the video signal includes black terminated white runs (in difference modulated and unmodulated signals) that are run length encoded using a code to reduce redundancies and compress binary video signals. *See Col. 1:67 – Col. 2:38; Col. 3:31-34; Col. 4:50- Col. 5:7; Col. 9:7-26 and Col. 9:27-45.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	In Saran, a raster input scanner converts the information content of an original document into a corresponding video signal which is in turn converted into a raw binary video signal which is then difference modulator using a difference modulator 31. *See Col. 4:50-59 and Col. 5:56-62.* The difference modulator generates difference modulated picture elements and unmodulated picture elements of opposite logic levels (i.e., "1" and "0"). *See Col. 6:9-19.* An example of the series of difference modulated and unmodulated picture elements are shown lines a-c of Figure 4. *See Col. 9:7-17.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	As shown in Figure 4, black terminated white runs are derived (a run of "0" different modulated signals with a "1"). *See Col. 9:7-26 and Figure 4.*
(c) for each of said events, determining the run length and assigning a code word to represent	Saran discloses that the codewords formed for the black terminated white runs (a run of zeros with a "1" at the end), such as 3W+B and 6W+B as shown in Figure 4, are

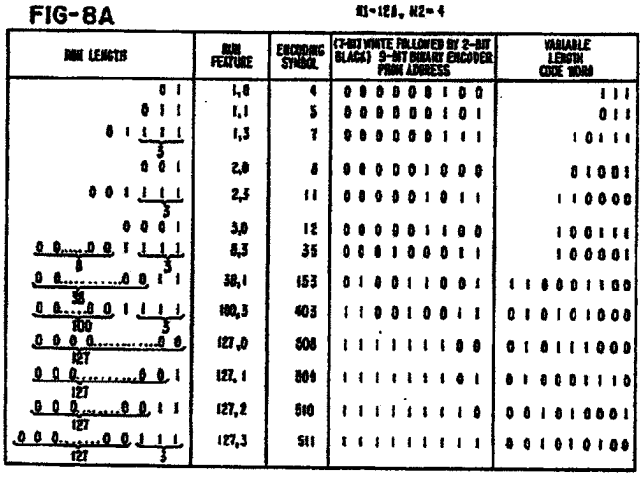
U.S. 4,901,075 CLAIM ELEMENTS	Saran Patent
said run length and said non-zero coefficient.	the codewords "10111" and "11010" respectively. *See Col. 9:7-26 and Figure 4.* These codewords are residue codes e. *See Col. 13:1-16 and Figure 4.*
11. The method of claim 8, comprising the additional steps of: determining whether the run length of each event exceeds a predetermined run length and if so, splitting said respective event into a plurality of sections so that each of said sections has a run length below said predetermined run length, and assigning a code word to each section.	Saran discloses that, "For conserving on the storage capacity required of the memory banks 62,63 and 64,65, a block length multiple plus run length residue code format is utilized in encoding the black terminated white runs of difference modulated and unmodulated picture elements. The advantage of that format is, as shown in FIG. 4, that black terminated white runs in excess of a predetermined block length are represented by a block length multiple code d plus, if the run happens to be a noninteger multiple of the block length, a run length residue code e." *See Col. 13:1-16.* Thus, for black terminated white runs that exceed a predetermined length, Saran uses a block length multiple code d and a run length residue code e for encoding the black terminated white runs that exceed the predetermined length. In the example shown in Figure 4, a black terminated white run of 258W+B is encoded as eight 32W Huffman codes ("10011001") and then a 2W+B Huffman code ("1010") to form 9 sections with each section being less than a predetermined value (a run length of 33 in this example) and each section has a Huffman codeword assigned to the section.

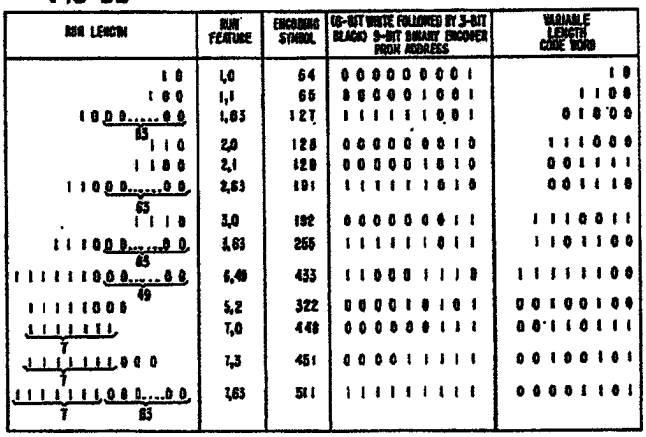
Invalidity Chart for U.S. Patent No. 4,363,036 to Subramaniam

U.S. 4,901,075 CLAIM ELEMENTS	Subramaniam '036 Patent
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	A method for compressing digital data is disclosed that generates prediction error pixels from the digital data to form symbols (WB runs or BW runs) which are then coded using variable length codewords. *See Abstract, Figures 8A and 8B and Col. 3:54 – Col. 4:51.* The invention relates to data compression and in particular a novel method and apparatus for reducing the number of bits of information needed to transmit a video image which reduces bandwidth requirements and storage requirements. *See Col. 1: 15-24.*
(a) transforming said signal into a sequence comprising zero	In the method, a prediction table and a window predictor transform the facsimile image into prediction error values

U.S. 4,901,075 CLAIM ELEMENTS	Subramaniam '036 Patent
coefficients occurring in runs and non-zero coefficients;	with "0" values and "1" values with minimum redundancy. *See Col. 2:56-58.* The window predictor consists of 13 pixels with pixels in the current scan line and 3 previous scan lines (a block) as shown in Figure 4B. *See Col. 9:40-44.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	Once the digital image is scanned and prediction errors are determined, run lengths are determined wherein the run lengths are: 1) white-black (WB) runs; and 2) black-white (BW) runs wherein each run has two sections called a black half and a white half. *See Col. 10:45-59 and Figures 8A and 8B.* As shown in Figures 8A and 8B, "01", "001", "0001" and "127 0's and a "1", "10", "100" and "1 with 63 0's" are examples of the run lengths.

FIG-8A



U.S. 4,901,075 CLAIM ELEMENTS	Subramaniam '036 Patent
	FIG-8B 
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	As shown in Figure 8A and 8B, each of the run lengths (including the specific examples above) is coded using a variable length code. *See Figures 8A and 8B and Col. 10:45-59.*
11. The method of claim 8, comprising the additional steps of: determining whether the run length of each event exceeds a predetermined run length and if so, splitting said respective event into a plurality of sections so that each of said sections has a run length below said predetermined run length, and assigning a code word to each section.	The method provides that, if the first half or second half of a run length exceeds the maximum length specified for that particular color, then that run length must be broken down by using both the general rule and its exception. *See Col. 11:26- Col. 12:54.*

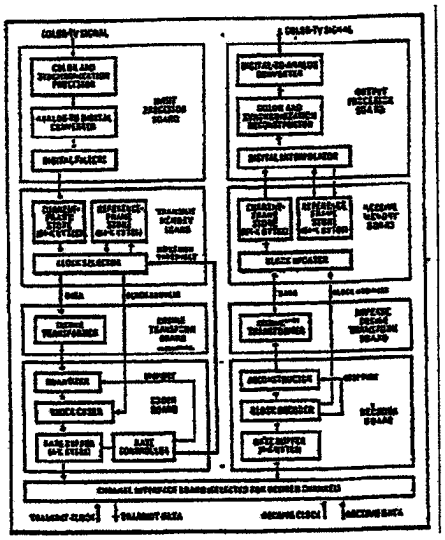
Invalidity Chart for U.S. Patent No. 3,984,833 to Van Voorhis

U.S. 4,901,075 CLAIM ELEMENTS	Van Voorhis Patent
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	Van Voorhis discloses an apparatus for encoding extended run-length codes for the compression of digital images that are a two-dimensional array of image points. *See Col. 1:13-19.* The compression of the digital images (using run length codes) reduces the storage requirements for digital

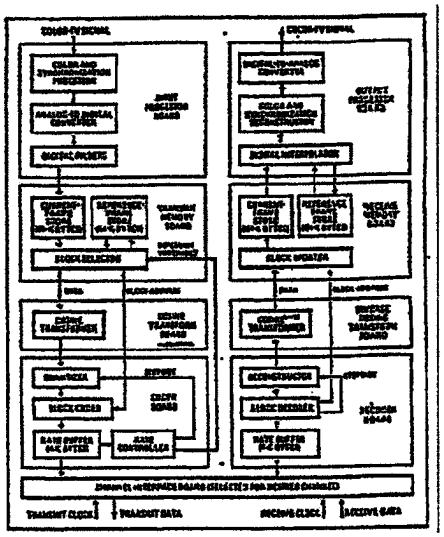
U.S. 4,901,075 CLAIM ELEMENTS	Van Voorhis Patent
	images and reduces the bandwidth required for the transmission of the digital images *See Col. 1:27-31.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	Van Voorhis discloses that an image, for a black/white image, has image points that are transformed into a single bit of information with a value of either 0 or 1 to indicate that the corresponding area of the picture is light or dark. *See Col. 1, lines 19-23.* The value zero occurs far more frequency than the other signal value one. From the examples, the value zero occurs most frequency in uninterrupted runs. For example, column 14, lines 64 to 66, mentions: *"For the purpose of the illustration, a run is defined as a one or as a string of one or more zeros and the first one following this string of zeros."*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	Van Voorhis discloses that an event may be a binary encoded representation of an alphanumeric character, an analog voltage, a run of binary video information, a run of binary image information or any other type of information capable of recognition. *See Col. 6, lines 59-65.* Van Voorhis also describes that, from the signal, runs are recognized as follows: "*In such a circumstance, the event recognizer 10 of Van Voorhis may recognize each sequence of consecutive bits of the same logic , which is denoted as a run. Runs may also be sequences of bits of one of the logic levels, or sequences of a level terminating in another level.*" *See Col. 7:11-15.* Van Voorhis discloses an example of a run (See Col. 14:64-66; underlining was added): *"For the purpose of the illustration, a run is defined as a one or as a string of one or more zeros and the first one following this string of zeros."* Further examples can be found in column 15, lines 11- 32.
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	Van Voorhis discloses coding of events where the event may include a string of one or more zeros and the first one following this string of zeros. *See Col. 14, lines 64-66.* The encoder then calculates and outputs code words for a specific class of ordinary and extended run-length codes. *See Col, 3, lines 58-61.* Examples of the codes used by the coder are shown in Tables 1 and 2. *See Col. 3, line 58 –*

U.S. 4,901,075 CLAIM ELEMENTS	Van Voorhis Patent
	Col. 4, line 64 and Tables 1 and 2.

Invalidity Chart For Widcom VTC-56

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	The Widcom VTC-56 is a video codec that has the boards shown in the diagram reproduced below. *See Widcom 1984 Article, pg. 115.*  The boards include a cosine transform board and a coder board. The VTC-56 divides each frame into 8X8 blocks of pixels that are then cosine transformed. In particular, the cosine transform board performs a cosine transform that generates an array of transform coefficients that contains a DC coefficient and 63 AC coefficients with many zero-valued AC coefficients. *See Widcom 1984 Article, pg. 114.* The coefficients in the array of transform coefficients are quantized and coded. The Widcom VTC-56 performs bandwidth compression (on color video pictures) at ratios of up to 1,440:1 which is sufficient to transmit color-TV pictures through a telephone line. *See Widcom 1984 Article, pg. 113.* The cosine transform coding for the pixel-to-pixel decorrelation

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
	(performed by the cosine transform and coder board) result in a 6:1 compression ratio (*See Widcom 1984 Article, pg. 113, table*) of the color-TV pictures (converting into quantized coefficient values which are the sequence of signal values.) The bandwidth compression causes a bitrate reduction of the sequence of signal values.
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	The events encoded by the VTC-56 include runs of zero AC coefficients followed by an AC coefficient having an absolute value of one (RL1) and runs of zero AC coefficients followed by an AC coefficient having an absolute value greater than one (RL0). *See VTC-56B Coder Theory of Operation at 4.* These events are then encoded with a code word wherein more frequently occurring values are represented by short code words and less frequently occurring values are represented by longer code words. *See Widcom 1984 Article at pg. 114.* In the VTC-56, the codewords are selected from several different tables based on the entropy of the image being encoded. In particular, there are six different tables that are used to code the AC coefficients wherein each table is optimized for a particular entropy level of the image to be coded. The table is selected based on a calculation of a standard deviation of the computed transform coefficients. *See VTC-56B Coder Theory of Operation at 3.*
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	In the VTC-56, event that include: 1) runs of zero AC coefficients followed by an AC coefficient having an absolute value of one (RL1); and 2) runs of zero AC coefficients followed by an AC coefficient having an absolute value greater than one (RL0) are encoded using a Huffman code word. *See Widcom 1984 Article at pg. 114.* The AC coefficients in the array of quantized transform coefficients are encoded in which runs of zero AC coefficients followed by a non-zero AC coefficient are encoded. In the VTC-56, runs are zero valued AC coefficients are encoded: *"Because there are so many zero-valued coefficients, the final code is further compressed by coding run lengths instead of transmitting long runs of 0 bits."*

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
	See Widcom 1984 Article, p. 114.
4. The method of claim 3, wherein said code words are Huffman code words.	The code words are Huffman codewords. In the VTC-56, the Huffman codeword is selected from several different tables based on the entropy of the image being encoded. In particular, there are six different tables that are used to code the AC coefficients wherein each table is optimized for a particular entropy level of the image to be coded. The table is selected based on a calculation of a standard deviation of the computed transform coefficients.
7. A method as claimed in claim 4, characterized in that the Huffman codeword is independent of the sign of that non-zero coefficient which succeeds or precedes the run of zero-coefficients and in that the sign is coded by a separate bit.	The VTC-56 codes the AC coefficient magnitudes with the Huffman code words above so that the Huffman codewords are independent of the sign of that coefficient. The coder board then sends the sign separately from the code for the AC coefficient magnitude. *See VTC-56B Coder Theory of Operation at 3.*
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	The Widcom VTC-56 is a video codec that has the boards shown in the diagram reproduced below. *See Widcom 1984 Article, pg. 115.*  The boards include a cosine transform board

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
	and a coder board The Widcom VTC-56 performs bandwidth compression (on color video pictures) at ratios of up to 1,440:1 which is sufficient to transmit color-TV pictures through a telephone line. *See Widcom 1984 Article, pg. 113.* The cosine transform coding for the pixel-to-pixel decorrelation (performed by the cosine transform and coder board) result in a 6:1 compression ratio (*See Widcom 1984 Article, pg. 113, table*) of the color-TV pictures (converting into quantized coefficient values which are the sequence of signal values.) The bandwidth compression causes a bitrate reduction of the sequence of signal values.
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	The boards of the VTC-56 include a cosine transform board. The VTC-56 divides each frame into 8X8 blocks of pixels that are then cosine transformed. In particular, the cosine transform board performs a cosine transform that generates an array of transform coefficients that contains a DC coefficient and 63 AC coefficients with many zero-valued AC coefficients. *See Widcom 1984 Article, pg. 114.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	The events encoded by the VTC-56 include runs of zero AC coefficients followed by an AC coefficient having an absolute value of one (RL1) and runs of zero AC coefficients followed by an AC coefficient having an absolute value greater than one (RL0). *See VTC-56B Coder Theory of Operation at 4*
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	These events are then encoded with a code word wherein more frequently occurring values are represented by short code words and less frequently occurring values are represented by longer code words. The code words are Huffman codewords. *See Widcom 1984 Article at pg. 114.* In the VTC-56, the Huffman codeword is selected from several different tables based on the entropy of the image being encoded. In particular, there are six different tables that are used to code the AC coefficients wherein each table is optimized for a particular entropy level of the image to be coded. The table is selected based on a calculation of a standard deviation of the computed transform coefficients. *See VTC-56B Coder Theory of Operation at 3*

Invalidity Chart for U.S. Patent No. 4,698,672 to Chen et al. (the "Chen Patent")

U.S. 4,901,075 CLAIM ELEMENTS	Chen Patent
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	Chen discloses a coding system for reducing redundancy. *See Title*. Chen discloses "methods and apparatus for processing signals to remove redundant information thereby making the signals more suitable for transfer through a limited bandwidth medium." Chen is specifically related to methods and apparatus useful in video compression systems. *See Abstract, Figures 1-4 and Col. 1, lines 15-20.* Prior to coding in a coder 14, a forward processor 52 processes the spatial domain input signals to form processed signals which typically are transform domain signals arranged in blocks of transform domain coefficients. *See Figure 1 and Col. 4, lines 45-49.* The signals to be coded in Chen are multiple values where the multivalued digital numbers X(k) are typically the integers 0, 1, 2, 3, 4,.... Chen discloses that, in one example of the digital numbers, the highest frequency of occurrence is the value 0, the next highest frequency of occurrence is the value 1 and the other values greater than 1 (namely 2, 3, 4, 5 and so on) occur less frequently. *See Col. 3, lines 22-26.*
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	The coder 14 may perform runlength coding of the types R and R'. *See Col. 5, lines 32-36.* "The first type, R, is utilized when the runlength of 0's is followed by the next most frequently occurring value (1 in the usual case) ..." *See Col. 5, lines 36-38.* "Whenever the first type, R, of run-length coding is employed, no coding of the second value (usually 1) is required because an amplitude of 1 is implied by the use of the first type, R, of run-length coding." *See Col. 5, lines 45-49.*
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	The type, R, is coded with One's Redundancy (OR) coding or scene adaptive coding using Huffman codes. *See Col. 13, line 37- Col. 17, line 48 and Tables 6-9.* The type R encodes the run length of the zero coefficient and the following amplitude of 1.
4. The method of claim 3, wherein said code words are Huffman code words.	The type, R, is coded with One's Redundancy (OR) coding or scene adaptive coding using Huffman codes. *See Col. 13, line 37- Col. 17, line 48 and Tables 6-9.*

U.S. 4,901,075 CLAIM ELEMENTS	Chen Patent
7. A method as claimed in claim 4, characterized in that the Huffman codeword is independent of the sign of that non-zero coefficient which succeeds or precedes the run of zero-coefficients and in that the sign is coded by a separate bit.	In Chen, as shown in Tables 6 and 7, the coding tables assume that a separate sign bit, not in the tables is used to indicate the sign of each value coded in the manner indicated in Table 5. *See Col. 18, lines 3-17.*
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	Chen discloses a coding system for reducing redundancy. *See Title.* Chen discloses "methods and apparatus for processing signals to remove redundant information thereby making the signals more suitable for transfer through a limited bandwidth medium. Chen is specifically related to methods and apparatus useful in video compression systems. *See Abstract, Figures 1-4 and Col. 1, lines 15-20.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	Prior to coding in a coder 14, a forward processor 52 processes the spatial domain input signals to form processed signals which typically are transform domain signals arranged in blocks of transform domain coefficients. *See Figure 1 and Col. 4, lines 45-49.* The signals to be coded in Chen are multiple values where the multivalued digital numbers X(k) are typically the integers 0, 1, 2, 3, 4,.... Chen discloses that, in one example of the digital numbers, the highest frequency of occurrence is the value 0, the next highest frequency of occurrence is the value 1 and the other values greater than 1 (namely 2, 3, 4, 5 and so on) occur less frequently. *See Col. 3, lines 22-26.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	The coder 14 may perform runlength coding of the types R and R'. *See Col. 5, lines 32-36.* "The first type, R, is utilized when the runlength of 0's is followed by the next most frequently occurring value (1 in the usual case) ..." *See Col. 5, lines 36-38.* "Whenever the first type, R, of run-length coding is employed, no coding of the second value (usually 1) is required because an amplitude of 1 is implied by the user of the first type, R. of run-length coding." *See Col. 5, lines 45-49.*
(c) for each of said events, determining the run length and assigning a code word to represent	The type, R, is coded with One's Redundancy (OR) coding or scene adaptive coding using Huffman codes. *See Col. 13, line 37- Col. 17, line 48 and Tables 6-9.* The type R

U.S. 4,901,075 CLAIM ELEMENTS	Chen Patent
said run length and said non-zero coefficient.	encodes the run length of the zero coefficient and the following amplitude of 1.

Invalidity Chart For
U.S. Patent No. 4,494,151 to Liao in View of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder," IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

It would be obvious under 35 U.S.C. § 103 to combine the coding technique taught in U.S. Patent No. 4,494,151 to Liao with the use of transform coefficients in image and video coding as taught by the Chen Article because: 1) both Liao and the Chen Article are in the field of image compression; 2) DCT coefficients were well known; and 3) using DCT coefficients with the coding scheme of Liao would be a predictable variation.

U.S. 4,901,075 CLAIM ELEMENTS	U.S. Patent No. 4,494,151 to Liao	Chen Article
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	Liao states that, "There is a need for electronic systems for compacting data so that the information contained within said data may be stored in less memory space or transmitted at a higher rate." *See Col. 1:14-17.* Liao also discloses that one technique (to transmit at higher speed or reduce the bitrate) is the use of a simple run length code. *See Col. 1:18-21.* Liao also discloses that "*The object of the invention, therefore, is to provide a modified run-length encoding circuit which allows the efficient encoding/decoding of binary data at high data rates.*" *See Col. 2:15-19.* The uncoded signal values in Liao is a sequence of predictive values "0" and "1" values from an image predictor 31 as shown in Figures 2 and 3 which are input to an encoder 32. See Figures 2 and 3. Liao discloses, with reference to Figure 3 that, "*The majority of bits output are white or 0 bits since the scanned document usually is text*"	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227.*

U.S. 4,901,075 CLAIM ELEMENTS	U.S. Patent No. 4,494,151 to Liao	Chen Article
	when referring to the output bits from a raster input scanner 30 which are input to a predictor 31 that usually further reduces the number of 1 bits. *See Figure 3 and Col. 3:42-54.* Thus, in Liao, "*Because the data is first processed by a predictor, there is an increased likelihood of the encoder input comprising long strings of 0s.*" *See Col. 1:62-64.*	
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	In Liao, "*The encoder maximizes the compression of these strings by grouping the input data into data words comprising an uninterrupted line of nibbles containing all 0s, regardless of how many that may be, followed by a terminating nibble having at least one 1 bit. A first code word portion is assigned to the number of all-zero nibbles, and a second code word portion is assigned to the data pattern of the terminating nibble. The final code word is the combination of the first and second code word portions.*" *See Col. 1:64 – Col. 2:5.*	
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	The code words assigned to each portion is shown in Figure 1A and the code words are of variable length and wherein the code words are shorter than the original data and the more frequently occurring run lengths are assigned to short code words. *See Figure 1A and Col. 6:20- 44.* Thus, Liao discloses that a series of Huffman codewords are formed from the signal values. In Liao, "*In Example 1, the first string comprises 31 all-zero nibbles and a terminating nibble of 1000. X≤A and 26≤Y≤63 so a Type 3A output word is called for. In this case, 11,nnnnnnn,bbbb =11,011111 (31 all-zero nibbles), 1000 (actual bit*	

U.S. 4,901,075 CLAIM ELEMENTS	U.S. Patent No. 4,494,151 to Liao	Chen Article
	pattern)." See Figure 2 and Col. 3:13-18. Thus, a terminating nibble such as "1000" and a preceding run of all zero nibbles (such as 31 all-zero nibbles) are coded using a codeword.	
4. The method of claim 3, wherein said code words are Huffman code words.	The code words assigned to each portion is shown in Figure 1A and the code words are of variable length which are Huffman codewords. *See Figure 1A and Col. 6:20- 44.*	

Invalidity Chart for U.S. Patent 4,136,363 to Saran in View of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder," IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

It would be obvious under 35 U.S.C. § 103 to combine the coding technique taught in U.S. Patent No. 4,136,363 to Saran with the use of transform coefficients in image and video coding as taught by the Chen Article because: 1) both Saran and the Chen Article are in the field of image compression; 2) DCT coefficients were well known; and 3) using DCT coefficients with the coding scheme of Saran would be a predictable variation.

U.S. 4,901,075 CLAIM ELEMENTS	Saran Patent	Chen Article
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	Saran discloses a system and method for encoding a video signal generated based on a scan of a document wherein the video signal includes black terminated white runs (in difference modulated and unmodulated signals) that are run length encoded using a code to reduce redundancies and compress binary video signals. *See Col. 1:67 – Col. 2:38; Col. 3:31-34; Col. 4:50- Col. 5:7; Col. 9:7-26 and Col. 9:27-45.* In Saran, a raster input scanner converts the information content of an original document into a corresponding video signal which is in turn converted into a raw binary	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227*

U.S. 4,901,075 CLAIM ELEMENTS	Saran Patent	Chen Article
	video signal which is then difference modulator using a difference modulator 31. *See Col. 4:50-59 and Col. 5:56-62.* The difference modulator generates difference modulated picture elements and unmodulated picture elements of opposite logic levels (i.e., "1" and "0"). See 6:9-19. An example of the series of difference modulated and unmodulated picture elements are shown lines a-c of Figure 4. "0" is the signal value (A) occurring most frequently in runs. *See Col. 9:7-17.*	
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	As shown in Figure 4, black terminated white runs are derived (a run of "0" different modulated signals with a "1"). *See Col. 9:7-26 and Figure 4.*	
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	Saran discloses that the codewords formed for the black terminated white runs (a run of zeros with a "1" at the end), such as 3W+B and 6W+B as shown in Figure 4, are the codewords "10111" and "11010" respectively. *See Col. 9:7-26 and Figure 4.* These codewords are residue codes e. *See Col. 13:1-16 and Figure 4.*	
4. The method of claim 3, wherein said code words are Huffman code words.	Saran discloses that, "Thus, it should be recalled that the basic Huffman rule for taking advantage of variable length run length message codes is that the code assigned to any given run length should be no longer than the code assigned to any less probable run length. *See Col. 2:27-*	

U.S. 4,901,075 CLAIM ELEMENTS	Saran Patent	Chen Article
	38 and Col. 9:39-43.	

Invalidity Chart For U.S. Patent Nos. 4,092,676 to Saran in View of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder," IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

It would be obvious under 35 U.S.C. § 103 to combine the coding technique taught in U.S. Patent No. 4,092,676 to Saran with the use of transform coefficients in image and video coding as taught by the Chen Article because: 1) both Saran and the Chen Article are in the field of image compression; 2) DCT coefficients were well known; and 3) using DCT coefficients with the coding scheme of Saran would be a predictable variation.

U.S. 4,901,075 CLAIM ELEMENTS	Saran Patent	Chen Article
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	Saran discloses a system and method for encoding a video signal generated based on a scan of a document wherein the video signal includes black terminated white runs (in difference modulated and unmodulated signals) that are run length encoded using a code to reduce redundancies and compress binary video signals. *See Col. 1:67 – Col. 2:38; Col. 3:31-34; Col. 4:50-Col. 5:7; Col. 9:7-26 and Col. 9:27-45.* In Saran, a raster input scanner converts the information content of an original document into a corresponding signal which is in turn converted into a raw binary video signal which is then difference modulator using a difference modulator 31. *See Col. 4:50-59 and Col. 5:56-62.* The difference modulator generates difference modulated picture elements and unmodulated picture elements of opposite logic levels (i.e., "1" and "0"). *See Col. 6:9-19.* An example of the series of difference modulated	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227.*

U.S. 4,901,075 CLAIM ELEMENTS	Saran Patent	Chen Article
	and unmodulated picture elements are shown lines a-c of Figure 4. "0" is the signal value (A) occurring most frequently in runs. *See Col. 9:7-17.*	
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	As shown in Figure 4, black terminated white runs are derived (a run of "0" different modulated signals with a "1"). *See Col. 9:7-26 and Figure 4.*	
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	Saran discloses that the codewords formed for the black terminated white runs (a run of zeros with a "1" at the end), such as 3W+B and 6W+B as shown in Figure 4, are the codewords "10111" and "11010" respectively. *See Col. 9:7-26 and Figure 4.* These codewords are residue codes e. *See Col. 13:1-16 and Figure 4.*	
4. The method of claim 3, wherein said code words are Huffman code words.	Saran discloses that, "Thus, it should be recalled that the basic Huffman rule for taking advantage of variable length run length message codes is that the code assigned to any given run length should be no longer than the code assigned to any less probable run length. *See Col. 2:27-38 and Col. 9:39-43.*	

Invalidity Chart for U.S. Patent No. 4,316,222 to Subramaniam in view of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder," IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

It would be obvious under 35 U.S.C. § 103 to combine the coding technique taught in U.S. Patent No. 4,316,222 to Subramaniam with the use of transform coefficients in image and video coding as taught by the Chen Article because: 1) both Subramaniam and the Chen Article are in the field of image compression; 2) DCT coefficients were well known; and 3) using DCT coefficients with the coding scheme of Subramaniam would be a predictable variation.

U.S. 4,901,075 CLAIM ELEMENTS	Subramaniam Patent	Chen Article
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	A method is disclosed for reducing the number of bits of information when transmitting a video image. *See Col. 1:7-11.* In the method, an image is divided into a series of rows of data elements of different types, such as black and white colors, so that a series of digital elements (white areas generate a "0" output and black areas generate a "1" output) are generated which correspond to the sequence of signal values. *See Col. 2:30-38.* When working with documents, the image processor 10 converts the original image data into long strings of 0's followed by short strings of 1's and short strings of 1's followed by long strings of 0's. *See Col. 2:62-66.*	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression of video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227.*

U.S. 4,901,075 CLAIM ELEMENTS	Subramaniam Patent	Chen Article
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	From the image signals, runs length symbols are located and these runs are white-black (WB) runs and black-white (BW) runs. *See Col. 2:66- Col. 3:8.* In the preferred implementation, the WB run has a white half run 1 to 511 pixels and the black half run is 0 to 7 pixels and the BW run has black half run of 1 to 7 pixels and a white half run of 0 to 511 pixels. *See Col. 3:4-8.*	
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	As shown in Figures 2A and 2B (reproduced below), the encoder codes "01", "001", 511 0s followed by a 1, "10", "100" and a 1 followed by 511 zeros with the variable length code words "111", "01001", "010001110", "10", "1100" and "01000" respectively wherein a series of 0s or 1s are followed by a single bit of the other value.	

RUN LENGTH	RUN FEATURE	ENCODING SYMBOL	BINARY PROM ADDRESS	VARIABLE LENGTH CODE WORD
01	1,0	8	1000	111
011	1,1	9	1001	011
01111111	1,6	14	1110	1010
011111111	1,7	15	1111	10111
001	2,0	16	10000	01001
00111111	2,6	22	10110	11001
001111111	2,7	23	10111	110000
0001	3,0	24	11000	100111
00···00 (7) 11···11 (7)	8,7	71	1000111	100001
00···0 (139) 11	139,1	1113	10001010011	110001100
00···0 (500) 1111111 (7)	500,7	4007	11111010011	010101000
000···00 (511)	511,0	4088	11111111000	010111000
0000 (511) 1	511,1	4089	11111111001	010001110
00···0 (511) 111111	511,6	4094	11111111110	001010001
00···00 (511) 1111111	511,7	4095	11111111111	001010100

<table>
<tr><th>U.S. 4,901,075 CLAIM ELEMENTS</th><th>Subramaniam Patent</th><th>Chen Article</th></tr>
<tr><td></td><td>
<table>
<tr><th>RUN LENGTH</th><th>RUN FEATURE</th><th>ENCODING SYMBOL</th><th>BINARY PROM ADDRESS</th><th>VARIABLE LENGTH CODE WORD</th></tr>
<tr><td>10</td><td>1,0</td><td>512</td><td>1000</td><td>10</td></tr>
<tr><td>100</td><td>1,1</td><td>513</td><td>10000</td><td>1100</td></tr>
<tr><td>10 00000 ··· 00 (511)</td><td>1,511</td><td>1023</td><td>1111111111</td><td>01000</td></tr>
<tr><td>110</td><td>2,0</td><td>1024</td><td>10000000000</td><td>111000</td></tr>
<tr><td>1100</td><td>2,1</td><td>1025</td><td>10000000001</td><td>001111</td></tr>
<tr><td>110 00 ··· 000 (511)</td><td>2,511</td><td>1535</td><td>10111111111</td><td>001110</td></tr>
<tr><td>1110</td><td>3,0</td><td>1536</td><td>11000000000</td><td>1110010</td></tr>
<tr><td>1110 000 ··· 00 (510)</td><td>3,510</td><td>2046</td><td>11111111110</td><td>1101110</td></tr>
<tr><td>1110 00 ··· 00 (511)</td><td>3,511</td><td>2047</td><td>11111111111</td><td>1101100</td></tr>
<tr><td>110 0000 (199)</td><td>2,199</td><td>1223</td><td>10011000111</td><td>1111100</td></tr>
<tr><td>11111000</td><td>5,2</td><td>2562</td><td>10100000010</td><td>00100100</td></tr>
<tr><td>11111110</td><td>7,1</td><td>3585</td><td>11100000001</td><td>00110111</td></tr>
<tr><td>111111000</td><td>7,3</td><td>3587</td><td>11100000011</td><td>00100101</td></tr>
<tr><td>1111111 00 - 0 - 0 (511)</td><td>7,511</td><td>4095</td><td>11111111111</td><td>00001101</td></tr>
</table>
See Figures 2A and 2B.

Subramaniam provides that, "the run length symbols are used to address an encoder PROM (programmable read-only memory) in which a series of variable-length code words are stored. These code words are assigned to their corresponding symbol addresses based upon their frequency of occurrence." See Col. 2:1-6. An example of the codewords are shown in Figures 2A and 2B (reproduced above).
</td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>4. The method of claim 3, wherein said code words are Huffman code words.</td><td>The variable length codes may be Huffman codes. See Col. 1:21-22.</td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:</td><td>A method is disclosed for reducing the number of bits of information when transmitting a video image. See Col. 1:7-11. In the method, an image is divided into a series of rows of data elements of different types, such as black and white colors, so that a series of digital elements (white areas generate a "0" output and black areas generate a "1" output) are generated which correspond to the sequence of signal values. See Col. 2:30-38.</td><td>Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth</td></tr>
</table>

U.S. 4,901,075 CLAIM ELEMENTS	Subramaniam Patent	Chen Article
		compression for video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generated DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	When working with documents, the image processor 10 converts the original image data into long strings of 0's followed by short strings of 1's and short strings of 1's followed by long strings of 0's. *See Col. 2:62-66.*	
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	From the image signals, runs length symbols are located and these runs are white-black (WB) runs and black-white (BW) runs. *See Col. 2:66- Col. 3:8.* As can be seen the value "0" is the signal value (A) occurring most frequently in runs. In the preferred implementation, the WB run has a white half run 1 to 511 pixels and the black half run is 0 to 7 pixels and the BW run has black half run of 1 to 7 pixels and a white half run of 0 to 511 pixels. *See Col. 3:4-8.*	
(c) for each of	As shown in Figures 2A and 2B (reproduced below),	

U.S. 4,901,075 CLAIM ELEMENTS	Subramaniam Patent	Chen Article
said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	the encoder codes "01", "001", 511 0s followed by a 1, "10", "100" and a 1 followed by 511 zeros with the variable length code words "111", "01001", "010001110", "10", "1100" and "01000" respectively wherein a series of 0s or 1s are followed by a single bit of the other value.	

RUN LENGTH	RUN FEATURE	ENCODING SYMBOL	BINARY PROM ADDRESS	VARIABLE LENGTH CODE WORD
01	1,0	8	1000	111
011	1,1	9	1001	011
01[1111111]	1,6	14	1110	1010
01[11111111]	1,7	15	1111	10111
001	2,0	16	10000	01001
001[1111111]	2,6	22	10110	11001
001[11111111]	2,7	23	10111	110000
0001	3,0	24	11000	10011
00[00]00 1[11]11 (8, 7)	8,7	71	1000111	100001
00[0]0 11 (139)	139,1	1113	10001011001	11000100
00[0]0 1 [1111111] (500, 7)	500,7	4007	11111010001111	01010100
000[00] (511)	511,0	4088	11111111111000	01011000
0000 1 (511)	511,1	4089	11111111111001	01000110
00[0]0 [111111] (511)	511,6	4094	11111111111110	00101000
00[00] [111111] (511)	511,7	4095	11111111111111	00101010

RUN LENGTH	RUN FEATURE	ENCODING SYMBOL	BINARY PROM ADDRESS	VARIABLE LENGTH CODE WORD
10	1,0	512	1000	10
100	1,1	513	10000	1100
10 [00000]00 (511)	1,511	1023	1111111111	01000
110	2,0	1024	10000000000	111000
1100	2,1	1025	10000000001	001111
110 [00]000 (511)	2,511	1535	10111111111	001110
1110	3,0	1536	11000000000	111010
1110 [000]00 (510)	3,510	2046	11111111110	110110
1110 [00]00 (511)	3,511	2047	11111111111	110100
110 [0000] (199)	2,199	1223	10011000111	11111100
11111000	5,2	2562	10100000010	00100100
11111110	7,1	3585	11100000001	00110111
111111000	7,3	3587	11100000011	00100101
1111111 [00]0[0] (511)	7,511	4095	11111111111	00001101

See Figures 2A and 2B.

Subramaniam provides that, "*the run length symbols are used to address an encoder PROM (programmable read-only memory) in which a series*

U.S. 4,901,075 CLAIM ELEMENTS	Subramaniam Patent	Chen Article
	of variable-length code words are stored. These code words are assigned to their corresponding symbol addresses based upon their frequency of occurrence." *See Col. 2:1-6.* An example of the codewords are shown in Figures 2A and 2B (reproduced above).	
11. The method of claim 8, comprising the additional steps of: determining whether the run length of each event exceeds a predetermined run length and if so, splitting said respective event into a plurality of sections so that each of said sections has a run length below said predetermined run length, and assigning a code word to each section.	The method provides that, if the first half or second half of a run length exceeds the maximum length specified for that particular color, then that run length must be broken down by using both the general rule and its exception. *See Col. 3:44- Col. 4:68.*	

Invalidity Chart for U.S. Patent No. 3,984,833 to vanVoorhis In View of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder", IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

It would be obvious under 35 U.S.C. § 103 to combine the coding technique taught in U.S. Patent No. 3,984,833 to Van Voorhis with the use of transform coefficients in image and video coding as taught by the Chen Article because: 1) both Van Voorhis and the Chen Article are in the field of image compression; 2) DCT coefficients were well known; and 3) using DCT coefficients with the coding scheme of Van Voorhis would be a predictable variation.

U.S. 4,901,075 CLAIM ELEMENTS	Van Voorhis Patent	Chen Article
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	Van Voorhis discloses an apparatus for encoding extended run-length codes for the compression of digital images that are a two-dimensional array of image points. *See Col. 1:13-19.* The compression of the digital images (using run length codes) reduces the storage requirements for digital images and reduces the bandwidth required for the transmission of the digital images *See Col. 1:27-31.* The value zero occurs far more frequency than the signal value one. From the examples, the value zero occurs most frequency in uninterrupted runs. For example, column 14, lines 64 to 66, mentions: *"For the purpose of the illustration, a run is defined as a one or as a string of one or more zeros and the first one following this string of zeros."* Van Voorhis discloses that an image, for a black/white image, has image points that are converted into a single bit of information with a value of either 0 or 1 to indicate that the corresponding area of the picture is light or dark. *See Col. 1, lines 19-23.*	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression in video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used for image and video coding to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227.*
(a) deriving from said signal, a plurality of events each comprising	Van Voorhis discloses that an event may be a binary encoded representation of an alphanumeric	

U.S. 4,901,075 CLAIM ELEMENTS	Van Voorhis Patent	Chen Article
a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	character, an analog voltage, a run of binary video information, a run of binary image information or any other type of information capable of recognition. *See Col. 6, lines 59-65.* Van Voorhis also describes that, from the signal, runs are recognized as follows: *"In such as circumstance, the event recognizer 10 of Van Voorhis may recognize each sequence of consecutive bits of the same logic , which is denoted as a run. Runs may also be sequences of bits of one of the logic levels, or sequences of a level terminating in another level."* *See Col. 7:11-15.* Van Voorhis discloses an example of a run (See Col. 14:64-66; underlining was added): *"For the purpose of the illustration, a run is defined as a one or as a string of one or more zeros and the first one following this string of zeros."* Further examples can be found in col. 15, lines 11- 32.	
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	Van Voorhis discloses coding of events where the event may include a string of one or more zeros and the first one following this string of zeros. *See Col. 14, lines 64-66.* The encoder then calculates and outputs code words for a specific class of ordinary and extended run-length codes. *See Col, 3, lines 58-61.* Examples of the codes used by the coder are shown in Tables 1 and 2. *See Col. 3, line 58 – Col. 4, line 64 and Tables 1 and 2.*	

U.S. 4,901,075 CLAIM ELEMENTS	Van Voorhis Patent	Chen Article
4. The method of claim 3, wherein said code words are Huffman code words.	Van Voorhis describes a coding method wherein the relative frequencies of the occurrence for the various runs and special situations may be measured in a sample of images and the relative frequencies are used to calculate code word lengths that are ordered and bounded. The coding method places regular events approximately in order of decreasing relative frequency. *See Col, 5, lines 3-56.*	

Invalidity Chart For Henry H. J. Liao, "Upper Bound, Lower Bound and Run-Length Substitution Coding," NTC '77 Conference Record, Vol. 3, pp. 49:3-1 to 49:3-6 (1977) (the "Liao Article") in View of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder," IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

It would be obvious under 35 U.S.C. § 103 to combine the coding technique taught in the Liao Article with the use of transform coefficients in image and video coding as taught by the Chen Article because: 1) both the Liao Article and the Chen Article are in the field of image compression; 2) DCT coefficients were well known; and 3) using DCT coefficients with the coding scheme of the Liao Article would be a predictable variation.

U.S. 4,901,075 CLAIM ELEMENTS	Liao Article	Chen Article
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	The Liao Article discusses several bounds of "bandwidth compression for run-length coding." *See pg. 49:3-1, left column, Abstract.* The Liao Article discusses run-length coding for a facsimile signal quantized into a sequence of binary digits (1's and 0's) which directly represent black and white picture elements. *See pg. 49:3-1, left column, first paragraph of Introduction.* The Liao Article also discusses image data run-length coding after a set of prediction errors are generated. *See pg. 49:3-1, left column, first paragraph of Introduction.* Thus, the Liao Article discusses bandwidth compression (bit	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generated DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See 225-227.*

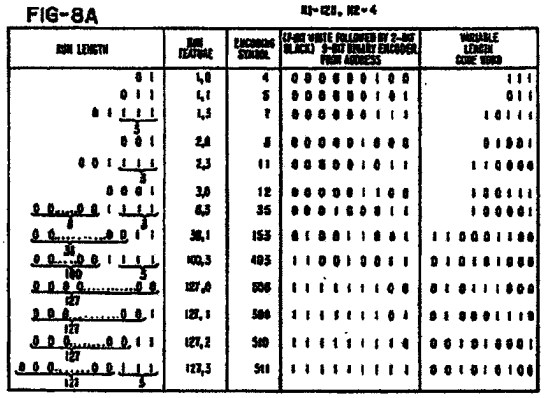
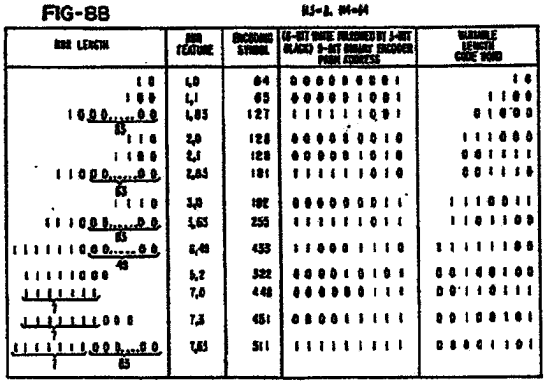
U.S. 4,901,075 CLAIM ELEMENTS	Liao Article	Chen Article
	rate reduction) bounds for run length coding of a sequence of binary digits or predictive error values.	
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	The Liao Article, the prediction error values are determined in which the run-length of prediction errors constitute a majority of single bit runs (B) and a few other short runs. *See pg. 49:3-2, left column, first paragraph of Maximum Entropy Lower Bound section.* The prediction errors are recorded as "B" and correct predictions are recorded as "W" so that a message set for these prediction values in shown in Table 1 that have runs of W followed by B. *See pg. 49:3-2, left column, first paragraph of Maximum Entropy Lower Bound section and Table 1.*	
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	The Liao Article states that, "The best code assignment will be the set of codes with the shortest average length, i.e., the minimum redundancy code. Huffman's coding is a systematic procedure for constituting such as code with minimum redundancy." *See pg. 49:3-1, left column, second paragraph of Introduction section.* The Liao Article also contains a table with a run-length substitution code that is a Huffman code that represent a run of W values (zero to nine) followed by a B value. *See pg. 49:3-3, left and right columns, Run-Length Substitution section, Table 2 and pg. 49:3-6, Table 5.* Table 5 shows the frequency of each run-length and the Huffman length assigned to each run-length based on the frequency. In these tables, Huffman codes are formed from the prediction error values.	

U.S. 4,901,075 CLAIM ELEMENTS	Liao Article	Chen Article
4. The method of claim 3, wherein said code words are Huffman code words.	The Liao Article also contains a table with a run-length substitution code that is a Huffman code that represent a run of W values (zero to nine) followed by a B value. *See pg. 49:3-3, left and right columns, Run-Length Substitution section, Table 2 and pg. 49:3-6, Table 5.* Table 5 shows the frequency of each run-length and the Huffman length assigned to each run-length based on the frequency. In these tables, Huffman codes are formed from the prediction error values.	

Invalidity Chart for US Patent No. 4,363,036 in View of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder," IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

It would be obvious under 35 U.S.C. § 103 to combine the coding technique taught in U.S. Patent No. 4,363,036 to Subramaniam with the use of transform coefficients in image and video coding as taught by the Chen Article because: 1) both Subramaniam and the Chen Article are in the field of image compression; 2) DCT coefficients were well known; and 3) using DCT coefficients with the coding scheme of Subramaniam would be a predictable variation.

U.S. 4,901,075 CLAIM ELEMENTS	Subramaniam '036 Patent	Chen Article
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a	A method for compressing digital data is disclosed that generates prediction error pixels from the digital data to form symbols (WB runs or BW runs) which are then coded using variable length codewords. *See Abstract, Figures 8A and 8B and Col. 3:54 – Col. 4:51.* The invention relates to data compression and in particular a novel method and apparatus for reducing the number of bits of information needed to transmit a video image which reduces bandwidth requirements and storage requirements. *See Col. 1: 15-24.* In the method, a prediction table and a window predictor transform the facsimile image into	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which

U.S. 4,901,075 CLAIM ELEMENTS	Subramaniam '036 Patent	Chen Article
plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	prediction error values with "0" values and "1" values with minimum redundancy. *See Col. 2:56-58.* The window predictor consists of 13 pixels with pixels in the current scan line and 3 previous scan lines (a block) as shown in Figure 4B. *See Col. 9:40-44.*	results in zero coefficients and non-zero coefficients. *See pp. 225-227.*
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	Once the digital image is scanned and prediction errors are determined, run lengths are determined wherein the run lengths are: 1) white-black (WB) runs; and 2) black-white (BW) runs wherein each run has two sections called a black half and a white half. *See Col. 10:45-59 and Figures 8A and 8B.* FIG-8A  FIG-8B  As shown in Figures 8A and 8B, "01", "001",	

U.S. 4,901,075 CLAIM ELEMENTS	Subramaniam '036 Patent	Chen Article
	"0001" and "127 0's and a "1", "10", "100" and "1 with 63 0's" are examples of the run lengths.	
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	As shown in Figure 8A and 8B, each of the run lengths (including the specific examples above) is coded using a variable length code. *See Figures 8A and 8B and Col. 10:45-59.*	
4. The method of claim 3, wherein said code words are Huffman code words.	The variable length codes are Huffman codes. *See Col 1:31-3, Col. 10:45-59 and Figures 8A and 8B.*	

Kodak refers Philips to the individuals identified in Kodak's initial disclosures and Kodak's document production. Kodak's investigation into this Interrogatory is ongoing. Kodak will supplement and/or amend this response as circumstances and its ongoing investigation warrant.

Dated: September 7, 2007

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VERIFICATION

I, Timothy M. Lynch, Director of Corporate Commercial Affairs and Vice President of Legal and Assistant General Counsel for Eastman Kodak Company, am authorized to make this verification on behalf of Eastman Kodak Company and hereby verify that I have read DEFENDANT EASTMAN KODAK COMPANY'S FIRST SUPPLEMENTAL RESPONSES TO PLAINTIFF U.S. PHILIPS CORPORATION'S FIRST SET OF INTERROGATORIES (NOS. 2-3). Although I do not have personal knowledge of all the facts contained therein, I hereby declare under penalty of perjury that they are true to the best of my knowledge, information and belief.

Dated: 11/30/07

Timothy M. Lynch

EXHIBIT

F

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

U.S. PHILIPS CORPORATION, Plaintiff, v. EASTMAN KODAK COMPANY, Defendant.	)	Civil Action No. 06-00251-GMS

DEFENDANT EASTMAN KODAK COMPANY'S SIXTH SUPPLEMENTAL RESPONSES TO PLAINTIFF U.S. PHILIPS CORPORATION'S FIRST SET OF INTERROGATORIES (Nos. 2-3, 7-9 & 12-13)

Pursuant to Rule 33 of the Federal Rules of Civil Procedure, Defendant Eastman Kodak Company ("Kodak") hereby supplements its responses to the First Set of Interrogatories ("Interrogatories") (Nos. 2-3, 7-9 & 12-13) propounded by Plaintiff U.S. Philips Corporation ("Philips") as follows:

PRELIMINARY STATEMENTS

1. Kodak's responses to Philips' Interrogatories are made to the best of Kodak's present knowledge, information and belief. Kodak reserves the right to supplement and amend these responses should future investigation indicate that such supplementation or amendment is necessary. Kodak's responses should in no way be considered prejudicial in relation to further discovery, research, analysis or production of evidence.

2. Kodak's responses are made solely for the purpose of and in relation to this action. Each response is given subject to all appropriate objections including, but not limited to, objections concerning privilege, competency, relevancy, materiality, propriety and admissibility. All objections are reserved and may be interposed at any time.

3. Until the Court enters a protective order in this case, Kodak will not provide Philips with any Kodak or third-party confidential, trade secret, or proprietary business, technical, marketing or financial information.

4. Kodak incorporates by reference each and every general objection set forth below into each and every specific response. From time to time a specific response may repeat a general objection for emphasis or some other reason. The failure to include any general objection in any specific response shall not be interpreted as a waiver of any general objection to that response.

5. By responding to Philips' Interrogatories, Kodak does not waive any objection that may be applicable to: (a) the use, for any purpose, by Philips of any information or documents given in this response to Philips' Interrogatories; or (b) the admissibility, relevancy or materiality of any of the information or documents at issue in this case.

GENERAL OBJECTIONS

1. Kodak objects to each and every Interrogatory, and to Philips' instructions and definitions, to the extent that they purport to impose additional burdens or duties on Kodak that exceed the scope of reasonable and permissible discovery under the Federal Rules of Civil Procedure, the Local Civil Rules for the District of Delaware, or the Individual Rules of the Judge(s) hearing this matter.

2. Kodak objects to each and every Interrogatory to the extent they seek information protected by attorney-client privilege, the work product immunity doctrine, or any other applicable law, protection or doctrine. The production of any privileged information or document by Kodak is unintentional, and Kodak does not intend to waive any applicable objection or privilege as a result of such production or disclosure.

3. Kodak objects to each and every Interrogatory to the extent it is overly broad or unduly burdensome or oppressive, particularly when the Interrogatory is unduly burdensome in view of Kodak's cost necessary to investigate weighed against Philips' need for the information.

4. Kodak objects to each and every Interrogatory to the extent it requires Kodak to make a legal conclusion and/or render an expert opinion.

5. Kodak objects to each and every Interrogatory as overly broad and unduly burdensome to the extent it is unlimited in temporal scope or otherwise not limited to a time frame that is relevant to this litigation and the patent in suit. Pursuant to 35 U.S.C. § 286, Philips is not entitled to recover for any infringement that allegedly occurred more than six years prior to the filing of the original Complaint on April 18, 2006. Kodak limits its interrogatory responses to the time period set forth in the specific responses and objections.

6. Kodak objects to each and every Interrogatory to the extent it seeks information already in Philips' possession or available in the public domain. Such information is as readily available to Philips as it is to Kodak.

7. Kodak objects to each and every Interrogatory to the extent it seeks information that is not in the possession, custody, or control of Kodak.

8. Kodak objects to each and every Interrogatory to the extent it seeks information that Kodak is not permitted to disclose pursuant to confidentiality obligations or agreements with third parties.

9. Kodak objects to each and every Interrogatory to the extent it seeks confidential, trade secret, or proprietary business, technical, marketing, or financial information. As noted above in Kodak's Preliminary Statements, Kodak will not provide such information until a suitable protective order has been entered by the Court.

10. Kodak objects to each and every Interrogatory to the extent it seeks information that is neither relevant to the issues in the lawsuit nor is reasonably calculated to lead to the discovery of admissible evidence.

11. Kodak objects to Philips' Definition No. 1 ("you" and "your") as overly broad and unduly burdensome to the extent it requests Kodak to produce documents maintained by other companies or entities. Kodak will produce only those documents in its possession, custody, or control.

12. Kodak objects to Philips' Instruction No. 2 as overly broad in time. Except as set forth below, Kodak will not separately identify the document, communication or item for which it claims privilege. Rather, Kodak will identify its privileged documents in the form of a privilege log. However, Kodak will not disclose, produce or include on a privilege log any documents or things created or dated after the filing of Philips' original Complaint on April 18, 2006.

SPECIFIC OBJECTIONS AND RESPONSES

Kodak hereby supplements its responses to Interrogatories Nos. 2-3, 7-9 & 12-13 as follows:

INTERROGATORY NO. 2:

For every claim of the patent-in-suit that YOU allege is invalid or unenforceable, and separately for each claim so identified, state each fact known by YOU that supports, refutes, or relates to YOUR allegations of invalidity and unenforceability; identify each person who has knowledge about the subject matter of this interrogatory; and identify each document and thing relating to the subject matter of this interrogatory.

SECOND SUPPLEMENTAL RESPONSE TO INTERROGATORY NO. 2:

Kodak objects to this Interrogatory to the extent it calls for legal conclusions or expert opinion. Kodak further objects to this Interrogatory as seeking information protected by the attorney-client privilege, the work product immunity doctrine and/or other applicable privileges or protections. Kodak objects to this Interrogatory as compound because it contains discrete subparts that require separate and distinct responses. Kodak objects to this Interrogatory as

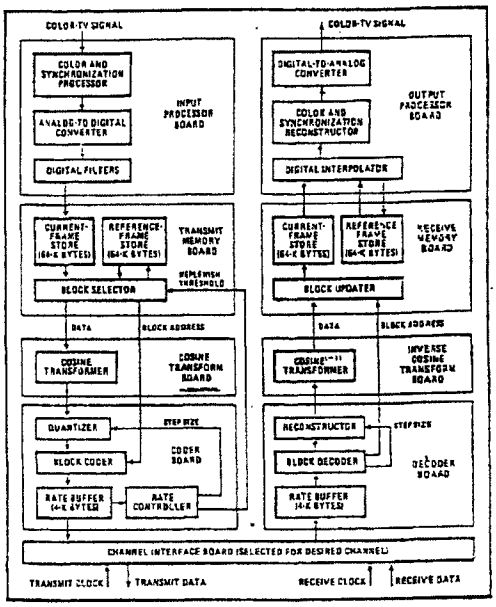
overly broad and unduly burdensome. Kodak further objects to this Interrogatory to the extent it seeks to impose additional burdens or duties on Kodak that exceed the scope of reasonable and permissible discovery under the Federal Rules of Civil Procedure, the Local Civil Rules for the District of Delaware, or the Individual Rules of the Judge(s) hearing this matter. This Interrogatory is premature in light of the expert discovery schedule agreed to by the parties and reflected in the Court's scheduling order. This Interrogatory is also premature because it seeks Kodak's contentions and analysis before Kodak has completed discovery relating to invalidity, before Kodak has conducted expert discovery on invalidity, and before the Court has issued a claim construction ruling.

Subject to these objections and the general objections set forth above, Kodak provides its second supplemental response to Interrogatory No. 2 as follows: The Supplemental Invalidity Chart for Widcom VTC-56, provided below, replaces and supersedes the Invalidity Chart of Widcom VTC-56 provided in Kodak's first supplemental response, served on September 7, 2007.

Supplemental Invalidity Chart For Widcom VTC-56

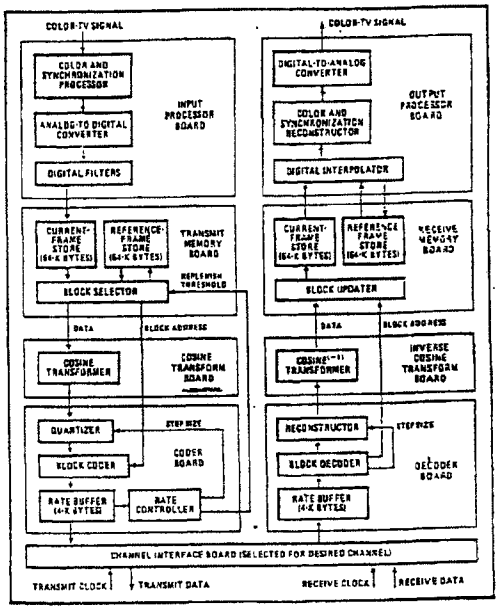
US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	Prior to the end of 1985, Kodak developed a video conferencing center that included a video conference room at the State Street Kodak office and a video conference room at Kodak Park Building 205. Each of the video conference rooms had a Widcom VTC-56 codec. *See KODAK_015739 - KODAK_015743*; *see also Final Transcript of Deposition of Robert Derounian taken on September 14, 2007 ("Derounian Tr.") at 13:7 – 15:17 and 21:22-24, 23:20- 24:24, 30:25-31_23, 34:17- 36:15 and Exhibits 4-8.* The Widcom VTC-56 codecs were purchased by Kodak prior to the end of 1985. *See Derounian*

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
	Tr. at 24:25 – 25:11 and 26:21 – 27:15 and WIDCOM 001550 and WIDCOM 001551. Mr. Derounian trained more than 100 people to use the Widcom VTC-56 (and in fact the Widcom VTC-56 was used during each training) and was present during each training. *See Derounian Tr. at 27:19 – 30:24.* The Widcom VTC-56 codec was used for two-way video conferencing more than 100 times. *See Derounian Tr. at 44:16-20.* In total, more than 100 Widcom VTC-56 codec were sold and the sales occurred prior to the end of January 1986. *See WIDCOM 001550 and WIDCOM 001551; see also Final Transcript of Deposition of Shrikant Acharya taken on October 30, 2007 ("Acharya Tr.") at 28:7-15; see also Final Transcript of Deposition of Stanley Fralick taken on October 22, 2007 ("Fralick Tr.") at 31:7 – 32:22.* The Widcom VTC-56 is a video codec that has the boards shown in the diagram reproduced below. *See "Codec Squeezes Color Teleconferencing Through Digital Telephone Lines", J Anderson et al., Electronics, January 26, 1984, pp. 113-115 at KODAK_051224 – KODAK_051226 ("Widcom 1984 Article") at pg. 115.*

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
	 The boards include a cosine transform board and a coder board. The VTC-56 divides each frame into 8X8 blocks of pixels that are then cosine transformed. In particular, the cosine transform board performs a cosine transform that generates an array of transform coefficients that contains a DC coefficient and 63 AC coefficients with many zero-valued AC coefficients. *See Widcom 1984 Article, pg. 114.* The coefficients in the array of transform coefficients are quantized and coded. *See also Widcom VTC-56 codec.* The operation and coding of the Widcom VTC-56 machine was simulated using software written in Fortran and the Fortran software performed the same coding as the Widcom VTC-56 machine. *See Acharya Tr. at 40:17-22 and WIDCOM 003705 – WIDCOM 003712; see Acharya Tr. at 41:9 – 49:10.* The Widcom VTC-56 performs bandwidth compression (on color video pictures) at ratios of up to 1,440:1 which is sufficient to transmit color-TV pictures through a telephone line. *See Widcom 1984 Article, pg. 113.* The cosine transform coding for the pixel-to-pixel decorrelation (performed by the cosine transform and coder board) result in a 6:1 compression ratio (*See Widcom 1984 Article, pg.*

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
	113, table) of the color-TV pictures (converting into quantized coefficient values which are the sequence of signal values.) The bandwidth compression causes a bitrate reduction of the sequence of signal values.
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	The events encoded by the VTC-56 include runs of zero AC coefficients followed by an AC coefficient having an absolute value of one (RL1) and runs of zero AC coefficients followed by an AC coefficient having an absolute value greater than one (RL0). *See VTC-56B Coder Theory of Operation by Widcom, Inc. (KODAK_079513 – KODAK_079570) ("VTC-56B Coder Theory of Operation") at KODAK_079517*; *see Fralick Tr. at 52:3 - 53:2*; *see also Widcom VTC-56 codec*. These events are then encoded with a code word wherein more frequently occurring values are represented by short code words and less frequently occurring values are represented by longer code words. *See Widcom 1984 Article at pg. 114*. In the VTC-56, the codewords are selected from several different tables based on the entropy of the image being encoded. In particular, there are six different tables that are used to code the AC coefficients wherein each table is optimized for a particular entropy level of the image to be coded. The table is selected based on a calculation of a standard deviation of the computed transform coefficients. *See VTC-56B Coder Theory of Operation at KODAK_079516*; *see also Final Transcript of Deposition of Eric Hamilton taken on October 10, 2007 ("Hamilton Tr.") at 90:7- 93:20; see also Widcom VTC-56 codec.*
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	In the VTC-56, event that include: 1) runs of zero AC coefficients followed by an AC coefficient having an absolute value of one (RL1); and 2) runs of zero AC coefficients followed by an AC coefficient having an absolute value greater than one (RL0) are encoded using a Huffman code word. *See Widcom 1984 Article at pg. 114; see also Hamilton Tr. at 87:13 – 100:16; see also Widcom VTC-56 codec.* The AC coefficients in the array of quantized transform coefficients are encoded in which runs of zero AC coefficients followed by a non-zero AC coefficient are encoded. In the VTC-56, runs are zero valued AC coefficients are

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
	encoded: *"Because there are so many zero-valued coefficients, the final code is further compressed by coding run lengths instead of transmitting long runs of 0 bits."* *See Widcom 1984 Article, p. 114.*
4. The method of claim 3, wherein said code words are Huffman code words.	The code words are Huffman codewords. In the VTC-56, the Huffman codeword is selected from several different tables based on the entropy of the image being encoded. In particular, there are six different tables that are used to code the AC coefficients wherein each table is optimized for a particular entropy level of the image to be coded. The table is selected based on a calculation of a standard deviation of the computed transform coefficients. *See Hamilton Tr. at 90:7- 93:20; Acharya Tr. at 37:7-15; see also Widcom VTC-56 codec.*
7. A method as claimed in claim 4, characterized in that the Huffman codeword is independent of the sign of that non-zero coefficient which succeeds or precedes the run of zero-coefficients and in that the sign is coded by a separate bit.	The VTC-56 codes the AC coefficient magnitudes with the Huffman code words above so that the Huffman codewords are independent of the sign of that coefficient. The coder board then sends the sign separately from the code for the AC coefficient magnitude. *See VTC-56B Coder Theory of Operation at KODAK_079516*; *see also Widcom VTC-56 codec.*
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	Prior to the end of 1985, Kodak developed a video conferencing center that included a video conference room at the State Street Kodak office and a video conference room at Kodak Park Building 205. Each of the video conference rooms had a Widcom VTC-56 codec. *See KODAK_015739 -- KODAK_015743*; *see also Derounian Tr. at 13:7 – 15:17 and 21:22-24, 23:20- 24:24, 30:25- 31_23, 34:17- 36:15 and Exhibits 4-8.* The Widcom VTC-56 codecs were purchased by Kodak prior to the end of 1985. *See Derounian Tr. at 24:25 – 25:11 and 26:21 – 27:15 and WIDCOM 001550 and WIDCOM*

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
	001551. Mr. Derounian trained more than 100 people to use the Widcom VTC-56 (and in fact the Widcom VTC-56 was used during each training) and was present during each training. *See Derounian Tr. at 27:19 – 30:24.* The Widcom VTC-56 codec was used for two-way video conferencing more than 100 times. *See Derounian Tr. at 44:16-20.* In total, more than 100 Widcom VTC-56 codec were sold and the sales occurred prior to the end of January 1986. *See WIDCOM 001550 and WIDCOM 001551. See also Acharya Tr. at 28:7-15; see also Fralick Tr. at 31:7 – 32:22.* The Widcom VTC-56 is a video codec that has the boards shown in the diagram reproduced below. *See Widcom 1984 Article, at pg. 115.*  The boards include a cosine transform board and a coder board. The VTC-56 divides each frame into 8X8 blocks of pixels that are then cosine transformed. In particular, the cosine transform board performs a cosine transform that generates an array of transform coefficients that contains a DC coefficient and 63 AC coefficients with many zero-valued AC coefficients. *See Widcom 1984 Article, pg. 114.* The coefficients in the array of transform

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
	coefficients are quantized and coded. *See also Widcom VTC-56 codec.* The operation and coding of the Widcom VTC-56 machine was simulated using software written in Fortran and the Fortran software performed the same coding as the Widcom VTC-56 machine. *See Acharya Tr. at 40:17-22 and WIDCOM 003705 – WIDCOM 003712; see Acharya Tr. at 41:9 – 49:10.* The Widcom VTC-56 performs bandwidth compression (on color video pictures) at ratios of up to 1,440:1 which is sufficient to transmit color-TV pictures through a telephone line. *See Widcom 1984 Article, pg. 113.* The cosine transform coding for the pixel-to-pixel decorrelation (performed by the cosine transform and coder board) result in a 6:1 compression ratio (*See Widcom 1984 Article, pg. 113, table*) of the color-TV pictures (converting into quantized coefficient values which are the sequence of signal values.) The bandwidth compression causes a bitrate reduction of the sequence of signal values.
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	The boards of the VTC-56 include a cosine transform board. The VTC-56 divides each frame into 8X8 blocks of pixels that are then cosine transformed. In particular, the cosine transform board performs a cosine transform that generates an array of transform coefficients that contains a DC coefficient and 63 AC coefficients with many zero-valued AC coefficients. *See Widcom 1984 Article, pg. 114; see also Widcom VTC-56 codec.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	The events encoded by the VTC-56 include runs of zero AC coefficients followed by an AC coefficient having an absolute value of one (RL1) and runs of zero AC coefficients followed by an AC coefficient having an absolute value greater than one (RL0). *See VTC-56B Coder Theory of Operation at KODAK_079517; see Fralick Tr. at 52:3 - 53:2; see also Widcom VTC-56 codec.*
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	These events are then encoded with a code word wherein more frequently occurring values are represented by short code words and less frequently occurring values are represented by longer code words. *See Widcom 1984 Article at pg. 114.* In the VTC-56, the codewords are selected from several different tables based on the entropy of the image being encoded. In particular, there are six different tables that are used to code the AC coefficients

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	wherein each table is optimized for a particular entropy level of the image to be coded. The table is selected based on a calculation of a standard deviation of the computed transform coefficients. *See VTC-56B Coder Theory of Operation at KODAK_079516; see also Hamilton Tr. at 90:7- 93:20; see also Widcom VTC-56 machine.* In the VTC-56, event that include: 1) runs of zero AC coefficients followed by an AC coefficient having an absolute value of one (RL1); and 2) runs of zero AC coefficients followed by an AC coefficient having an absolute value greater than one (RL0) are encoded using a Huffman code word. *See Widcom 1984 Article at pg. 114; see also Hamilton Tr. at 87:13 – 100:16.* The AC coefficients in the array of quantized transform coefficients are encoded in which runs of zero AC coefficients followed by a non-zero AC coefficient are encoded. In the VTC-56, runs are zero valued AC coefficients are encoded: *"Because there are so many zero-valued coefficients, the final code is further compressed by coding run lengths instead of transmitting long runs of 0 bits."* *See Widcom 1984 Article, p. 114.*

The invalidity chart provided below supplements Kodak's first supplemental response to Interrogatory No. 2, served on September 7, 2007.

Invalidity Chart for COST 211bis Simulation Subgroup Paper entitled "Block Coding Using a Two-Dimensional Run-Length Table", published September 9, 1986 PHLPSKD_00070973 - PHLPSKD_00070979 (the "COST Paper")

US 4,901,075 CLAIM ELEMENTS	COST Paper
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent	The COST Paper was a proposal made by Dr. Peter Vogel to the COST 211bis Simulation Subgroup. *See Rough Deposition Transcript of Peter Vogel, Ph. D. (the "Vogel Tr.") at 117, lines 12- 24.* The paper was published/made public and distributed to the participants of the COST

US 4,901,075 CLAIM ELEMENTS	COST Paper
quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	211bis Simulation Subgroup by at least September 9, 1986. *See Vogel Tr. at 120, line 2 – 121, line 20.* The COST paper discloses a 2D-run-length coding. See Vogel Tr. at 122, lines 3-7. "For the 2D-run-length coding the events corresponding to a run-length of consecutive zero coefficients and coefficients unequal to zero defining the end of the run-length are considered as composite rather than separate statistical events…" *See COST Paper at PHLPSKD_00070973. See Vogel Tr. at 122:22 – 123:1.* The 2D-run-length coding with the Huffman codes provides a bit reduction of approximately 12% compared with coding by an amplitude-and- run-length lookup table using Huffman codes. *See COST Paper at PHLPSKD_00070974.*
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	"For the 2D-run-length coding the events corresponding to a run-length of consecutive zero coefficients and coefficients unequal to zero defining the end of the run-length are considered as composite rather than separate statistical events…" *See COST Paper at PHLPSKD_00070973 and Appendix A at PHLPSKD_00070977 - PHLPSKD_00070978.*
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	As shown in Appendix A, a Huffman code for the composite events are assigned to the composite events that are a run-length of consecutive zero coefficients and coefficients unequal to zero. *See COST Paper at PHLPSKD_00070973, and Appendix A at PHLPSKD_00070977- PHLPSKD_00070978.* For example, a composite event with a zero run length of "2" and a "5" coefficient unequal to zero is assigned the Huffman code "0010101110". *See COST Paper at PHLPSKD_00070977.*
4. The method of claim 3, wherein said code words are Huffman code words.	The codes shown in Appendix A of the COST Paper are Huffman codes. *See COST Paper at PHLPSKD_00070973 and Appendix A at PHLPSKD_00070977- PHLPSKD_00070978.*
7. A method as claimed in claim 4, characterized in that the Huffman codeword is independent of the sign of that non-zero	The Huffman codes in Appendix A of the COST Paper are independent of the sign of the non-zero coefficient since each code in Appendix A is based on the magnitude of the coefficient unequal to zero. *See COST Paper Appendix A*

US 4,901,075 CLAIM ELEMENTS	COST Paper
coefficient which succeeds or precedes the run of zero-coefficients and in that the sign is coded by a separate bit.	*at PHLPSKD_00070977- PHLPSKD_00070978.* The sign bit is coded with a separate bit. *See COST Paper at PHLPSKD_00070973 and Appendix A at PHLPSKD_00070977- PHLPSKD_00070978.*
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	The COST Paper was a proposal made by Dr. Peter Vogel to the COST 211bis Simulation Subgroup. *See Rough Deposition Transcript of Peter Vogel, Ph. D. (the "Vogel Tr.") at 117, lines 12- 24.* The paper was published/made public and distributed to the participants of the COST 211bis Simulation Subgroup by at least September 9, 1986. *See Vogel Tr. at 120, line 2 – 121, line 20.* The 2D-run-length coding with the Huffman codes provides a bit reduction of approximately 12% compared with coding by an amplitude-and- run-length lookup table using Huffman codes. *See COST Paper at PHLPSKD_00070974.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	The COST paper discloses a 2D-run-length coding. See Vogel Tr. at 122, lines 3-7. "For the 2D-run-length coding the events corresponding to a run-length of consecutive zero coefficients and coefficients unequal to zero defining the end of the run-length are considered as composite rather than separate statistical events…" *See COST Paper at PHLPSKD_00070973. See Vogel Tr. at 122:22- 123:1.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	"For the 2D-run-length coding the events corresponding to a run-length of consecutive zero coefficients and coefficients unequal to zero defining the end of the run-length are considered as composite rather than separate statistical events…" *See COST Paper at PHLPSKD_00070973. See also COST Paper, Appendix A at PHLPSKD_00070977 - PHLPSKD_00070978.*
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	As shown in Appendix A, a Huffman codes for the composite events are assigned to the composite events that are a run-length of consecutive zero coefficients and coefficients unequal to zero. *See COST Paper at PHLPSKD_00070973, and PHLPSKD_00070977- PHLPSKD_00070978.* For example, a composite event with a zero run length of "2" and a "5" coefficient unequal to zero, the Huffman code is "0010101110". *See COST Paper at PHLPSKD_00070977.*

Pursuant to Federal Rule of Civil Procedure 33(d), Kodak further responds to this Interrogatory by incorporating by reference the documents referenced in each chart. These documents have been produced to Philips or by Philips to Kodak and are as equally available to Philips as they are to Kodak. Kodak also incorporates by reference the Widcom VTC-56 codec, which was identified in Kodak's initial disclosures. Further, Kodak incorporates by reference the deposition testimony of Robert Derounian, Shrikant Acharya, Stanley Fralick, Eric Hamilton and Peter Vogel.

In addition, Kodak refers Philips to the individuals identified in Kodak's initial disclosures and Kodak's document production. Kodak's investigation into this Interrogatory is ongoing. Kodak will supplement this response as circumstances and its ongoing investigation warrant.

INTERROGATORY NO. 3:

For every claim of the patent-in-suit that YOU allege is invalid over prior art under 35 U.S.C. §§ 102 or 103, describe in a claim chart, separately for each claim so identified, how each and every claim limitation is disclosed or suggested by specific teachings in identified items of prior art: identify each person who has knowledge about the subject matter of this interrogatory; and identify each document and thing relating to the subject matter of this interrogatory.

SECOND SUPPLEMENTAL RESPONSE TO INTERROGATORY NO. 3:

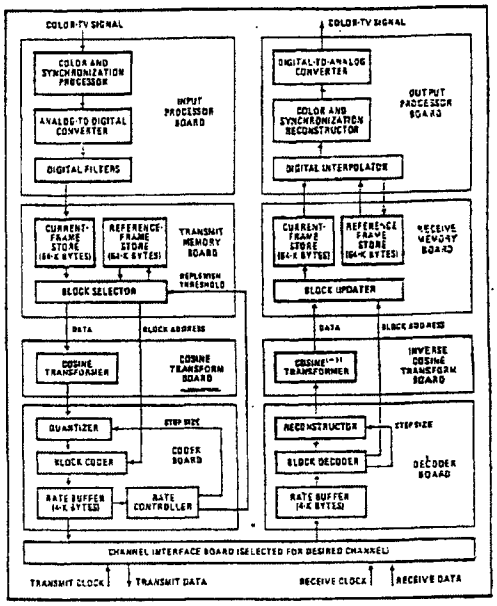
Kodak objects to this Interrogatory to the extent it calls for legal conclusions or expert opinion. Kodak further objects to this Interrogatory as seeking information protected by the attorney-client privilege, the work product immunity doctrine and/or other applicable privileges or protections. Kodak objects to this Interrogatory as compound because it contains discrete subparts that require separate and distinct responses. Kodak objects to this Interrogatory as

overly broad and unduly burdensome. This Interrogatory is premature in light of the expert discovery schedule agreed to by the parties and reflected in the Court's scheduling order. This Interrogatory is also premature because it seeks Kodak's contentions and analysis before Kodak has completed discovery relating to invalidity, before Kodak has conducted expert discovery on invalidity, and before the Court has issued a claim construction ruling.

Subject to these objections and the general objections set forth above, Kodak provides its second supplemental response to Interrogatory No. 3 as follows: The Supplemental Invalidity Chart for Widcom VTC-56, provided below, replaces and supersedes the Invalidity Chart of Widcom VTC-56 provided in Kodak's first supplemental response, served on September 7, 2007.

Supplemental Invalidity Chart For Widcom VTC-56

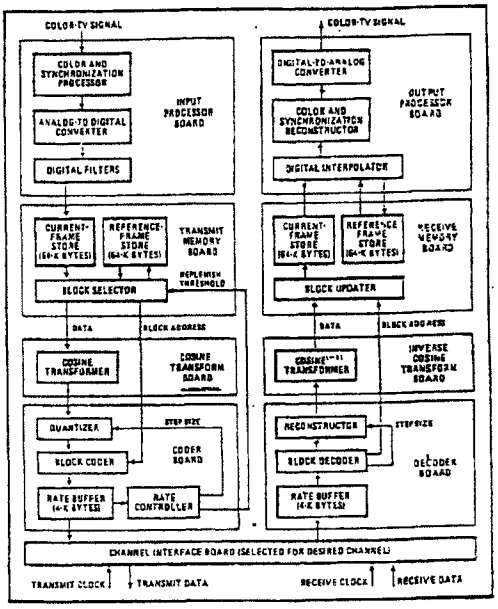
US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	Prior to the end of 1985, Kodak developed a video conferencing center that included a video conference room at the State Street Kodak office and a video conference room at Kodak Park Building 205. Each of the video conference rooms had a Widcom VTC-56 codec. *See KODAK_015739 – KODAK_015743*; *see also Final Transcript of Deposition of Robert Derounian taken on September 14, 2007 ("Derounian Tr.") at 13:7 – 15:17 and 21:22-24, 23:20- 24:24, 30:25-31_23, 34:17- 36:15 and Exhibits 4-8*. The Widcom VTC-56 codecs were purchased by Kodak prior to the end of 1985. *See Derounian Tr. at 24:25 – 25:11 and 26:21 – 27:15 and WIDCOM 001550 and WIDCOM 001551*. Mr. Derounian trained more than 100 people to use the Widcom VTC-56 (and in fact the Widcom VTC-56 was used during each training) and was present during each training. *See Derounian Tr. at 27:19 – 30:24*. The Widcom VTC-56 codec was used for two-way video

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
	conferencing more than 100 times. *See Derounian Tr. at 44:16-20.* In total, more than 100 Widcom VTC-56 codec were sold and the sales occurred prior to the end of January 1986. *See WIDCOM 001550 and WIDCOM 001551; see also Final Transcript of Deposition of Shrikant Acharya taken on October 30, 2007 ("Acharya Tr.") at 28:7-15; see also Final Transcript of Deposition of Stanley Fralick taken on October 22, 2007 ("Fralick Tr.") at 31:7 – 32:22.* The Widcom VTC-56 is a video codec that has the boards shown in the diagram reproduced below. *See "Codec Squeezes Color Teleconferencing Through Digital Telephone Lines", J Anderson et al., Electronics, January 26, 1984, pp. 113-115 at KODAK_051224 – KODAK_051226 ("Widcom 1984 Article") at pg. 115.*  The boards include a cosine transform board and a coder board. The VTC-56 divides each frame into 8X8 blocks of pixels that are then cosine transformed. In particular, the cosine transform board performs a cosine transform that generates an array of transform coefficients that contains a DC coefficient and 63 AC

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
	coefficients with many zero-valued AC coefficients. *See Widcom 1984 Article, pg. 114.* The coefficients in the array of transform coefficients are quantized and coded. *See also Widcom VTC-56 codec.* The operation and coding of the Widcom VTC-56 machine was simulated using software written in Fortran and the Fortran software performed the same coding as the Widcom VTC-56 machine. *See Acharya Tr. at 40:17-22 and WIDCOM 003705 – WIDCOM 003712; see Acharya Tr. at 41:9 – 49:10.* The Widcom VTC-56 performs bandwidth compression (on color video pictures) at ratios of up to 1,440:1 which is sufficient to transmit color-TV pictures through a telephone line. *See Widcom 1984 Article, pg. 113.* The cosine transform coding for the pixel-to-pixel decorrelation (performed by the cosine transform and coder board) result in a 6:1 compression ratio (*See Widcom 1984 Article, pg. 113, table*) of the color-TV pictures (converting into quantized coefficient values which are the sequence of signal values.) The bandwidth compression causes a bitrate reduction of the sequence of signal values.
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	The events encoded by the VTC-56 include runs of zero AC coefficients followed by an AC coefficient having an absolute value of one (RL1) and runs of zero AC coefficients followed by an AC coefficient having an absolute value greater than one (RL0). *See VTC-56B Coder Theory of Operation by Widcom, Inc. (KODAK_079513 – KODAK_079570) ("VTC-56B Coder Theory of Operation") at KODAK_079517*; see *Fralick Tr. at 52:3 - 53:2*; see *also Widcom VTC-56 codec.* These events are then encoded with a code word wherein more frequently occurring values are represented by short code words and less frequently occurring values are represented by longer code words. *See Widcom 1984 Article at pg. 114.* In the VTC-56, the codewords are selected from several different tables based on the entropy of the image being encoded. In particular, there are six different tables that are used to code the AC coefficients wherein each table is optimized for a particular entropy level of the image to be coded. The table is selected based on a calculation of a standard deviation of the computed

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
	transform coefficients. *See VTC-56B Coder Theory of Operation at KODAK_079516; see also Final Transcript of Deposition of Eric Hamilton taken on October 10, 2007 ("Hamilton Tr.") at 90:7- 93:20; see also Widcom VTC-56 codec.*
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	In the VTC-56, event that include: 1) runs of zero AC coefficients followed by an AC coefficient having an absolute value of one (RL1); and 2) runs of zero AC coefficients followed by an AC coefficient having an absolute value greater than one (RL0) are encoded using a Huffman code word. *See Widcom 1984 Article at pg. 114; see also Hamilton Tr. at 87:13 – 100:16; see also Widcom VTC-56 codec.* The AC coefficients in the array of quantized transform coefficients are encoded in which runs of zero AC coefficients followed by a non-zero AC coefficient are encoded. In the VTC-56, runs are zero valued AC coefficients are encoded: *"Because there are so many zero-valued coefficients, the final code is further compressed by coding run lengths instead of transmitting long runs of 0 bits."* *See Widcom 1984 Article, p. 114.*
4. The method of claim 3, wherein said code words are Huffman code words.	The code words are Huffman codewords. In the VTC-56, the Huffman codeword is selected from several different tables based on the entropy of the image being encoded. In particular, there are six different tables that are used to code the AC coefficients wherein each table is optimized for a particular entropy level of the image to be coded. The table is selected based on a calculation of a standard deviation of the computed transform coefficients. *See Hamilton Tr. at 90:7- 93:20; Acharya Tr. at 37:7-15; see also Widcom VTC-56 codec.*
7. A method as claimed in claim 4, characterized in that the	The VTC-56 codes the AC coefficient magnitudes with the Huffman code words above so that the Huffman

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
Huffman codeword is independent of the sign of that non-zero coefficient which succeeds or precedes the run of zero-coefficients and in that the sign is coded by a separate bit.	codewords are independent of the sign of that coefficient. The coder board then sends the sign separately from the code for the AC coefficient magnitude. *See VTC-56B Coder Theory of Operation at KODAK_079516*; *see also Widcom VTC-56 codec.*
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	Prior to the end of 1985, Kodak developed a video conferencing center that included a video conference room at the State Street Kodak office and a video conference room at Kodak Park Building 205. Each of the video conference rooms had a Widcom VTC-56 codec. *See KODAK_015739 – KODAK_015743*; *see also Derounian Tr. at 13:7 – 15:17 and 21:22-24, 23:20- 24:24, 30:25- 31_23, 34:17- 36:15 and Exhibits 4-8.* The Widcom VTC-56 codecs were purchased by Kodak prior to the end of 1985. *See Derounian Tr. at 24:25 – 25:11 and 26:21 – 27:15 and WIDCOM 001550 and WIDCOM 001551.* Mr. Derounian trained more than 100 people to use the Widcom VTC-56 (and in fact the Widcom VTC-56 was used during each training) and was present during each training. *See Derounian Tr. at 27:19 – 30:24.* The Widcom VTC-56 codec was used for two-way video conferencing more than 100 times. *See Derounian Tr. at 44:16-20.* In total, more than 100 Widcom VTC-56 codec were sold and the sales occurred prior to the end of January 1986. *See WIDCOM 001550 and WIDCOM 001551. See also Acharya Tr. at 28:7-15; see also Fralick Tr. at 31:7 – 32:22.* The Widcom VTC-56 is a video codec that has the boards shown in the diagram reproduced below. *See Widcom 1984 Article, at pg. 115.*

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
	 The boards include a cosine transform board and a coder board. The VTC-56 divides each frame into 8X8 blocks of pixels that are then cosine transformed. In particular, the cosine transform board performs a cosine transform that generates an array of transform coefficients that contains a DC coefficient and 63 AC coefficients with many zero-valued AC coefficients. *See Widcom 1984 Article, pg. 114.* The coefficients in the array of transform coefficients are quantized and coded. *See also Widcom VTC-56 codec.* The operation and coding of the Widcom VTC-56 machine was simulated using software written in Fortran and the Fortran software performed the same coding as the Widcom VTC-56 machine. *See Acharya Tr. at 40:17-22 and WIDCOM 003705 – WIDCOM 003712; see Acharya Tr. at 41:9 – 49:10.* The Widcom VTC-56 performs bandwidth compression (on color video pictures) at ratios of up to 1,440:1 which is sufficient to transmit color-TV pictures through a telephone line. *See Widcom 1984 Article, pg. 113.* The cosine transform coding for the pixel-to-pixel decorrelation (performed by the cosine transform and coder board) result in a 6:1 compression ratio (*See Widcom 1984 Article, pg.*

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
	113, table) of the color-TV pictures (converting into quantized coefficient values which are the sequence of signal values.) The bandwidth compression causes a bitrate reduction of the sequence of signal values.
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	The boards of the VTC-56 include a cosine transform board. The VTC-56 divides each frame into 8X8 blocks of pixels that are then cosine transformed. In particular, the cosine transform board performs a cosine transform that generates an array of transform coefficients that contains a DC coefficient and 63 AC coefficients with many zero-valued AC coefficients. *See Widcom 1984 Article, pg. 114*; *see also Widcom VTC-56 codec.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	The events encoded by the VTC-56 include runs of zero AC coefficients followed by an AC coefficient having an absolute value of one (RL1) and runs of zero AC coefficients followed by an AC coefficient having an absolute value greater than one (RL0). *See VTC-56B Coder Theory of Operation at KODAK_079517*; *see Fralick Tr. at 52:3 - 53:2*; *see also Widcom VTC-56 codec.*
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	These events are then encoded with a code word wherein more frequently occurring values are represented by short code words and less frequently occurring values are represented by longer code words. *See Widcom 1984 Article at pg. 114.* In the VTC-56, the codewords are selected from several different tables based on the entropy of the image being encoded. In particular, there are six different tables that are used to code the AC coefficients wherein each table is optimized for a particular entropy level of the image to be coded. The table is selected based on a calculation of a standard deviation of the computed transform coefficients. *See VTC-56B Coder Theory of Operation at KODAK_079516*; *see also Hamilton Tr. at 90:7- 93:20; see also Widcom VTC-56 machine.* In the VTC-56, event that include: 1) runs of zero AC coefficients followed by an AC coefficient having an absolute value of one (RL1); and 2) runs of zero AC coefficients followed by an AC coefficient having an absolute value greater than one (RL0) are encoded using a Huffman code word. *See Widcom 1984 Article at pg. 114; see also Hamilton Tr. at 87:13 – 100:16.* The AC coefficients in the array of quantized transform coefficients are encoded in which runs of zero AC

US 4,901,075 CLAIM ELEMENTS	Widcom VTC-56
	coefficients followed by a non-zero AC coefficient are encoded. In the VTC-56, runs are zero valued AC coefficients are encoded: *"Because there are so many zero-valued coefficients, the final code is further compressed by coding run lengths instead of transmitting long runs of 0 bits."* *See Widcom 1984 Article, p. 114.*

The invalidity chart provided below supplements Kodak's first supplemental response to Interrogatory No. 3, served on September 7, 2007.

Invalidity Chart for COST 211bis Simulation Subgroup Paper entitled "Block Coding Using a Two-Dimensional Run-Length Table", published September 9, 1986 PHLPSKD_00070973 - PHLPSKD_00070979 (the "COST Paper")

US 4,901,075 CLAIM ELEMENTS	COST Paper
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	The COST Paper was a proposal made by Dr. Peter Vogel to the COST 211bis Simulation Subgroup. *See Rough Deposition Transcript of Peter Vogel, Ph. D. (the "Vogel Tr.") at 117, lines 12- 24.* The paper was published/made public and distributed to the participants of the COST 211bis Simulation Subgroup by at least September 9, 1986. *See Vogel Tr. at 120, line 2 – 121, line 20.* The COST paper discloses a 2D-run-length coding. See Vogel Tr. at 122, lines 3-7. "For the 2D-run-length coding the events corresponding to a run-length of consecutive zero coefficients and coefficients unequal to zero defining the end of the run-length are considered as composite rather than separate statistical events…" *See COST Paper at PHLPSKD_00070973. See Vogel Tr. at 122:22 – 123:1.* The 2D-run-length coding with the Huffman codes provides a bit reduction of approximately 12% compared with coding by an amplitude-and- run-length lookup table using Huffman codes. *See COST Paper at*

US 4,901,075 CLAIM ELEMENTS	COST Paper
	PHLPSKD_00070974.
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	"For the 2D-run-length coding the events corresponding to a run-length of consecutive zero coefficients and coefficients unequal to zero defining the end of the run-length are considered as composite rather than separate statistical events…" *See COST Paper at PHLPSKD_00070973 and Appendix A at PHLPSKD_00070977 - PHLPSKD_00070978.*
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	As shown in Appendix A, a Huffman code for the composite events are assigned to the composite events that are a run-length of consecutive zero coefficients and coefficients unequal to zero. *See COST Paper at PHLPSKD_00070973, and Appendix A at PHLPSKD_00070977- PHLPSKD_00070978.* For example, a composite event with a zero run length of "2" and a "5" coefficient unequal to zero is assigned the Huffman code "0010101110". *See COST Paper at PHLPSKD_00070977.*
4. The method of claim 3, wherein said code words are Huffman code words.	The codes shown in Appendix A of the COST Paper are Huffman codes. *See COST Paper at PHLPSKD_00070973 and Appendix A at PHLPSKD_00070977- PHLPSKD_00070978.*
7. A method as claimed in claim 4, characterized in that the Huffman codeword is independent of the sign of that non-zero coefficient which succeeds or precedes the run of zero-coefficients and in that the sign is coded by a separate bit.	The Huffman codes in Appendix A of the COST Paper are independent of the sign of the non-zero coefficient since each code in Appendix A is based on the magnitude of the coefficient unequal to zero. *See COST Paper Appendix A at PHLPSKD_00070977- PHLPSKD_00070978.* The sign bit is coded with a separate bit. *See COST Paper at PHLPSKD_00070973 and Appendix A at PHLPSKD_00070977- PHLPSKD_00070978.*
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	The COST Paper was a proposal made by Dr. Peter Vogel to the COST 211bis Simulation Subgroup. *See Rough Deposition Transcript of Peter Vogel, Ph. D. (the "Vogel Tr.") at 117, lines 12- 24.* The paper was published/made public and distributed to the participants of the COST 211bis Simulation Subgroup by at least September 9, 1986. *See Vogel Tr. at 120, line 2 – 121, line 20.* The 2D-run-length coding with the Huffman codes provides a bit reduction of approximately 12% compared

US 4,901,075 CLAIM ELEMENTS	COST Paper
	with coding by an amplitude-and- run-length lookup table using Huffman codes. *See COST Paper at PHLPSKD_00070974.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	The COST paper discloses a 2D-run-length coding. See Vogel Tr. at 122, lines 3-7. "For the 2D-run-length coding the events corresponding to a run-length of consecutive zero coefficients and coefficients unequal to zero defining the end of the run-length are considered as composite rather than separate statistical events..." *See COST Paper at PHLPSKD_00070973. See Vogel Tr. at 122:22- 123:1.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	"For the 2D-run-length coding the events corresponding to a run-length of consecutive zero coefficients and coefficients unequal to zero defining the end of the run-length are considered as composite rather than separate statistical events..." *See COST Paper at PHLPSKD_00070973. See also COST Paper, Appendix A at PHLPSKD_00070977 - PHLPSKD_00070978.*
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	As shown in Appendix A, a Huffman codes for the composite events are assigned to the composite events that are a run-length of consecutive zero coefficients and coefficients unequal to zero. *See COST Paper at PHLPSKD_00070973, and PHLPSKD_00070977-PHLPSKD_00070978.* For example, a composite event with a zero run length of "2" and a "5" coefficient unequal to zero, the Huffman code is "0010101110". *See COST Paper at PHLPSKD_00070977.*

Pursuant to Federal Rule of Civil Procedure 33(d), Kodak further responds to this Interrogatory by incorporating by reference the documents referenced in each chart. These documents have been produced to Philips or by Philips to Kodak and are as equally available to Philips as they are to Kodak. Kodak also incorporates by reference the Widcom VTC-56 codec, which was identified in Kodak's initial disclosures. Further, Kodak incorporates by reference the deposition testimony of Robert Derounian, Shrikant Acharya, Stanley Fralick, Eric Hamilton and Peter Vogel.

In addition, Kodak refers Philips to the individuals identified in Kodak's initial

disclosures and Kodak's document production. Kodak's investigation into this Interrogatory is ongoing. Kodak will supplement this response as circumstances and its ongoing investigation warrant.

INTERROGATORY NO. 7:

If YOU contend that any of the JPEG image encoding products or services identified in YOUR response to Interrogatory No. 1 were licensed, impliedly or otherwise, under the patent-in-suit, state each fact known by YOU that supports, refutes, or relates to YOUR contention, including the particular products or services that were allegedly licensed, the number of products or services that were allegedly licensed, the particular patents or patent pools that were allegedly licensed, the particular agreements that allegedly licensed those products or services, the specific parties to any such license or patent pool agreements, identify each person who has knowledge about the subject matter of this interrogatory; and identify each document and thing relating to the subject matter of this interrogatory.

SECOND SUPPLEMENTAL RESPONSE TO INTERROGATORY NO 7:

Kodak incorporates by reference its objections to Interrogatory No. 7, served on April 6, 2007. Kodak further incorporates by reference its supplemental response to Interrogatory No. 7, served on November 13, 2007. Subject to the general and specific objections, Kodak responds to this Interrogatory as follows:

Pursuant to Federal Rule of Civil Procedure 33(d), Kodak further responds to this Interrogatory by incorporating by reference at least the following documents: PHLPSKD_00014883-14956, 17855-17925, 19423-19502, 20178-20299, 20599-20668, 21040-21087, and 58226-58229. These documents were produced by Philips to Kodak and are as equally available to Philips as they are to Kodak.

Kodak's investigation into this Interrogatory is ongoing. Kodak will supplement this response as circumstances and its ongoing investigation warrant.

INTERROGATORY NO. 8:

Describe in detail all facts that support, refute, or relate to YOUR assertions that this action is barred by laches, equitable estoppel, patent exhaustion, license, release, waiver/estoppel, and/or unclean hands; identify each person who has knowledge about the subject matter of this interrogatory; and identify each document and thing relating to the subject matter of this interrogatory.

SECOND SUPPLEMENTAL RESPONSE TO INTERROGATORY NO 8:

For each subcategory referenced in Interrogatory No. 8, Kodak incorporates by reference its objections to Interrogatory No. 8, served on April 6, 2007 and its supplemental response to Interrogatory No. 8, served on November 13, 2007. Subject to the general and specific objections, Kodak responds to this Interrogatory as follows:

For each subcategory referenced in Interrogatory No. 8, Kodak further responds to this Interrogatory by incorporating by reference, pursuant to Federal Rule of Civil Procedure 33(d), at least the following documents: PHLPSKD_00014883-14956, 17855-17925, 19423-19502, 20178-20299, 20599-20668, 21040-21087, and 58226-58229. These documents were produced by Philips to Kodak and are as equally available to Philips as they are to Kodak.

For the subcategory specifically related to "laches," Kodak further responds to this Interrogatory by incorporating by reference, pursuant to Federal Rule of Civil Procedure 33(d), at least the following documents: K003520-3528, 3579-3590, and 4201-4214. These documents were produced to Philips and are as equally available to Philips as they are to Kodak.

Kodak's investigation into this Interrogatory is ongoing. Kodak will supplement this

response as circumstances and its ongoing investigation warrant.

INTERROGATORY NO. 9:

Describe in detail all facts that support, refute, or relate to YOUR assertions that Philips engaged in deceptive trade practices in violation of 6 Del. C. § 2532, committed fraud, and/or made a negligent misrepresentation; identify each person who has knowledge about the subject matter of this interrogatory; and identify each document and thing relating to the subject matter of this interrogatory.

SECOND SUPPLEMENTAL RESPONSE TO INTERROGATORY NO. 9:

For each subcategory referenced in Interrogatory No. 9, Kodak incorporates by reference its objections to Interrogatory No. 9, served on April 6, 2007 and its supplemental response to Interrogatory No. 9, served on November 13, 2007. Subject to the general and specific objections, Kodak responds to this Interrogatory as follows:

For each subcategory referenced in Interrogatory No. 9, Kodak further responds to this Interrogatory by incorporating by reference, pursuant to Federal Rule of Civil Procedure 33(d), at least the following documents: PHLPSKD_00014883-14956, 17855-17925, 19423-19502, 20178-20299, 20599-20668, 21040-21087, and 58226-58229. These documents were produced by Philips to Kodak and are as equally available to Philips as they are to Kodak.

Kodak's investigation into this Interrogatory is ongoing. Kodak will supplement this response as circumstances and its ongoing investigation warrant.

INTERROGATORY NO. 1:

Separately for each JPEG image encoding product or service identified in YOUR response to Interrogatory No. 1, and separately for each month from April 18, 2000, until the date of the response to this Interrogatory, state the total quantity of JPEG image encoding

products or services that has been made, sold, offered for sale, imported into the United States, used, leased, distributed, and/or licensed by or for YOU or YOUR customers; identify each person who has knowledge about the subject matter of this interrogatory; and identify each document and thing relating to the subject matter of this interrogatory.

FIRST SUPPLEMENTAL RESPONSE TO INTERROGATORY NO. 12:

Kodak objects to this Interrogatory as vague and ambiguous, including without limitation, its use of the phrases "JPEG encoding product or service" and "total quantity of JPEG image encoding products or services." Kodak objects to this Interrogatory on the grounds that it calls for a legal conclusion as to the terms "made, sold, offered for sale, imported into the United States, used, leased, distributed, and/or licensed." Kodak further objects to this Interrogatory as being compound because it contains discrete subparts that require separate distinct and multiple responses. Kodak objects to this Interrogatory as overly broad and unduly burdensome. Kodak further objects to this Interrogatory to the extent it seeks to impose additional burdens or duties on Kodak that exceed the scope of reasonable and permissible discovery under the Federal Rules of Civil Procedure, the Local Civil Rules for the District of Delaware, or the Individual Rules of the Judge(s) hearing this matter. Kodak further objects to the extent this Interrogatory seeks confidential information from third parties that Kodak is under an obligation not to disclose. Kodak further objects to this Interrogatory to the extent it seeks information that is beyond Kodak's possession, custody or control. Subject to these objections and the general objections set forth above, Kodak responds as follows:

Pursuant to Federal Rule of Civil Procedure 33(d), Kodak responds to this Interrogatory by incorporating by reference its production of Kodak financial documents, including without limitation, the native file spreadsheets contained in the following productions: Kodak_018143,

018652, 18653 and 19303. These documents have been produced to Philips and are as equally available to Philips as they are to Kodak. Further, Kodak incorporates fully by reference its supplemental responses to Interrogatory No. 1 and the deposition testimony of Andrew Evenski. In addition, Kodak refers Philips to the individuals identified in Kodak's initial disclosures and Kodak's document production. Kodak's investigation into this Interrogatory is ongoing. Kodak will supplement this response as circumstances and its ongoing investigation warrant.

INTERROGATORY NO. 2:

Separately for each JPEG image encoding product or service identified in YOUR response to Interrogatory No. 1, and separately for each month from April 18, 2000, until the date of the response to this Interrogatory, state YOUR revenues, profits, and costs for each product or service that has been made, sold, offered for sale, imported into the United States, used, leased, distributed, and/or licensed by or for YOU or YOUR customers; identify each person who has knowledge about the subject matter of this interrogatory; and identify each document and thing relating to the subject matter of this interrogatory.

FIRST SUPPLEMENTAL RESPONSE TO INTERROGATORY NO. 1:

Kodak objects to this Interrogatory as vague and ambiguous, including without limitation, its use of the phrase "JPEG encoding product or service." Kodak further objects to this Interrogatory as being compound because it contains discrete subparts that require separate distinct and multiple responses. Kodak objects to this Interrogatory as overly broad and unduly burdensome. Kodak further objects to this Interrogatory to the extent it seeks to impose additional burdens or duties on Kodak that exceed the scope of reasonable and permissible discovery under the Federal Rules of Civil Procedure, the Local Civil Rules for the District of Delaware, or the Individual Rules of the Judge(s) hearing this matter. This interrogatory is

premature in light of the expert discovery schedule agreed to by the parties and reflected in the Court's scheduling order. Kodak further objects to the extent this Interrogatory seeks confidential information from third parties that Kodak is under an obligation not to disclose. Kodak further objects to this Interrogatory to the extent it seeks information that is beyond Kodak's possession, custody or control. Subject to these objections and the general objections set forth above, Kodak responds as follows:

Pursuant to Federal Rule of Civil Procedure 33(d), Kodak responds to this Interrogatory by incorporating by reference its production of Kodak financial documents, including without limitation, the native file spreadsheets contained in the following productions: Kodak_018143, 018652, 18653 and 19303. These documents have been produced to Philips and are as equally available to Philips as they are to Kodak. Further, Kodak incorporates fully by reference its supplemental responses to Interrogatory No. 1 and the deposition testimony of Andrew Evenski. In addition, Kodak refers Philips to the individuals identified in Kodak's initial disclosures and Kodak's document production. Kodak's investigation into this Interrogatory is ongoing. Kodak will supplement this response as circumstances and its ongoing investigation warrant.

Date: November 13, 2007

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CERTIFICATE OF SERVICE

I, Nikki Wyll, hereby certify that on November 16, 2007, copies of the following document were served on the following counsel of record in the manner indicated:

DEFENDANT EASTMAN KODAK COMPANY'S SIXTH SUPPLEMENTAL RESPONSES TO PLAINTIFF U.S. PHILIPS CORPORATION'S FIRST SET OF INTERROGATORIES (NOS. 2-3, 7-9 & 12-13)

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EXHIBIT

G

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

U.S. PHILIPS CORPORATION, Plaintiff, v. EASTMAN KODAK COMPANY, Defendant.	)	Civil Action No. 06-00251-GMS

EXPERT REPORT OF DR. TOURADJ EBRAHIMI FOR U.S. PATENT NO. 4,901,075 ON INVALIDITY

I. INTRODUCTION

1. I submit this Expert Report in this case on issues relating to invalidity of U.S. Patent No. 4,901,075 (the "'075 Patent") being asserted by U.S. Philips Corporation ("Philips") against Eastman Kodak Company ("Kodak"). I reserve the right to supplement or modify this Expert Report as necessary or appropriate and in response to any expert reports served by Philips.

2. I have been retained by DLA Piper as an expert in this case as to the '075 Patent. No part of my compensation is dependent upon the outcome of this case or any issue in it.

3. I am being compensated at my usual rate of $300 per hour for work on this case.

4. This expert report contains eight sections, including this Introduction. The additional parts are: Qualifications (Part II), List of Materials Reviewed (Part III), Legal Basis for Opinion (Part IV), Background of Technology (Part V), Claim Construction (Part VI), Invalidity (Part VII) and Conclusion (Part VIII).

II. QUALIFICATIONS

5. A copy of my current curriculum vitae ("CV") is attached as Exhibit 1.

6. I am a Professor of Image Processing at the Swiss Federal Institute of Technology (EPFL), in Lausanne, Switzerland, involved in teaching and research in the field of Multimedia Signal Processing. Before joining EPFL as a faculty member in 1994, I was with AT&T Bell Laboratories Research Center in Holmdel, NJ, USA, where I worked on video compression techniques for communication. Prior to that, I was with Sony Corporation in Tokyo, Japan, working at its Corporate Research Center in the area of image and video compression for storage applications.

7. I hold a Masters of Science Degree from EPFL in Electrical Engineering with specialization in Image Processing, and a PhD from the same University on Video Compression.

8. During my career I have been closely involved in various projects on image and video compression including many related to standardization. I am the Head of the Swiss Delegation to JPEG, MPEG and SC29 which is the body overseeing the work of these two standards. I have been and continue to be the chair of various technical subgroups within the JPEG and MPEG standardization committees, including chairman of requirements in JPEG, editor of the secure JPEG 2000 standard, and editor of the MPEG-4 video standard. I also chaired the joint Ad Hoc Group between ISO/IEC and ITU-T experts in charge of examining proposals for inclusion of new Amendments to JPEG image compression standard.

9. I have received several awards and distinctions in the area of image and video compression standardization. Examples include four ISO certificates for outstanding contributions to JPEG 2000, Secure JPEG 2000, JPEG 2000 reference software, and the MPEG-4 video standard. I have received the first prize for best publication of the IEEE Transactions on Consumer Electronics in 2000 for a paper describing the JPEG 2000 standard. I have been author or co-author of more than 150 publications (books, book chapters, journal papers, conference proceedings), and hold several patents.

10. I regularly teach courses at graduate levels in European Universities (Switzerland, France, and Italy) on image and video compression which include detailed description of the JPEG compression standard.

III. MATERIALS RELIED UPON

11. A list of the materials I relied upon is contained on Appendix A to this Report.

IV. LEGAL BASIS FOR OPINION

A. The Asserted Claims.

12. I understand that the following claims of the '075 Patent are asserted in this litigation: 3-4, 7-8 and 11.

B. Invention Date/Priority Date

13. I have been informed by counsel for Kodak that the invention date of a patent is the date of conception of the invention. I understand that conception is the mental part of the inventive act, but is more than a mere vague idea of how to solve a problem. The means for solving the problem and their interaction must be comprehended also.

14. Counsel for Kodak has additionally informed me that the date for determining priority of invention over an alleged prior art reference (the priority date) is the earliest of one of three dates:

a) the date of actual reduction to practice of the invention prior to the effective date of the reference; or

b) the date of conception of the invention coupled with due diligence from a date prior to the reference date to a subsequent actual reduction to practice; or

c) the date of conception of the invention coupled with due diligence from prior to the reference date to the filing date of the application (also known as constructive reduction to practice).

15. Counsel for Kodak has additionally informed me that the date of actual reduction to practice is the date that the invention existed and worked for its intended purpose.

C. Anticipation

16. I have been informed by counsel for Kodak that a patent claim may be invalid under 35 U.S.C. §102 if prior art anticipates the claim. I further understand that for anticipation, every element in a claim must be identically shown in a single reference and arranged as in the claim in order for that reference to anticipate the claim.

1. 35 U.S.C. §102(a)

17. Counsel for Kodak has informed me that a patent is invalid under 35 U.S.C. §102(a) if the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent.

18. Counsel for Kodak has additionally informed me that a patent or printed publication reference qualifies as prior art under 35 U.S.C. §102(a) if it has a publication date that predates the priority date of the invention.

2. 35 U.S.C. §102(b)

19. Counsel for Kodak has informed me that a patent is invalid under 35 U.S.C. §102(b) if the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States.

20. Counsel for Kodak has additionally informed me that a patent or printed publication reference qualifies as prior art under 35 U.S.C. §102(b) if it has a publication date that is more than one year before filing of the application for patent.

3. 35 U.S.C. §102(e)

21. Counsel for Kodak has informed me that a patent is invalid under 35 U.S.C. §102(e) if the invention was described in: (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for the purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

22. Counsel for Kodak has additionally informed me that a U.S. Patent qualifies as prior art under 35 U.S.C. §102(e) if it has an effective filing date that predates the priority date of the invention.

D. Obviousness

23. Counsel for Kodak has informed me that a patent claim is invalid when the differences between the subject matter of the claim and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the invention pertains. I have further been informed that the inquiry as to whether a patent claim is obvious includes the steps of determining the scope and content of the prior art; determining the differences between the prior art and the claims at issue; and determining the level of ordinary skill in the art. Against this background the obviousness or non-obviousness of the claim is determined.

24. I have also been informed by counsel for Kodak that a patent claim composed of several elements is not proved obvious merely by demonstrating that each element was,

independently, known in the prior art. This is because most, if not all, inventions will be combinations of known elements. A primary reference may not be modified in light of or combined with one or more secondary references where the result would be to render the primary reference inoperable for its intended purpose. Rather, the combination is likely to be obvious when it is the predictable use or variation of prior art elements according to their established functions. Stated another way, the combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results. I also understand that the prior art reference must be viewed without the benefit of hindsight reasoning.

E. Indefiniteness

25. Counsel for Kodak also has informed me that, under 35 U.S.C. § 112, patent claims must particularly point out and distinctly claim the subject matter which the applicant regards as his invention. Kodak's counsel has also informed me that this definiteness requirement does not compel absolute clarity, but that only claims not amenable to construction or insolubly ambiguous are indefinite. I further understand that the definiteness of claim terms depends on whether those terms can be given any reasonable meaning, and that claims are found indefinite only if reasonable efforts at claim construction prove futile.

V. BACKGROUND OF TECHNOLOGY

A. Digital Images and Compression

26. Digital images are produced as the result of a sampling and quantization process applied to an analog signal (picture). In their canonical form, digital images are often represented by one or three matrices whose elements contain the luminance or the three color components values of the quantized samples of the image also referred to as pixels. The

canonical form (also known as raw format) of a digital image typically generates very large files in size when compared to other digital files containing text, speech or audio.

27. Even though the size of available memory and the bandwidth of communication channels have not ceased to increase, and continue to do so, most consumer and professional applications cannot be deployed in a cost effective way unless compression is applied. Thanks to image compression, digital images have become part of everyday life, on the Internet, in Digital Still Cameras, and in Multimedia enabled Mobile Phones, to mention a few examples.

28. Image compression algorithms, as a special case of multimedia data compression, can be divided into two main processing blocks. The first processing block consists in building the messages to be coded which represent the multimedia signal. In the case of an image, the message can be the value of the color of a pixel, the pattern representing exactly or approximately a collection of pixels, or any other appropriate representation of an image. The result of the first processing block (the message) is then input to a second processing block where based on different considerations, such as statistical characteristics of the messages generated by the signal seen as a source, codewords are assigned to each message or a collection of messages.

29. Depending on the choice of the method to build the message in the first processing block, there are two main approaches for digital image compression, namely, predictive coding, and transform coding. In predictive coding, the value of an image pixel is predicted from past pixels, and only the error of such a prediction is considered as the message. Several variants of predictive coding can be distinguished depending on the way the prediction is performed, and on the method used to represent the prediction error. Transform based coding first transforms the pixel values from their original spatial domain into an abstract space in which

their energy is concentrated on a smaller number of non-zero coefficients. These coefficients are then quantized and eventually reordered in order to create the messages. Here too, several variants can be distinguished depending on the type of the transform performed, the method used for quantization, the method of re-ordering of coefficients, etc. Since the 1960s where the first operational digital image coding schemes were put forward, literally hundreds of digital image compression algorithms have been reported in the literature. Among those include the "Scene Adaptive Coder" by Pratt and Chen, published in 1984 which is also referred to in the Vogel patent. According to this approach, the digital image to be compressed is divided into blocks of size 16x16 pixels to which a 2D Discrete Cosine Transform (DCT) is applied. The resulting coefficients are then quantized and reorganized in a zig-zag scan. The message to be coded then becomes runs of consecutive zero valued coefficients, and the amplitude of non-zero coefficients.

30. An important issue in any data compression and in particular in image compression schemes is the methodology used for the bit assignment in the second processing block. The purpose of the bit assignment is to produce a uniquely decodable, and preferably an as compact as possible sequence of binary data (1 and 0) also called a bitstream, representing the encoded messages and therefore the compressed digital image. One important class of bit assignment techniques is entropy coding. The idea behind entropy coding is to assign shorter codewords (in number of bits) to messages that occur more often. In 1952, Huffman proposed a method to build minimum redundancy codes which produce optimal results in terms of compression if messages to which bits are to be assigned are independent, if each message is assigned to an integer number of bits, and if their frequency (probability) of occurrence is known. Since then, Huffman codewords have been widely used in data compression.

31. At this point, it is important to mention a few observations regarding Huffman codewords. As said above, Huffman codewords rely on statistical characteristics of the messages produced by the signal to be coded. There are two ways in which such statistics can be generated, namely, by off-line, or by on-line methods. In off-line methods, the statistics (probabilities) of the messages of the signal to be coded are estimated from a set of signals similar to the signal to be coded. A Huffman table is then built off-line based on such statistics where shorter codewords are assigned to more frequent messages. The Huffman codewords used to compress a signal is therefore based on statistics of other signals as opposed to those of the signal to be coded. The compression efficiency of such a Huffman coding will depend on how closely the statistics of the signals used to generate the Huffman codewords match those of the signal to be coded. To improve this, in on-line methods, care is taken to use the statistics of the signal to be coded in order to generate the Huffman codewords. For example, in a first pass, the statistics of messages of the signal to be coded are gathered. Based on these statistics, Huffman codewords are generated, and then used to code the signal during a second pass. The Huffman table containing the codewords of messages extracted from the signal is also included into the compressed bitstream.

32. A number of other practical considerations have to be taken into account when using Huffman codewords. On the one hand, the less frequently a message occurs in a signal, the more difficult it is to accurately estimate the probability of such an occurrence. Fortunately, this is not a serious drawback because such rare messages occur less frequently, and therefore their impact on the overall compression efficiency is limited. On the other hand, for a large population of messages (which is often the case in image compression), the less frequent messages tend to receive very long codewords which makes their implementation less practical. Based on the

above two observations, variants of Huffman codewords have been frequently used in which only Huffman codewords are produced for most frequent messages. For less frequent messages, an escape code is designed to signal that a rare message is expected. Other suboptimal bit assignment approaches are then applied to such rare messages.

B. The '075 Patent

33. The '075 patent is entitled "Method and apparatus for bit rate reduction" and defines a method for compression of digital images by transform coding. The core of the method is based on the work of Pratt and Chen in their paper entitled "Scene Adaptive Coder", published in 1984, also referred to by the inventor.

34. The major difference between the '075 Patent and the Scene Adaptive Coder is as follows. In the Scene Adaptive Coder, after quantization and zig-zag scan of transformed coefficients, the message is defined to be either the runs of consecutive zero valued coefficients or the amplitude of a non-zero coefficient. The Vogel patent instead defines the runs of consecutive zero valued coefficients together with the amplitude of the next or the previous non-zero coefficient as the message to be coded. This is justified by the fact that, based on experiments carried out, it has been observed that the probability of such a combined message is smaller than the product of the probability of the corresponding zero run multiplied by the probability of the corresponding non-zero amplitude. This means that there exists a statistical dependency between the run of zero coefficients and the amplitude of the non-zero coefficient that follows or precedes such a run. It is a known fact that in situations when there are statistical dependencies between two messages, Huffman coding of a message defined as the combination of two statistically dependent messages produces higher compression efficiency when compared to independent Huffman coding of each message separately, as was proposed in the Scene

Adaptive Coder by Chen and Pratt. Hence, Vogel proposes a single Huffman coding of zero-runs and the previous or the following non-zero amplitude coefficients, by proposing a 2D-VLC table containing the appropriate codewords of combinations of runs and the following (or the preceding) non-zero amplitude based on the statistics of the signal to be coded (see claim 3 of the Vogel patent). The Vogel patent reports gains of 12% when compared to Chen and Pratt.

35. For practical reasons, the Vogel patent also proposes various escape codes in order to reduce the number of messages that are Huffman coded by breaking them into smaller events which are signaled using appropriate and well known mechanisms.

VI. CLAIM CONSTRUCTION

36. I have reviewed the claim construction positions of Kodak. I agree with them because Kodak's claim construction positions are consistent with the way in which a person of ordinary skill in the relevant art would interpret the claims of the '075 Patent.

37. After reading the '075 patent and its prosecution history, it is my opinion that a person of ordinary skill in the art in the 1986-1987 time frame would have been an engineer having a masters degree in electrical engineering plus at least two years of experience in the field of digital signal compression.

38. My analysis of the prior art based on Kodak's claim construction positions are set forth below.

39. I have also reviewed the claim construction positions of Philips. I do not agree with their claim construction positions. However, for completeness, I have analyzed the prior art under Philips' claim constructions and, where appropriate because my opinion is different under Philips' claim constructions, I have provided a separate analysis of that prior art based on Philips' claim constructions.

VII. INVALIDITY

A. Anticipatory Prior Art Under Kodak's Constructions

40. It is my opinion that the prior art listed in this section below anticipates one or more of the Asserted Claims under Kodak's claim constructions for the reasons set forth below.

1. Widcom VTC-56

41. It is my opinion that the Widcom VTC-56 codec anticipates claims 3-4 and 7-8 of the '075 Patent. The details of my analysis of the Widcom VTC-56 codec under Kodak's constructions are set forth in Appendix B, Exhibit 1.

2. U.S. Patent No. 4,698,672 to Chen et al.

42. It is my opinion that U.S. Patent No. 4,698,672 to Chen et al. anticipates claims 3-4 and 7-8 of the '075 Patent. The details of my analysis of U.S. Patent No. 4,698,672 to Chen et al. under Kodak's constructions are set forth in Appendix B, Exhibit 2.

3. "Block Coding Using a Two-Dimensional Run-Length Table" Paper published to the COST 211bis Simulation Subgroup

43. It is my opinion that the "Block Coding Using a Two-Dimensional Run-Length Table" Paper anticipates claims 3-4 and 7-8 of the '075 Patent. The details of my analysis of the "Block Coding Using a Two-Dimensional Run-Length Table" Paper under Kodak's constructions are set forth in Appendix B, Exhibit 3.

B. Anticipatory Prior Art Under Philips' Constructions

44. It is my opinion that the prior art listed in this section below anticipates one or more of the Asserted Claims under Philips' claim constructions for the reasons set forth below.

1. Widcom VTC-56

45. It is my opinion that the Widcom VTC-56 codec anticipates claims 3-4 and 7-8 of the '075 Patent under Philips' constructions for the same reasons as set forth in Appendix B, Exhibit 1 above.

2. U.S. Patent No. 4,698,672 to Chen et al.

46. It is my opinion that U.S. Patent No. 4,698,672 to Chen et al. anticipates claims 3-4 and 7-8 of the '075 Patent under Philips' constructions for the same reasons as set forth in Appendix B, Exhibit 2 above.

3. "Block Coding Using a Two-Dimensional Run-Length Table" Paper published to the COST 211bis Simulation Subgroup

47. It is my opinion that the "Block Coding Using a Two-Dimensional Run-Length Table" Paper anticipates claims 3-4 and 7-8 of the '075 Patent under Philips' constructions for the same reasons as set forth in Appendix B, Exhibit 3 above.

C. Obviousness Prior Art Under Kodak's Constructions

48. It is my opinion that the prior art listed in this section below renders one or more of the Asserted Claims unpatentable under Kodak's claim constructions for the reasons set forth below.

1. U.S. Patent No. 3,984,833 Van Voorhis in view of Chen Article

49. It is my opinion that claims 3, 4 and 8 of the '075 Patent are unpatentable over U.S. Patent No. 3,984,833 to van Voorhis in view of the Chen Article. The details of my analysis of U.S. Patent No. 3,984,833 to van Voorhis in view of the Chen Article under Kodak's constructions are set forth in Appendix C, Exhibit 1.

2. U.S. Patent No. 4,420,771 to Pirsch in View of the Chen Article

50. It is my opinion that claims 3, 4 and 8 of the '075 Patent are unpatentable over U.S. Patent No. 4,420,771 to Pirsch in view of the Chen Article. The details of my analysis of U.S. Patent No. 4,420,771 to Pirsch under Kodak's constructions are set forth in Appendix C, Exhibit 2.

3. U.S. Patent No. 4,316,222 to Subramaniam in view of Chen Article

51. It is my opinion that claims 3-4, 8 and 11 of the '075 Patent are unpatentable over U.S. Patent No. 4,316,222 to Subramaniam in view of the Chen Article. The details of my analysis of U.S. Patent No. 4,316,222 to Subramaniam in view of the Chen Article under Kodak's constructions are set forth in Appendix C, Exhibit 3.

4. U.S. Patent No. 4,363,036 to Subramaniam in view of Chen Article

52. It is my opinion that claims 3-4, 8 and 11 of the '075 Patent are unpatentable over U.S. Patent No. 4,363,036 to Subramaniam in view of the Chen Article. The details of my analysis of U.S. Patent No. 4,363,036 to Subramaniam in view of the Chen Article under Kodak's constructions are set forth in Appendix C, Exhibit 4.

5. U.S. Patent No. 4,092,676 to Saran in view of Chen Article

53. It is my opinion that claims 3-4, 8 and 11 of the '075 Patent are unpatentable over U.S. Patent No. 4,092,676 to Saran in view of the Chen Article. The details of my analysis of U.S. Patent No. 4,092,676 to Saran in view of the Chen Article under Kodak's constructions are set forth in Appendix C, Exhibit 5.

6. U.S. Patent No. 4,136,363 to Saran in view of Chen Article

54. It is my opinion that claims 3-4, 8 and 11 of the '075 Patent are unpatentable over U.S. Patent No. 4,136,363 to Saran in view of the Chen Article. The details of my analysis of

U.S. Patent No. 4,136,363 to Saran in view of the Chen Article under Kodak's constructions are set forth in Appendix C, Exhibit 6.

7. U.S. Patent No. 4,494,151 to Liao in view of Chen Article

55. It is my opinion that claims 3-4, 8 and 11 of the '075 Patent are unpatentable over U.S. Patent No. 4,494,151 to Liao in view of the Chen Article. The details of my analysis of U.S. Patent No. 4,494,151 to Liao in view of the Chen Article under Kodak's constructions are set forth in Appendix C, Exhibit 7.

8. "Upper Bound, Lower Bound and Run-Length Substitution Coding" Article by Henry Liao in view of Chen Article

56. It is my opinion that claims 3-4, 8 and 11 of the '075 Patent are unpatentable over Liao Article in view of the Chen Article. The details of my analysis of the Liao Article in view of the Chen Article under Kodak's constructions are set forth in Appendix C, Exhibit 8.

D. Obviousness Prior Art Under Philips' Constructions

57. It is my opinion that the prior art listed in this section below renders one or more of the Asserted Claims unpatentable under Philips' claim constructions for the reasons set forth below.

1. U.S. Patent No. 3,984,833 Van Voorhis in view of Chen Article

58. It is my opinion that claims 3-4 and 8 of the '075 Patent are unpatentable over U.S. Patent No. 3,984,833 to van Voorhis in view of the Chen Article. The details of my analysis of U.S. Patent No. 3,984,833 to van Voorhis in view of the Chen Article under Philips' constructions are set forth in Appendix C, Exhibit 9.

2. U.S. Patent No. 4,420,771 to Pirsch in View of the Chen Article

59. It is my opinion that claims 3, 4 and 8 of the '075 Patent are unpatentable over U.S. Patent No. 4,420,771 to Pirsch in view of the Chen Article. The details of my analysis of U.S. Patent No. 4,420,771 to Pirsch under Philips' constructions are set forth in Appendix C, Exhibit 10.

3. U.S. Patent No. 4,316,222 to Subramaniam in view of Chen Article

60. It is my opinion that claims 3-4, 8 and 11 of the '075 Patent are unpatentable over U.S. Patent No. 4,316,222 to Subramaniam in view of the Chen Article. The details of my analysis of U.S. Patent No. 4,316,222 to Subramaniam in view of the Chen Article under Philips' constructions are the same as set forth in Appendix C, Exhibit 3.

4. U.S. Patent No. 4,363,036 to Subramaniam in view of Chen Article

61. It is my opinion that claims 3-4, 8 and 11 of the '075 Patent are unpatentable over U.S. Patent No. 4,363,036 to Subramaniam in view of the Chen Article. The details of my analysis of U.S. Patent No. 4,363,036 to Subramaniam in view of the Chen Article under Philips' constructions are set forth in Appendix C, Exhibit 11.

5. U.S. Patent No. 4,092,676 to Saran in view of Chen Article

62. It is my opinion that claims 3-4, 8 and 11 of the '075 Patent are unpatentable over U.S. Patent No. 4,092,676 to Saran in view of the Chen Article. The details of my analysis of U.S. Patent No. 4,092,676 to Saran in view of the Chen Article under Philips' constructions are set forth in Appendix C, Exhibit 12.

6. U.S. Patent No. 4,136,363 to Saran in view of Chen Article

63. It is my opinion that claims 3-4, 8 and 11 of the '075 Patent are unpatentable over U.S. Patent No. 4,136,363 to Saran in view of the Chen Article. The details of my analysis of

U.S. Patent No. 4,136,363 to Saran in view of the Chen Article under Philips' constructions are set forth in Appendix C, Exhibit 13.

7. U.S. Patent No. 4,494,151 to Liao in view of Chen Article

64. It is my opinion that claims 3-4, 8 and 11 of the '075 Patent are unpatentable over U.S. Patent No. 4,494,151 to Liao in view of the Chen Article. The details of my analysis of U.S. Patent No. 4,494,151 to Liao in view of the Chen Article under Philips' constructions are set forth in Appendix C, Exhibit 14.

8. "Upper Bound, Lower Bound and Run-Length Substitution Coding" Article by Henry Liao in view of Chen Article

65. It is my opinion that claims 3-4, 8 and 11 of the '075 Patent are unpatentable over Liao Article in view of the Chen Article. The details of my analysis of the Liao Article in view of the Chen Article under Philips' constructions are set forth in Appendix C, Exhibit 15.

E. Indefinitness under 35 USC 112, second paragraph of Terms "For Transmission at a Reduced Bit Rate" and "For Transmission at a Reduced Bandwidth" (Claims 3 and 8)

66. The preambles of claim 3 and claim 8 include claim elements that are ambiguous and would not have been understood by those skilled in the art because there are no disclosures within the '075 patent or its prosecution history to determine what is meant by the phrases "reduced bit rate" and " reduced bandwidth." Alternately, these phrases might be construed relative to the encoding method of the Chen 1984 article against which the claimed encoding method purportedly provides a 12% reduction.

1. Both Claim Phrases Should be Found Indefinite

67. Neither the patent nor the file history provide the person of ordinary skill in the art with information sufficient to determine whether the claimed coding method provides for transmission at a reduced " bit rate" or " bandwidth."

68. "Reduced" is a relative term: this reduction must be in comparison to a reference value. "Transmission" and "bit rate," in the context of the '075 patent's video signal, refer to the transfer speed of data per unit of time, that is, how fast the bits of encoded video data are transferred in a given time interval. An analogy might be that a small pipe lets a given amount of water flow (transmits water) per unit second and a pipe that is twice as large lets twice as much water flow over the same time period. Applying this to transmission of information, in 1986, a 1200 bps modem could transfer data at 1200 bits per second over a telephone line. By contrast, in 1986, a 2400 bps modem could transfer twice as many bits per second, over the same telephone line.

69. In order to determine what " for transmission at a reduced bit rate" means in the context of the '075 patent, the person of ordinary skill in the art must be able to perform a comparison between the transmitted bit rate of the alleged invention and the transmitted bit rate of the system that is accused of infringement. But if the person of ordinary skill does not know the transmission channels that are used by both methods, a reduced bit rate (i.e., a slower speed) can be shown simply by using a slower type of transmission channel (or hardware). For example, the '075 patent claims to improve the bit rate over the Chen method by 12%. If a video signal encoded by the Chen method is transmitted using a 2400 bps modem and the same video signal is encoded using the '075 patent method and transmitted using the 1200 bps modem, the '075 patent method will transmit the video signal at a reduced bit rate, regardless of the reduction

attributable to the claimed coding method. In other words, the signal transferred over the 1200 bps modem will be " transmitted at a reduced bit rate." But, the claimed invention should not be covering admitted prior art. The scope of the claim should cover coding methods that " improve" over Chen, and without additional detail, not disclosed in the patent, this comparison cannot be made.

70. A person of ordinary skill would know that determining " transmission at a reduced bit rate" requires knowing information that is not disclosed anywhere in the patent. For example, in order to determine the bit rate being compared against, it requires knowing the transmission rate of the equipment, the transmission rate of the medium (wires, atmosphere, telephone lines, etc.) and how the signals are packaged (modulated) for transmission. In other words, to determine if an accused device is transmitting at a reduced bit rate, the accused device must be compared to a transmission bit rate recited in the claim. There must be a "reference" to compare against, in order to determine if the transfer rate of the claimed coding method is reduced.

71. Because there is no disclosure of a reference coding bit rate, and further because there is no disclosure of the transmitted bit rate produced by the claimed method, it would not have been possible for a person of ordinary skill to determine if the claimed coding method produced a transmission that offered " a reduced bit rate."

72. There is a similar lack of disclosure problem for "bandwidth" as there is for "bit rate." "Bandwidth" is the actual space in a frequency spectrum through which data is sent. The frequency spectrum used for all communications are partitioned into smaller portions which are assigned to each different type of communication (e.g. radio, TV, etc). Within each portion, for example in the TV portion, there are further divisions into smaller adjacent frequency ranges,

each range corresponding to a channel on a TV. The width of the frequency used to transmit one TV channel (i.e., one video signal) corresponds to that channel' s bandwidth.

73. For another example, AM radio has stations, each of which has a bandwidth. When you tune the radio to a particular radio station on the AM dial, you do this by selecting a number on the AM dial that corresponds to the middle of the segment (bandwidth) of the frequency range that AM station is transmitted on. That is, there is a portion of frequencies above and below that center point over which the signal is transmitted. The length (width) of this segment is the bandwidth used by that radio station.

74. In order to determine whether an accused system meets the limitation " for transmission at a reduced bandwidth," the person of ordinary skill in the art must know what size bandwidth qualifies as a " reduced bandwidth." Is a bandwidth reduced by a certain percentage ? Is a bandwidth reduced by a certain amount of frequency? The '075 patent is silent on this.

75. Because there is no disclosure of any bandwidths in the patent, there is no way to determine when a sufficient reduction in bandwidth is achieved. In fact, there is not even a disclosure of the bandwidth used by the claimed coding method. Nor would a person of ordinary skill in the art be able to determine the bandwidth used or the amount reduced after performing the claimed coding method of the '075 patent.

76. Moreover, the term " bandwidth" is never used in the patent, other than in claim 8. Accordingly there is no disclosure in the '075 patent sufficient to inform a person of ordinary skill how to effect a reduction in bandwidth using the claimed encoding method.

77. Therefore, based on the above, it is my opinion that claims 3 and 8 are invalid under 35 USC 112, second paragraph.

VIII. CONCLUSION

78. In my expert opinion, the Asserted Claims of the '075 Patent are invalid because the Asserted Claims are anticipated by a piece of prior art, unpatentable over a piece of prior art or a combination of prior art or are indefinite.

79. I reserve the right to modify and supplement this report in response to any reports drafted by or testimony offered by Philips' expert witnesses and in response to any other fact discovery that is conducted by the parties.

Dated: 14 Dec 2007

Touradj Ebrahimi, Ph.D.

EXHIBIT

H

Electronic Acknowledgement Receipt

EFS ID:	2829274
Application Number:	90010104
International Application Number:	
Confirmation Number:	5714
Title of Invention:	METHOD AND APPARATUS FOR BIT RATE REDUCTION
First Named Inventor/Applicant Name:	Peter Vogel
Customer Number:	26379
Filer:	Timothy W. Lohse
Filer Authorized By:	
Attorney Docket Number:	223612-25
Receipt Date:	07-FEB-2008
Filing Date:	
Time Stamp:	19:12:34
Application Type:	Reexam (Third Party)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$ 2520
RAM confirmation Number	3546
Deposit Account	071896
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	NPL Documents	BlockCoding09Sept86.pdf	205883 7809458bdd367af90f50b95640ce3ddacc298a31	no	7
Warnings:					
Information:					
2	NPL Documents	4420771.pdf	615220 bb20974b18e00c65c5ac11da995e86ab972a0708	no	11
Warnings:					
Information:					
3	NPL Documents	4494151.pdf	651175 bfc004ccc097175d66fd44b61ff718570bec53f6	no	18
Warnings:					
Information:					
4	NPL Documents	4698672.pdf	1534661 177117a3bf3c051600733ce4e6bb2e4d516c73c9	no	19
Warnings:					
Information:					
5	NPL Documents	NTC_Conference_Record.pdf	375233 0068044603cc02d06353c4f3d69b5732eb7d14c5	no	7
Warnings:					
Information:					
6	NPL Documents	SceneAdaptiveCoder.pdf	488027 f0beff39bf80db824f4a489b9d30283d08aaa806	no	9
Warnings:					
Information:					
7	Reexam Miscellaneous Incoming Letter	Attachment_to_Request_Ex Parte_ReExam_4901075.pdf	404845 fa63c4ee6ed6ce150cbab4328f8b0265fb42efb1	no	73
Warnings:					
Information:					

8		Additional_Attachment_Support_Reexam.pdf	6802386 8d74a43b6691879142ade8798791738 4d7983701	yes	130

Multipart Description/PDF files in .zip description

Document Description	Start	End
Reexam Miscellaneous Incoming Letter	1	2
Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party	3	6
Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party	7	17
Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party	18	28
Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party	29	35
Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party	36	74
Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party	75	130

Warnings:

Information:

9	Reexam Miscellaneous Incoming Letter	Request_ExParte_Reexamination_transmittal.pdf	317018 0466b458bd3810e77eb2ea5d866c009 719d9f209	no	3

Warnings:

Information:

10	Reexam - Info Disclosure Statement Filed by 3rd Party	IDS_Statement_SBPTO_08.pdf	196089 a9364732f08adba0ecd86b5354a1923f b7bc167d	no	3

Warnings:

Information:

11	NPL Documents	3984833.pdf	1360190 3393edb463401af297875e8c804285c4 06b98751	no	18

Warnings:

Information:

12	NPL Documents	4092676.pdf	1043482 cd7f8a50d4fbe8a23ea3089c60304ccb9 1d92286	no	12

Warnings:

Information:

13	NPL Documents	4136363.pdf	999205 c4994ba3c7828d925e6f1c42cee9efd44 0a950be	no	12

Warnings:					
Information:					
14	NPL Documents	4316222.pdf	964763 2073bd199b339a143e042513503c49a1a2651d0e	no	17
Warnings:					
Information:					
15	NPL Documents	4363036.pdf	1867959 8004b9160848e4d9cb5f368cd286aac387505fa6	no	30
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16	NPL Documents	4901075.pdf	582668 ea05eed9e4ae403928444c9b0f94bbfb49ee6eee	no	10
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17	Fee Worksheet (PTO-06)	fee-info.pdf	8127 7e25720f0bd6d01e662b9f70885b04e6f25cdd12	no	2
Warnings:					
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			Total Files Size (in bytes):	18416931	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/57 (09-07)
Approved for use through 08/31/2010. OMB 0651-0033
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

(Also referred to as FORM PTO-1465)

REQUEST FOR *EX PARTE* REEXAMINATION TRANSMITTAL FORM

Address to:
Mail Stop *Ex Parte* Reexam
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attorney Docket No.: 223612-25

Date: February 7, 2008

1. [X] This is a request for *ex parte* reexamination pursuant to 37 CFR 1.510 of patent number 4,901,075 issued February 13, 1990. The request is made by:

   [ ] patent owner. [X] third party requester.

2. [X] The name and address of the person requesting reexamination is:

   Timothy W. Lohse
   DLA Piper US LLP
   2000 University Avenue, East Palo Alto, CA 94303

3. [X] a. A check in the amount of $ 2520 is enclosed to cover the reexamination fee, 37 CFR 1.20(c)(1);

   [X] b. The Director is hereby authorized to charge the fee as set forth in 37 CFR 1.20(c)(1) to Deposit Account No. 07-1896 (submit duplicative copy for fee processing); or

   [ ] c. Payment by credit card. Form PTO-2038 is attached.

4. [X] Any refund should be made by [ ] check or [X] credit to Deposit Account No. 07-1896. 37 CFR 1.26(c). If payment is made by credit card, refund must be to credit card account.

5. [X] A copy of the patent to be reexamined having a double column format on one side of a separate paper is enclosed. 37 CFR 1.510(b)(4)

6. [ ] CD-ROM or CD-R in duplicate, Computer Program (Appendix) or large table
   [ ] Landscape Table on CD

7. [ ] Nucleotide and/or Amino Acid Sequence Submission
   If applicable, items a. – c. are required.

   a. [ ] Computer Readable Form (CRF)
   b. Specification Sequence Listing on:

      i. [ ] CD-ROM (2 copies) or CD-R (2 copies); **or**
      ii. [ ] paper

   c. [ ] Statements verifying identity of above copies

8. [ ] A copy of any disclaimer, certificate of correction or reexamination certificate issued in the patent is included.

9. [X] Reexamination of claim(s) 3-4, 7-8 and 11 is requested.

10. [X] A copy of every patent or printed publication relied upon is submitted herewith including a listing thereof on Form PTO/SB/08, PTO-1449, or equivalent.

11. [ ] An English language translation of all necessary and pertinent non-English language patents and/or printed publications is included.

This collection of information is required by 37 CFR 1.510. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop *Ex Parte* Reexam, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PTO/SB/57 (09-07)
Approved for use through 08/31/2010. OMB 0651-0033
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

12. [X] The attached detailed request includes at least the following items:

a. A statement identifying each substantial new question of patentability based on prior patents and printed publications. 37 CFR 1.510(b)(1)
b. An identification of every claim for which reexamination is requested, and a detailed explanation of the pertinency and manner of applying the cited art to every claim for which reexamination is requested. 37 CFR 1.510(b)(2)

13. [ ] A proposed amendment is included (only where the patent owner is the requester). 37 CFR 1.510(e)

14. [X] a. It is certified that a copy of this request (if filed by other than the patent owner) has been served in its entirety on the patent owner as provided in 37 CFR 1.33(c).
The name and address of the party served and the date of service are:

Philips Intellectual Property & Standards

P.O. Box 3001, Briarcliff Manor, NY 10510

Date of Service: February 7, 2008; or

[ ] b. A duplicate copy is enclosed since service on patent owner was not possible.

15. Correspondence Address: Direct all communication about the reexamination to:

[X] The address associated with Customer Number: 26379

OR

[ ] Firm or Individual Name

Address

City	State	Zip

Country

Telephone	Email

16. [X] The patent is currently the subject of the following concurrent proceeding(s):
[ ] a. Copending reissue Application No. _____.
[ ] b. Copending reexamination Control No. _____.
[ ] c. Copending Interference No. _____.
[X] d. Copending litigation styled:

U.S. Philips Corporation v. Eastman Kodak Company

Case No. 06-251-GMS

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

/Timothy W. Lohse/ — Authorized Signature

February 7, 2008 — Date

Timothy W. Lohse — Typed/Printed Name

35,255 — Registration No.

[ ] For Patent Owner Requester
[X] For Third Party Requester

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Peter Vogel

U.S. Patent No. 4,901,075 Issued: February 13, 1990

Filed: September 11, 1987

Title: METHOD AND APPARATUS FOR BIT RATE REDUCTION

Certificate of Transmission Under 37 CFR 1.8
I hereby certify that this correspondence is being transmitted via electronic submission, attention Mail Stop: Reexam, Commissioner for Patents, Alexandria, VA 22313-1450 on:
February 7, 2008

/Timothy W. Lohse/
Timothy W. Lohse

* * *

ATTACHMENT TO REQUEST FOR EX-PARTE RE-EXAMINATION (FORM PTO-1465) PROVIDING INFORMATION ON U.S. PATENT NO. 4,901,075

ATTN: BOX REEXAM
Asst. Commissioner of Patents
Washington, D.C. 20231

Sir:

Reexamination under 35 U.S.C. §§ 302-307 and 37 CFR § 1.510 is requested of United States Patent Number 4,901,075 which issued on February 13, 1990 (the "Vogel patent"). This patent is still enforceable and re-examination is appropriate under 37 CFR § 1.510(a).

I. CLAIMS FOR WHICH REEXAMINATION IS REQUESTED

Reexamination is requested of claims 3-4, 7-8 and 11 of the Vogel patent in view of the prior art listed on the Citation of Prior Art under 37 CFR § 1.501 and 35 U.S.C. § 301 which is submitted with this Request for Reexamination.

II. EXPLANATION OF PERTINENCY AND MANNER OF APPLYING CITED PRIOR ART TO EVERY CLAIM FOR WHICH REEXAMINATION IS REQUESTED

A. Introduction

One or more prior art references submitted with the Citation of Prior Art render claims 3-4, 7-8 and 11 of the Vogel patent either anticipated under 35 USC 102 (a),(b) or (e) or unpatentable under 35 USC 103 so that substantial new questions of patentability of the claims in the Vogel patent have been raised by this request for reexamination. For each claim for which reexamination is sought, a specific citation of the prior art pertinent to the claim and a description of the relevancy of that prior art to the claim are set forth below in more detail. Most of the prior art relied on in this re-examination request was never submitted to the examiner and all of the prior art submitted with this re-examination request was not considered/used by the examiner during a rejection during the original prosecution of the Vogel patent.

The specific citation of the prior art pertinent to each claim and a description of the relevancy of that prior art to each claim appears below in the form of a claim chart for: 1) each anticipatory piece of prior art; and 2) each combination of prior art that renders certain claims of the Vogel patent obvious.

Furthermore, the district court in Delaware that is handling the co-pending patent litigation recently issued a claim construction order which is submitted with this request as it provides meaning to a few key terms. In addition, the expert for the assignee of the Vogel patent recently had his deposition taken (the transcript is attached to this request) and he confirms the interpretation of certain claim terms as set forth below in more detail.

B. **Anticipatory Prior Art**

1. COST 211bis Simulation Subgroup Paper entitled "Block Coding Using a Two-Dimensional Run-Length Table", published September 9, 1986 (the "COST Paper")

The COST Paper was a submission made by Dr. Peter Vogel (the named inventor) to the COST 211bis Simulation Subgroup meeting. *See Final Deposition Transcript of Peter Vogel, Ph. D. on October 24, 2007 (the "Vogel Tr.") at 117, lines 12- 24*. The paper was published/made public and distributed to the participants of the COST 211bis Simulation Subgroup by at least September 9, 1986. *See Vogel Tr. at 120, line 2 – 121, line 20*. Thus, the COST Paper is a publication that was published on September 9, 1986 (more than one year before the U.S. filing date), is therefore prior art to the Vogel patent under 35 USC 102(b) and is properly used as prior art in this re-examination request.

The COST Paper was not submitted to the examiner nor considered by the examiner during the prosecution of the Vogel patent.

As set forth below, claims 3-4 and 7-8 are anticipated by the COST Paper.

US 4,901,075 CLAIM ELEMENTS	**COST Paper**
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	The COST Paper discloses: "For the 2D-run-length coding the events corresponding to a run-length of consecutive zero coefficients and coefficients unequal to zero defining the end of the run-length are considered as composite rather than separate statistical events…" *See COST Paper at page 1, Section 2*. The run-length of consecutive zero coefficients and coefficients unequal to zero are generated from a blockwise transform of pixels of a video signal. *See COST Paper at page 1, Section 2*. The 2D-run-length coding with the Huffman codes provides a bit rate reduction of approximately 12% compared with coding by an amplitude-and- run-length lookup table using Huffman codes. *See COST Paper at page 2, Section 3*.
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective	The COST Paper discloses that a plurality of events are derived from the signal that include a run of zero coefficients and the preceding or following non-zero coefficient. (See "For the 2D-run-length coding the events

US 4,901,075 CLAIM ELEMENTS	COST Paper
run length and preceded or followed by at least one non-zero coefficient, and	corresponding to a run-length of consecutive zero coefficients and coefficients unequal to zero defining the end of the run-length are considered as composite rather than separate statistical events…" *See COST Paper at page 1, Section 2 and Appendix A*.
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	As shown in Appendix A of the COST Paper, a Huffman code for the composite events are assigned to each composite event that are a run-length of consecutive zero coefficients and coefficient unequal to zero. *See COST Paper at page 1, Sections 2 and 3 and Appendix A.* For example, a composite event with a zero run length of "2" and a "5" coefficient unequal to zero is assigned the Huffman code "00101011110". *See COST Paper at Appendix A*.
4. The method of claim 3, wherein said code words are Huffman code words.	The codes shown in Appendix A of the COST Paper are Huffman codes. *See COST Paper at page 1, Sections 2 and 3 and Appendix A.*
7. A method as claimed in claim 4, characterized in that the Huffman codeword is independent of the sign of that non-zero coefficient which succeeds or precedes the run of zero-coefficients and in that the sign is coded by a separate bit.	The Huffman codes in Appendix A of the COST Paper are independent of the sign of the non-zero coefficient since each code in Appendix A is based on the magnitude of the coefficient unequal to zero. *See COST Paper at Appendix A*. The sign bit is coded with a separate bit. *See COST Paper at page 1, Sections 2 and 3 and Appendix A*.
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	The COST Paper discloses a method for coding a signal. *See COST Paper*. The 2D-run-length coding with the Huffman codes disclosed in the COST Paper provides a bit rate reduction of approximately 12% compared with coding by an amplitude-and- run-length lookup table using Huffman codes. *See COST Paper at page 2, Section 3*.
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	The COST paper discloses a 2D-run-length coding of a signal. "For the 2D-run-length coding the events corresponding to a run-length of consecutive zero coefficients and coefficients unequal to zero defining the end of the run-length are considered as composite rather than separate statistical events…" *See COST Paper at page 1, Section 2*.
(b) deriving from said sequence, a	The COST Paper discloses that a plurality of events are

US 4,901,075 CLAIM ELEMENTS	COST Paper
plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	derived from the signal that include a run of zero coefficients and the preceding or following non-zero coefficient. (See "For the 2D-run-length coding the events corresponding to a run-length of consecutive zero coefficients and coefficients unequal to zero defining the end of the run-length are considered as composite rather than separate statistical events…" *See COST Paper at page 1, Section 2 and Appendix A*.
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	As shown in Appendix A of the COST Paper, a Huffman code for the composite events are assigned to each composite event that are a run-length of consecutive zero coefficients and coefficient unequal to zero. *See COST Paper at page 1, Sections 2 and 3 and Appendix A.* For example, a composite event with a zero run length of "2" and a "5" coefficient unequal to zero is assigned the Huffman code "00101011110". *See COST Paper at Appendix A*.

2. U.S. Patent No. 4,698,672 to Chen et al. (the "Chen Patent")

The Chen Patent is a patent that was filed on October 27, 1986 and issued on October 6, 1987. The Vogel patent is not entitled to the filing date of the first German priority application (German Patent Application DE 3631252 – the "'252 Application") with a filing date of September 13, 1986 under 35 USC 119 because the '252 Application (which is submitted along with an English translation with this request) does not meet the requirements of 35 USC 112 as required for a valid priority claim.

In particular, the '252 Application does not disclose the best mode of the invention as required by 35 USC 112, does not meet the enablement requirement as required by 35 USC 112 and does not meet the written description requirement as required by 35 USC 112 and thus the earliest effective filing date of the Vogel Patent is November 8, 1986. In more detail, the '252 Application: 1) does not disclose a particular method for "deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient" and thus fails to provide adequate written disclosure, enablement or best mode (*See Final Girod Deposition Transcript of January 30, 2008 (the "Girod Tr.") at 181:14 – 183:16*); and 2) does not contain a code table from which codewords are assigned and thus fails to provide adequate written disclosure, enablement or best mode (*See Girod Tr. at 183:17 – 190:8*)

Therefore, the Chen Patent is prior art to the Vogel patent under 35 USC 102(e) and is properly used as prior art in this re-examination request. While the Chen Patent was cited to the examiner and mentioned in passing during the prosecution, the examiner did not consider in detail the Chen Patent and it applicability to the claims of the Vogel Patent.

As set forth below, claims 3-4 and 7-8 are anticipated by the Chen Patent.

US 4,901,075 CLAIM ELEMENTS	**Chen Patent**
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero	Chen discloses a coding system for reducing redundancy. *See Title*. Chen discloses "methods and apparatus for processing signals to remove redundant information thereby making the signals more suitable for transfer through a limited bandwidth medium." Chen is specifically related to methods and apparatus useful in video compression systems. *See Abstract, Figures 1-4 and Col. 1, lines 15-20*.

US 4,901,075 CLAIM ELEMENTS	Chen Patent
coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	Prior to coding in a coder 14, a forward processor 52 processes the spatial domain input signals to form processed signals which typically are transform domain signals arranged in blocks of transform domain coefficients. *See Figure 1 and Col. 4, lines 45-49*. Thus, the signal in Chen include a plurality of zero coefficients and a plurality of non-zero coefficients.
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	In Chen, events (known as runlength coding) are generated of type R and R'. *See Col. 5, lines 30 -36*. The type R event combines a runlength of 0's followed by the next most frequently occurring value (1 in the usual case.) *See Col. 3, lines 30 -37 and Col. 5, lines 36-38*.
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	The event type, R, is coded with One's Redundancy (OR) coding or scene adaptive coding using Huffman codes. *See Col. 13, line 37- Col. 17, line 48 and Tables 6-9*. The type R encodes the run length of the zero coefficient and the following amplitude of 1. *See Col. 3, lines 32-37 and Col. 5, lines 36-38.*
4. The method of claim 3, wherein said code words are Huffman code words.	The type, R, is coded with One's Redundancy (OR) coding or scene adaptive coding using Huffman codes. *See Col. 13, line 37- Col. 17, line 48 and Tables 6-9*.
7. A method as claimed in claim 4, characterized in that the Huffman codeword is independent of the sign of that non-zero coefficient which succeeds or precedes the run of zero-coefficients and in that the sign is coded by a separate bit.	In Chen, as shown in Tables 6 and 7, the coding tables assume that a separate sign bit, not in the tables, is used to indicate the sign of each value coded in the manner indicated in Table 5. *See Col. 18, lines 3-17*. Chen also discloses that coefficient differences of one at the end of the consecutive zeros encode with R + SIGN. *See Col. 14, lines 35-37*.
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	Chen discloses a coding system for reducing redundancy. *See Title*. Chen discloses "methods and apparatus for processing signals to remove redundant information thereby making the signals more suitable for transfer through a limited bandwidth medium. Chen is specifically related to methods and apparatus useful in video compression systems. *See Abstract, Figures 1-4 and Col. 1, lines 15-20*.
(a) transforming said signal into a	Prior to coding in a coder 14, a forward processor 52

US 4,901,075 CLAIM ELEMENTS	Chen Patent
sequence comprising zero coefficients occurring in runs and non-zero coefficients;	processes the spatial domain input signals to form processed signals which typically are transform domain signals arranged in blocks of transform domain coefficients. *See Figure 1 and Col. 4, lines 45-49*. Thus, the signal in Chen include a plurality of zero coefficients occurring in runs and non-zero coefficients.
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	In Chen, events (known as runlength coding) are generated of type R and R'. *See Col. 5, lines 30 -36*. The type R event combines a runlength of 0's followed by the next most frequently occurring value (1 in the usual case.) *See Col. 3, lines 30 -37 and Col. 5, lines 36-38*.
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	The event type, R, is coded with One's Redundancy (OR) coding or scene adaptive coding using Huffman codes. *See Col. 13, line 37- Col. 17, line 48 and Tables 6-9*. The type R encodes the run length of the zero coefficient and the following amplitude of 1. *See Col. 3, lines 32-37 and Col. 5, lines 36-38.*

3. U.S. Patent No. 4,420,771 to Pirsch (the "Pirsch Patent")

The Pirsch Patent is a patent that was filed on February 9, 1981 and issued on December 13, 1983. The Pirsch Patent is prior art to the Vogel patent under 35 USC 102(a) or 35 USC 102(b) and is properly used as prior art in this re-examination request. The Pirsch Patent was not submitted to the examiner during the prosecution nor considered by the examiner during the prosecution.

As set forth below, claims 3-4 and 8 are anticipated by the Pirsch Patent.

US 4,901,075 CLAIM ELEMENTS	**Pirsch Patent**
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	Pirsch discloses a method for encoding multi-level signals. *See Title and Col. 1:60- 2:8 and 2:34-50*. Pirsch also discloses that multi-level signal encoding results in reducing redundancy in the signal and reducing the amount of data needed to represent the signal and the object of the present invention is to enable more efficient encoding of a multi-level signal. *See Col. 1:45-57*. Pirsch discloses that the system is used for encoding coefficients from a blockwise transform (error prediction values) wherein a large number of the error values will have values at or near ZERO. *See Col. 2, lines 39-45*. The error prediction values may be quantized. *See Col. 3, lines 2-5*. Thus, the signals in Pirsch include zero coefficients and non-zero coefficients.
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	Pirsch defines an event (a run) as a series of consecutive inputs having the same value, can also be modified, if desired, without diminishing the advantages of the present invention. Specifically, an alternative definition of a run may be a series of consecutive words of like value as well as the next (subsequent) word of different value." (Emphasis added*) See Col. 11, lines 25-43*.
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	Pirsch discloses a method for encoding the events (runs that are a series of consecutive words of like value as well as the next (subsequent) word of different value) using a coder 191 that uses variable length codes with an example of the codes for encoding the non-frequent values shown in Table 4. *See Col. 1:60- Col. 2:9, Col. 7:5- Col. 8:15 and Table 4.*
4. The method of claim 3, wherein said code words are Huffman code words.	The events in Pirsch (runs that are a series of consecutive words of like value as well as the next (subsequent) word of different value) are encoded by the coder 191 using a

US 4,901,075 CLAIM ELEMENTS	Pirsch Patent
	variable length Huffman code with an example of the Huffman codes for encoding the non-frequent values shown in Table 4. *See Col. 1:60- Col. 2:9, Col. 7:5- Col. 8:15 and Table 4.*
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	Pirsch discloses a method for encoding multi-level signals. *See Title and Col. 1:60- 2:8 and 2:34-50*. Pirsch also discloses that multi-level signal encoding results in reducing redundancy in the signal and reducing the amount of data needed to represent the signal and the object of the present invention is to enable more efficient encoding of a multi-level signal. *See Col. 1:45-57*.
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	Pirsch discloses that the system is used for encoding coefficients from a blockwise transform (error prediction values) wherein a large number of the error values will have values at or near ZERO. *See Col. 2, lines 39-45*. The error prediction values may be quantized. *See Col. 3, lines 2-5*. Thus, the signals in Pirsch include zero coefficients and non-zero coefficients.
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	Pirsch defines an event (a run) as a series of consecutive inputs having the same value, can also be modified, if desired, without diminishing the advantages of the present invention. Specifically, an alternative definition of a run may be a series of consecutive words of like value as well as the next (subsequent) word of different value." (Emphasis added*) See Col. 11, lines 25-43*.
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	Pirsch discloses a method for encoding the events (runs that are a series of consecutive words of like value as well as the next (subsequent) word of different value) using a coder 191 that uses variable length codes with an example of the codes for encoding the non-frequent values shown in Table 4. *See Col. 1:60- Col. 2:9, Col. 7:5- Col. 8:15 and Table 4.*

4. U.S. Patent No. 3,984,833 to Van Voorhis (the "Van Voorhis Patent")

The Van Voorhis Patent is a patent that was filed on July 17, 1975 and issued on October 5, 1976. The Van Voorhis Patent is prior art to the Vogel patent under 35 USC 102(a) or 35 USC 102(b) and is properly used as prior art in this re-examination request. The Van Voorhis Patent was not submitted to the examiner during the prosecution nor considered by the examiner during the prosecution.

As set forth below, claim 8 is anticipated by the Van Voorhis Patent.

US 4,901,075 CLAIM ELEMENTS	**Van Voorhis Patent**
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	Van Voorhis discloses an apparatus for encoding extended run-length codes for the compression of digital images that are a two-dimensional array of image points. *See Col. 1:13-19*. The compression of the digital images reduces the storage requirements for digital images and reduces the bandwidth required for the transmission of the digital images *See Col. 1:27-31*.
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	Van Voorhis discloses that an image, for a black/white image, has image points that are transformed into a sequence that has a value of either 0 or 1 (zero coefficients or non-zero coefficients) to indicate that the corresponding area of the picture is light or dark. *See Col. 1, lines 19-23*.
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	Van Voorhis discloses that an event may be a binary encoded representation of an alphanumeric character, an analog voltage, a run of binary video information, a run of binary image information or any other type of information capable of recognition. *See Col. 6, lines 59-65*. Van Voorhis also describes that, from the signal, events are recognized as follows: "*In such a circumstance, the event recognizer 10 of Van Voorhis may recognize each sequence of consecutive bits of the same logic , which is denoted as a run. Runs may also be sequences of bits of one of the logic levels, or sequences of a level terminating in another level.*" *See Col. 7:11-15*. and *"For the purpose of the illustration, a run is defined as a one or as a string of one or more zeros and the first one following this string of zeros."* *See Col. 14:64-66; underlining was added.*
(c) for each of said events,	Van Voorhis discloses coding of events where the event

US 4,901,075 CLAIM ELEMENTS	Van Voorhis Patent
determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	may include a string of one or more zeros and the first one following this string of zeros. *See Col. 14, lines 64-66*. The encoder then calculates and outputs code words for a specific class of ordinary and extended run-length codes. *See Col, 3, lines 58-61*. Examples of the codes used by the coder are shown in Tables 1 and 2. *See Col. 3, line 58 – Col. 4, line 64 and Tables 1 and 2*.

5. Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder", IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

The Chen Article was published in March 1984 and is prior art to the Vogel Patent under 35 USC 102(a) or 35 USC 102(b) and is properly used as prior art in this re-examination request. *See Girod Tr. at 101:12 – 102:7*. The Chen Article was submitted to the examiner late in the prosecution, but was never relied on by the examiner.

Furthermore, the court in the currently pending litigation recently issued a Markman order in which the court interpreted the following terms:

The term "code word" is construed to mean "a sequence of bits assigned to represent a particular event or events in accordance with a predefined set of rules"; and

The term "event" is construed to mean "a run of zero coefficients and the value of the non-zero coefficient which immediately precedes or follows that run."

In addition, the expert witness for the owner of the Vogel patent recently was deposed and provided additional evidence that the Vogel patent is invalid over the Chen Article.

In view of the above interpretations of these terms, claims 3-4 and 7-8 of the Vogel Patent are anticipated by the Chen Article.

US 4,901,075 CLAIM ELEMENTS	**Chen Article**
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227. See also Girod Tr. at 102:17-105:6.*
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective	Chen derives a plurality of events from the video signal and each event includes a run of zero coefficients and the value of the non-zero coefficient that precedes or follows that run. *See pg. 227-229. See also Girod Tr. at 115:9 – 116:3.*

US 4,901,075 CLAIM ELEMENTS	Chen Article
run length and preceded or followed by at least one non-zero coefficient, and	
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	Chen assigns a sequence of bits that represents a particular event or events in accordance with a predefined set of rules. In particular, Chen assigns a sequence of bits to represent a run of zeroes followed by a non-zero coefficient comprised of a code word for the run-length prefix, a code word for the run length and a code word for the non-zero coefficient (*See pp. 228-229, Tables I and II.*) to form a composite code word that is a sequence of bits that represent a particular event or events in accordance with a predefined set of rules. Consider for example, the event of four zero coefficients followed by a non-zero coefficient equal to four (00004): According to Chen this event is represented by a sequence of bits as follows: First the run length prefix, 010, is included in the composite code word to indicate the beginning of the run of four zeroes. (*See p. 228, Table I.*) Next, the Huffman code word for a run length of 4, 0101, is included in the composite code word. (*See p. 229, Table II.*) Finally, the Huffman code word for the non-zero coefficient with an amplitude of 4, 00001, is included in the composite code word. (*See p. 228, Table I.*) Thus the composite codeword that is a sequence of bits that represents the event 00004 is: 010010100001. This is true every time the event 00004 occurs, and thus that composite codeword is assigned according to a predefined set of rules. *See Girod Tr. at 118:9 – 120:6.*
4. The method of claim 3, wherein said code words are Huffman code words.	Chen discloses that the sequence of bits assigned are Huffman codewords. *See pp. 228-229 and Tables I and II.*
7. A method as claimed in claim 4, characterized in that the Huffman codeword is	Chen discloses that the Huffman codewords are independent of the sign (since the Huffman codes in Table I are codes for the non-zero coefficient amplitude only) and the sign is coded

US 4,901,075 CLAIM ELEMENTS	Chen Article
independent of the sign of that non-zero coefficient which succeeds or precedes the run of zero-coefficients and in that the sign is coded by a separate bit.	by a separate bit (not shown, but inherent since the generated DCT coefficients include negative value non-zero coefficients and the sign of the generated DCT coefficients must be coded by using a separate bit). *See pp. 228-229 and Table I.*
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. *See pp. 225-227.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227. See also Girod Tr. at 102:17-105:6.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	Chen derives a plurality of events from the video signal and each event includes a run of zero coefficients and the value of the non-zero coefficient that precedes or follows that run. *See pg. 227-229. See also Girod Tr. at 115:9 – 116:3.*
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	Chen assigns a sequence of bits that represents a particular event or events in accordance with a predefined set of rules. In particular, Chen assigns a sequence of bits to represent a run of zeroes followed by a non-zero coefficient comprised of a code word for the run-length prefix, a code word for the run length and a code word for the non-zero coefficient (*See pp. 228-229, Tables I and II.*) to form a composite code word that is a sequence of bits that represent a particular event or events in accordance with a predefined set of rules. Consider for example, the event of four zero coefficients followed by a non-zero coefficient equal to four (00004): According to Chen this event is represented by a sequence of bits as follows: First the run length prefix, 010, is included in the composite code word to indicate the beginning of the run of four zeroes. (*See p. 228, Table I.*) Next, the Huffman code word for a run length of 4, 0101, is included in the composite code word. (*See p. 229, Table II.*)

US 4,901,075 CLAIM ELEMENTS	Chen Article
	Finally, the Huffman code word for the non-zero coefficient with an amplitude of 4, 00001, is included in the composite code word. (*See p. 228, Table I.*) Thus the composite codeword that is a sequence of bits that represents the event 00004 is: 010010100001. This is true every time the event 00004 occurs, and thus that composite codeword is assigned according to a predefined set of rules. *See Girod Tr. at 118:9 – 120:6.*

C. **Obviousness Prior Art**

1. U.S. Patent No. 4,420,771 to Pirsch (the "Pirsch Patent") In View of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder", IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

The Pirsch Patent is a patent that was filed on February 9, 1981 and issued on December 13, 1983. The Pirsch Patent is prior art to the Vogel patent under 35 USC 102(a) or 35 USC 102(b) and is properly used as prior art in this re-examination request. The Pirsch Patent was not submitted to the examiner during the prosecution nor considered by the examiner during the prosecution. The Chen Article was published in March 1984 and is prior art to the Vogel Patent under 35 USC 102(a) or 35 USC 102(b) and is properly used as prior art in this re-examination request. The Chen Article was submitted to the examiner during the prosecution, but was never relied on by the examiner and was not used in combination with any other piece of prior art by the examiner.

Claims 3-4 and 8 of the Vogel Patent are unpatentable under 35 USC 103 over the Pirsch Patent in view of the Chen Article because:

1) The prior art (disclosed in the Chen Article as set forth below in the chart) discloses a method for coding signals that may include transform coding (using discrete cosine transforms (DCTs)) in which a sequence of coefficients having zero values and non-zero values are coded using codewords. In Chen, a run of zero coefficients are coded with a codeword and the non-zero coefficients are coded with a separate codeword. In Chen, Huffman codewords are used to code the run of zero coefficients as well as the non-zero coefficients.

2) In the Vogel patent, transform coded coefficients having zero and non-zero values are coded such that a run of zero coefficients and a preceding or subsequent non-zero coefficient are coded together.

3) The prior art (disclosed in the Pirsch Patent as set forth below in the chart) discloses a known combined coding technique to code a run of zero values and a non-zero value together using a single codeword which results in a higher level of compression.

4) One of ordinary skill in the art would have recognized that applying the known combined coding technique of the Pirsch Patent to the method of coding signals disclosed in the Chen Article would have yielded the predictable result of a higher compression coding system and also resulted in an improved coding system with the higher compression. *See Ebrahimi Declaration at ¶ 10.*

Therefore, claims 3-4 and 8 of the Vogel Patent would have been obvious over the combination of the Chen Article and the Pirsch Patent.

US 4,901,075 CLAIM ELEMENTS	**Pirsch Patent**	**Chen Article**
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	Pirsch discloses a method for encoding multi-level signals. *See Title and Col. 1:60- 2:8 and 2:34-50*. Pirsch also discloses that multi-level signal encoding results in reducing redundancy in the signal and reducing the amount of data needed to represent the signal and the object of the present invention is to enable more efficient encoding of a multi-level signal. *See Col. 1:45-57*. Pirsch discloses that the system is used for encoding coefficients from a blockwise transform (error prediction values) wherein a large number of the error values will have values at or near ZERO. *See Col. 2, lines 39-45*. The error prediction values may be quantized. *See Col. 3, lines 2-5*.	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227. See also Girod Tr. at 102:17-105:6.*
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	Pirsch defines an event (a run) as a series of consecutive inputs having the same value, can also be modified, if desired, without diminishing the advantages of the present invention. Specifically, an alternative definition of a run may be a series of consecutive words of like value as well as the next (subsequent) word of different value." (Emphasis added*) See Col. 11, lines 25-43*.	Chen derives a plurality of events from the video signal and each event includes a run of zero coefficients and the value of the non-zero coefficient that precedes or follows that run. *See pg. 227-229. See also Girod Tr. at 115:9 – 116:3.*

US 4,901,075 CLAIM ELEMENTS	Pirsch Patent	Chen Article
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	Pirsch discloses a method for encoding the events (runs that are a series of consecutive words of like value as well as the next (subsequent) word of different value) using a coder 191 that uses variable length codes with an example of the codes for encoding the non-frequent values shown in Table 4. *See Col. 1:60- Col. 2:9, Col. 7:5- Col. 8:15 and Table 4.*	Chen assigns a sequence of bits that represents a particular event or events in accordance with a predefined set of rules. In particular, Chen assigns a sequence of bits to represent a run of zeroes followed by a non-zero coefficient comprised of a code word for the run-length prefix, a code word for the run length and a code word for the non-zero coefficient (*See pp. 228-229, Tables I and II.*) to form a composite code word that is a sequence of bits that represent a particular event or events in accordance with a predefined set of rules. Consider for example, the event of four zero coefficients followed by a non-zero coefficient equal to four (00004): According to Chen this event is represented by a sequence of bits as follows: First the run length prefix, 010, is included in the composite code word to indicate the beginning of the run of four zeroes. (*See p. 228, Table I.*) Next, the Huffman code word for a run length of 4, 0101, is included in the

US 4,901,075 CLAIM ELEMENTS	Pirsch Patent	Chen Article
		composite code word. (*See p. 229, Table II.*) Finally, the Huffman code word for the non-zero coefficient with an amplitude of 4, 00001, is included in the composite code word. (*See p. 228, Table I.*) Thus the composite codeword that is a sequence of bits that represents the event 00004 is: 010010100001. This is true every time the event 00004 occurs, and thus that composite codeword is assigned according to a predefined set of rules. *See Girod Tr. at 118:9 – 120:6.*
4. The method of claim 3, wherein said code words are Huffman code words.	The events in Pirsch (runs that are a series of consecutive words of like value as well as the next (subsequent) word of different value) are encoded by the coder 191 using a variable length Huffman code with an example of the Huffman codes for encoding the non-frequent values shown in Table 4. *See Col. 1:60- Col. 2:9, Col. 7:5-Col. 8:15 and Table 4.*	Chen discloses that the sequence of bits assigned are Huffman codewords. *See pp. 228-229 and Tables I and II.*
7. A method as claimed in claim 4, characterized in that the Huffman codeword is independent of the sign of that non-zero coefficient which		Chen discloses that the Huffman codewords are independent of the sign (since the Huffman codes in Table I are codes for the non-zero coefficient amplitude only) and the

US 4,901,075 CLAIM ELEMENTS	Pirsch Patent	Chen Article
succeeds or precedes the run of zero-coefficients and in that the sign is coded by a separate bit.		sign is coded by a separate bit (not shown, but inherent since the generated DCT coefficients include negative value non-zero coefficients and the sign of the generated DCT coefficients must be coded by using a separate bit). *See pp. 228-229 and Table I.*
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	Pirsch discloses a method for encoding multi-level signals. *See Title and Col. 1:60- 2:8 and 2:34-50*. Pirsch also discloses that multi-level signal encoding results in reducing redundancy in the signal and reducing the amount of data needed to represent the signal and the object of the present invention is to enable more efficient encoding of a multi-level signal. *See Col. 1:45-57*.	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. *See pp. 225-227*.
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	Pirsch discloses that the system is used for encoding coefficients from a blockwise transform (error prediction values) wherein a large number of the error values will have values at or near ZERO. *See Col. 2, lines 39-45*. The error prediction values may be quantized. *See Col. 3, lines 2-5*. Thus, the signals in Pirsch include zero coefficients and non-zero coefficients.	The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227*. *See also Girod Tr. at 102:17-105:6*.
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one	Pirsch defines an event (a run) as a series of consecutive inputs having the same value, can also be modified, if desired, without diminishing the advantages of the present invention. Specifically, an alternative definition of a run may be a series of consecutive words of	Chen derives a plurality of events from the video signal and each event includes a run of zero coefficients and the value of the non-zero coefficient that precedes or follows that run. *See pg. 227-229*.

US 4,901,075 CLAIM ELEMENTS	Pirsch Patent	Chen Article
non-zero coefficient, and	like value as well as the next (subsequent) word of different value." (Emphasis added) *See Col. 11, lines 25-43.*	*See also Girod Tr. at 115:9 – 116:3.*
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	Pirsch discloses a method for encoding the events (runs that are a series of consecutive words of like value as well as the next (subsequent) word of different value) using a coder 191 that uses variable length codes with an example of the codes for encoding the non-frequent values shown in Table 4. *See Col. 1:60- Col. 2:9, Col. 7:5- Col. 8:15 and Table 4.*	Chen assigns a sequence of bits that represents a particular event or events in accordance with a predefined set of rules. In particular, Chen assigns a sequence of bits to represent a run of zeroes followed by a non-zero coefficient comprised of a code word for the run-length prefix, a code word for the run length and a code word for the non-zero coefficient (*See pp. 228-229, Tables I and II.*) to form a composite code word that is a sequence of bits that represent a particular event or events in accordance with a predefined set of rules. Consider for example, the event of four zero coefficients followed by a non-zero coefficient equal to four (00004): According to Chen this event is represented by a sequence of bits as follows: First the run length prefix, 010, is included in the composite code word to indicate the beginning of the run of four zeroes. (*See p. 228, Table I.*)

US 4,901,075 CLAIM ELEMENTS	Pirsch Patent	Chen Article
		Next, the Huffman code word for a run length of 4, 0101, is included in the composite code word. (*See p. 229, Table II.*) Finally, the Huffman code word for the non-zero coefficient with an amplitude of 4, 00001, is included in the composite code word. (*See p. 228, Table I.*) Thus the composite codeword that is a sequence of bits that represents the event 00004 is: 010010100001. This is true every time the event 00004 occurs, and thus that composite codeword is assigned according to a predefined set of rules. *See Girod Tr. at 118:9 – 120:6.*

2. US Patent No. 4,363,036 to Subramaniam (the "Subramaniam '036 Patent") In View of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder", IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

The Subramaniam '036 Patent was filed on March 16, 1981 and issued on December 7, 1982 and is prior art to the Vogel Patent under 35 USC 102(a) or 35 USC 102(b) and is properly used as prior art in this re-examination request. The Chen Article was published in March 1984 and is prior art to the Vogel Patent under 35 USC 102(a) or 35 USC 102(b) and is properly used as prior art in this re-examination request. The Subramaniam '036 Patent was not submitted to the examiner in prosecution not considered by the examiner during the prosecution. The Chen Article was submitted to the examiner during the prosecution, but was never relied on by the examiner and was not used in combination with any other piece of prior art by the examiner.

Claims 3-4, 8 and 11 of the Vogel Patent are unpatentable under 35 USC 103 over the Subramaniam '036 Patent in view of the Chen Article because:

1) The prior art (disclosed in the Chen Article as set forth below in the chart) discloses a method for coding signals that may include transform coding (using discrete cosine transforms (DCTs)) in which a sequence of coefficients having zero values and non-zero values are coded using codewords. In Chen, a run of zero coefficients are coded with a codeword and the non-zero coefficients are coded with a separate codeword. In Chen, Huffman codewords are used to code the run of zero coefficients as well as the non-zero coefficients.

2) In the Vogel patent, transform coded coefficients having zero and non-zero values are coded such that a run of zero coefficients and a preceding or subsequent non-zero coefficient are coded together.

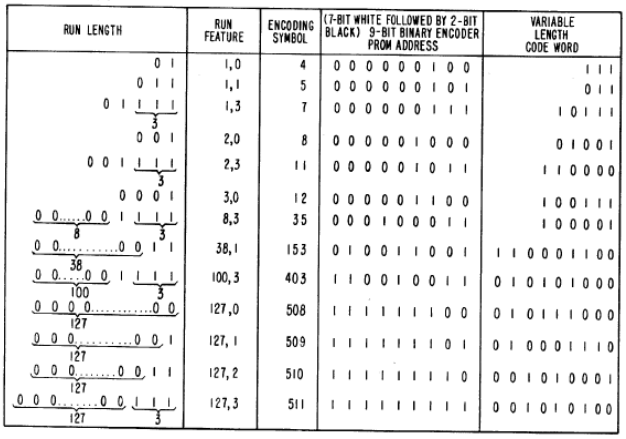
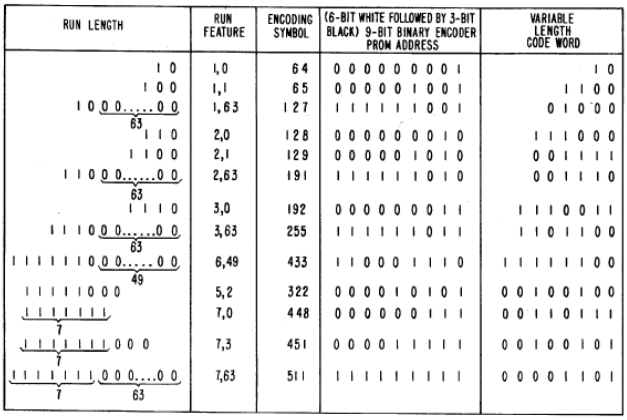
3) The prior art (disclosed in the Subramaniam '036 Patent as set forth below in the chart) discloses a known combined coding technique to code a run of zero values and a non-zero value together using a single codeword which results in a higher level of compression.

4) One of ordinary skill in the art would have recognized that applying the known combined coding technique of the Subramaniam '036 Patent to the method of coding signals disclosed in the Chen Article would have yielded the predictable result of a higher compression

coding system and also resulted in an improved coding system with the higher compression. *See Ebrahimi Declaration at ¶ 10.*

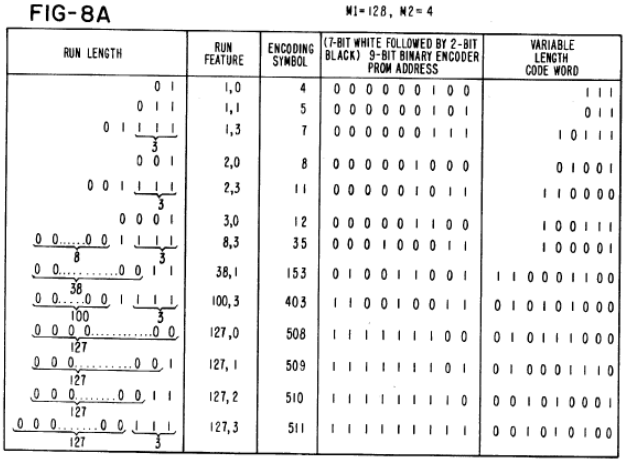
Therefore, claims 3-4, 8 and 11 of the Vogel Patent would have been obvious over the combination of the Chen Article and the Subramaniam '036 Patent.

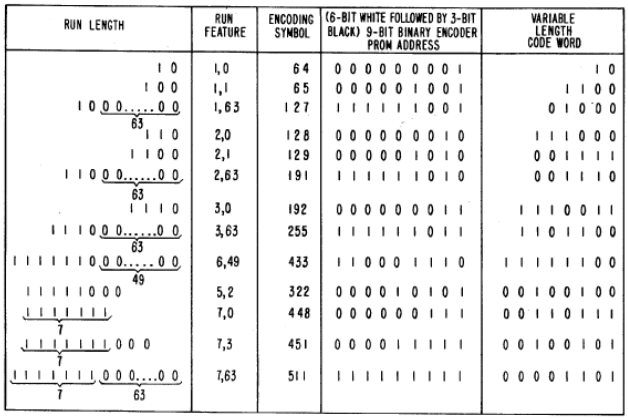
US 4,901,075 CLAIM ELEMENTS	**Subramaniam '036 Patent**	**Chen Article**
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	A method for compressing digital data is disclosed that generates prediction error pixels from the digital data to form events (WB runs or BW runs) which are then coded using variable length codewords. *See Abstract, Figures 8A and 8B and Col. 3:54 – Col. 4:51*. The method reduces the number of bits of information needed to transmit a video image which reduces bandwidth requirements and storage requirements. *See Col. 1: 15-24*.	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227. See also Girod Tr. at 102:17-105:6*.
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	The prediction error signals are combined into events (run lengths) wherein the events include: 1) white-black (WB) runs (zero values following by one or more 1 values); and 2) black-white (BW) (1 values following by one or more zero values) *See Col. 10:45-59 and Figures 8A and 8B*.	Chen derives a plurality of events from the video signal and each event includes a run of zero coefficients and the value of the non-zero coefficient that precedes or follows that run. *See pg. 227-229. See also Girod Tr. at 115:9 – 116:3*.

US 4,901,075 CLAIM ELEMENTS	Subramaniam '036 Patent	Chen Article
	FIG-8A M1=128, M2=4  FIG-8B M3=8, M4=64  As shown in Figures 8A and 8B, "01", "001", "0001" and "127 0's and a "1", "10", "100" and "1 with 63 0's" are examples of the events.	
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	As shown in Figure 8A and 8B, each of the events are coded using a variable length code. *See Figures 8A and 8B and Col. 10:45-59*.	Chen assigns a sequence of bits that represents a particular event or events in accordance with a predefined set of rules. In particular, Chen assigns a sequence of bits to represent a run of zeroes followed by a non-zero coefficient comprised of a code

US 4,901,075 CLAIM ELEMENTS	Subramaniam '036 Patent	Chen Article
		word for the run-length prefix, a code word for the run length and a code word for the non-zero coefficient (*See pp. 228-229, Tables I and II.*) to form a composite code word that is a sequence of bits that represent a particular event or events in accordance with a predefined set of rules. Consider for example, the event of four zero coefficients followed by a non-zero coefficient equal to four (00004): According to Chen this event is represented by a sequence of bits as follows: First the run length prefix, 010, is included in the composite code word to indicate the beginning of the run of four zeroes. (*See p. 228, Table I.*) Next, the Huffman code word for a run length of 4, 0101, is included in the composite code word. (*See p. 229, Table II.*)

US 4,901,075 CLAIM ELEMENTS	Subramaniam '036 Patent	Chen Article
		Finally, the Huffman code word for the non-zero coefficient with an amplitude of 4, 00001, is included in the composite code word. (*See p. 228, Table I.*) Thus the composite codeword that is a sequence of bits that represents the event 00004 is: 010010100001. This is true every time the event 00004 occurs, and thus that composite codeword is assigned according to a predefined set of rules. *See Girod Tr. at 118:9 – 120:6.*
4. The method of claim 3, wherein said code words are Huffman code words.	The variable length codes are Huffman codes. *See Col 1:31-3, Col. 10:45-59 and Figures 8A and 8B.*	Chen discloses that the codewords assigned are Huffman codewords. *See pp. 228-229 and Tables 1 and II.*
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	A method for compressing digital data is disclosed that generates prediction error pixels from the digital data to form events (WB runs or BW runs) which are then coded using variable length codewords. *See Abstract, Figures 8A and 8B and Col. 3:54 – Col. 4:51.* The method reduces the number of bits of information needed to transmit a video image which reduces bandwidth requirements and storage requirements. *See Col. 1: 15-24.*	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. *See pp. 225-*

US 4,901,075 CLAIM ELEMENTS	Subramaniam '036 Patent	Chen Article
		227.
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	A prediction table and a window predictor transform the facsimile image into prediction error values with "0" values and "1" values with minimum redundancy. *See Col. 2:56-58. See also Col. 9:40-44*.	The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227. See also Girod Tr. at 102:17-105:6.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	The prediction error signals are combined into events (run lengths) wherein the events include: 1) white-black (WB) runs (zero values following by one or more 1 values); and 2) black-white (BW) (1 values following by one or more zero values) *See Col. 10:45-59 and Figures 8A and 8B*.  FIG-8A M1=128, M2=4 RUN LENGTH / RUN FEATURE / ENCODING SYMBOL / (7-BIT WHITE FOLLOWED BY 2-BIT BLACK) 9-BIT BINARY ENCODER PROM ADDRESS / VARIABLE LENGTH CODE WORD 0 1 — 1,0 — 4 — 0 0 0 0 0 0 1 0 0 — 1 1 1 0 1 1 — 1,1 — 5 — 0 0 0 0 0 0 1 0 1 — 0 1 1 0 1 1 1 (3) — 1,3 — 7 — 0 0 0 0 0 0 1 1 1 — 1 0 1 1 1 0 0 1 — 2,0 — 8 — 0 0 0 0 0 1 0 0 0 — 0 1 0 0 1 0 0 1 1 1 (3) — 2,3 — 11 — 0 0 0 0 0 1 0 1 1 — 1 1 0 0 0 0 0 0 0 1 — 3,0 — 12 — 0 0 0 0 0 1 1 0 0 — 1 0 0 1 1 1 0 0 ..... 0 0 1 1 1 (8) (3) — 8,3 — 35 — 0 0 0 1 0 0 0 1 1 — 1 0 0 0 0 1 0 0 ..... 0 0 1 1 (38) — 38,1 — 153 — 0 1 0 0 1 1 0 0 1 — 1 1 0 0 0 1 1 0 0 0 0 ..... 0 0 1 1 1 (100) (3) — 100,3 — 403 — 1 1 0 0 1 0 0 1 1 — 0 1 0 1 0 1 0 0 0 0 0 0 0 ..... 0 0 (127) — 127,0 — 508 — 1 1 1 1 1 1 1 0 0 — 0 1 0 1 1 1 0 0 0 0 0 0 ..... 0 0 1 (127) — 127,1 — 509 — 1 1 1 1 1 1 1 0 1 — 0 1 0 0 0 1 1 1 0 0 0 0 ..... 0 0 1 1 (127) — 127,2 — 510 — 1 1 1 1 1 1 1 1 0 — 0 0 1 0 1 0 0 0 1 0 0 0 ..... 0 0 1 1 1 (127) (3) — 127,3 — 511 — 1 1 1 1 1 1 1 1 1 — 0 0 1 0 1 0 1 0 0	Chen derives a plurality of events from the video signal and each event includes a run of zero coefficients and the value of the non-zero coefficient that precedes or follows that run. *See pg. 227-229. See also Girod Tr. at 115:9 – 116:3*.

US 4,901,075 CLAIM ELEMENTS	Subramaniam '036 Patent	Chen Article
	FIG-8B N3=8, N4=64  As shown in Figures 8A and 8B, "01", "001", "0001" and "127 0's and a "1", "10", "100" and "1 with 63 0's" are examples of the events.	
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	As shown in Figure 8A and 8B, each of the events are coded using a variable length code. *See Figures 8A and 8B and Col. 10:45-59.*	Chen assigns a sequence of bits that represents a particular event or events in accordance with a predefined set of rules. In particular, Chen assigns a sequence of bits to represent a run of zeroes followed by a non-zero coefficient comprised of a code word for the run-length prefix, a code word for the run length and a code word for the non-zero coefficient (*See pp. 228-229, Tables I and II.*) to form a composite code word that is a sequence of bits that represent a particular event or events in accordance with a predefined set

US 4,901,075 CLAIM ELEMENTS	Subramaniam '036 Patent	Chen Article
		of rules. Consider for example, the event of four zero coefficients followed by a non-zero coefficient equal to four (00004): According to Chen this event is represented by a sequence of bits as follows: First the run length prefix, 010, is included in the composite code word to indicate the beginning of the run of four zeroes. (*See p. 228, Table I.*) Next, the Huffman code word for a run length of 4, 0101, is included in the composite code word. (*See p. 229, Table II.*) Finally, the Huffman code word for the non-zero coefficient with an amplitude of 4, 00001, is included in the composite code word. (*See p. 228, Table I.*) Thus the composite codeword that is a sequence of bits that represents the event

US 4,901,075 CLAIM ELEMENTS	Subramaniam '036 Patent	Chen Article
		00004 is: 010010100001. This is true every time the event 00004 occurs, and thus that composite codeword is assigned according to a predefined set of rules. *See Girod Tr. at 118:9 – 120:6.*
11. The method of claim 8, comprising the additional steps of: determining whether the run length of each event exceeds a predetermined run length and if so, splitting said respective event into a plurality of sections so that each of said sections has a run length below said predetermined run length, and assigning a code word to each section.	The method provides that, if the first half or second half of an event (run length) exceeds the maximum length specified for that particular value, then that run length must be broken down by using both the general rule and its exception. *See Col. 11:26- Col. 12:54.*	

3. US Patent No. 4,316,222 to Subramaniam (the "Subramaniam '222 Patent") in view of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder", IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

The Subramaniam '222 Patent was filed on December 7, 1979 and issued on February 16, 1982 and is prior art to the Vogel Patent under 35 USC 102(a) or 35 USC 102(b) and is properly used as prior art in this re-examination request. The Chen Article was published in March 1984 and is prior art to the Vogel Patent under 35 USC 102(a) or 35 USC 102(b) and is properly used as prior art in this re-examination request. The Subramaniam '222 Patent and the Chen Article were submitted to the examiner in prosecution towards the end of prosecution. However, the examiner never used this combination of prior art to reject the claims of the Vogel Patent.

The claim elements of claims 3-4, 8 and 11 of the Vogel Patent that are disclosed by the Subramaniam '036 Patent and the Chen Article appear in the chart below.

Claims 3-4, 8 and 11 of the Vogel Patent are unpatentable under 35 USC 103 over the Subramaniam '222 Patent in view of the Chen Article because:

1) The prior art (disclosed in the Chen Article as set forth below in the chart) discloses a method for coding signals that may include transform coding (using discrete cosine transforms (DCTs)) in which a sequence of coefficients having zero values and non-zero values are coded using codewords. In Chen, a run of zero coefficients are coded with a codeword and the non-zero coefficients are coded with a separate codeword. In Chen, Huffman codewords are used to code the run of zero coefficients as well as the non-zero coefficients.

2) In the Vogel patent, transform coded coefficients having zero and non-zero values are coded such that a run of zero coefficients and a preceding or subsequent non-zero coefficient are coded together.

3) The prior art (disclosed in the Subramaniam '222 Patent as set forth below in the chart) discloses a known combined coding technique to code a run of zero values and a non-zero value together using a single codeword which results in a higher level of compression.

4) One of ordinary skill in the art would have recognized that applying the known combined coding technique of the Subramaniam '222 Patent to the method of coding signals disclosed in the Chen Article would have yielded the predictable result of a higher compression

coding system and also resulted in an improved coding system with the higher compression. *See Ebrahimi Declaration at ¶ 10.*

Therefore, claims 3-4, 8 and 11 of the Vogel Patent would have been obvious over the combination of the Chen Article and the Subramaniam '222 Patent.

US 4,901,075 CLAIM ELEMENTS	**Subramaniam '222 Patent**	**Chen Article**
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	A method is disclosed for reducing the number of bits of information when transmitting a video image. *See Col. 1:7-11*. In the method, an image is divided into a series of rows of data elements of different types, such as black and white colors, so that a series of digital elements (white areas generate a "0" output and black areas generate a "1" output) are generated which correspond to the sequence of signal values. *See Col. 2:30-38 and Col. 2:62-66*.	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227. See also Girod Tr. at 102:17-105:6.*
(a) deriving from said	From the image signals, events (runs length symbols) are located and these runs are white-black (WB) runs (a run of	Chen derives a plurality of events

<table>
<tr><th>US 4,901,075 CLAIM ELEMENTS</th><th>Subramaniam ‘222 Patent</th><th>Chen Article</th></tr>
<tr><td>signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and</td><td>zeros followed by one or more 1 values) and black-white (BW) runs (a runs of 1 values followed by one or more zero values). See Col. 2:66- Col. 3:8 and 3:4-8.</td><td>from the video signal and each event includes a run of zero coefficients and the value of the non-zero coefficient that precedes or follows that run. See pg. 227-229. See also Girod Tr. at 115:9 – 116:3.</td></tr>
<tr><td>(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.</td><td>As shown in Figures 2A and 2B (reproduced below), the encoder codes events (“01”, “001”, 511 0s followed by a 1, “10”, “100” and a 1 followed by 511 zeros) with the variable length code words “111”, “01001”, “010001110”, “10”, “1100” and “01000” respectively wherein a series of 0s or 1s are followed by a single bit of the other value.
<table>
<tr><th>RUN LENGTH</th><th>RUN FEATURE</th><th>ENCODING SYMBOL</th><th>BINARY PROM ADDRESS</th><th>VARIABLE LENGTH CODE WORD</th></tr>
<tr><td>01</td><td>1,0</td><td>8</td><td>1000</td><td>111</td></tr>
<tr><td>011</td><td>1,1</td><td>9</td><td>1001</td><td>011</td></tr>
<tr><td>01111111</td><td>1,6</td><td>14</td><td>1110</td><td>1010</td></tr>
<tr><td>01111111</td><td>1,7</td><td>15</td><td>1111</td><td>10111</td></tr>
<tr><td>001</td><td>2,0</td><td>16</td><td>10000</td><td>01001</td></tr>
<tr><td>001111111</td><td>2,6</td><td>22</td><td>10110</td><td>110011</td></tr>
<tr><td>001111111</td><td>2,7</td><td>23</td><td>10111</td><td>110000</td></tr>
<tr><td>0001</td><td>3,0</td><td>24</td><td>11000</td><td>100111</td></tr>
<tr><td>00··00 1 11··11
8 7</td><td>8,7</td><td>71</td><td>1000111</td><td>100001</td></tr>
<tr><td>00··0 11
139</td><td>139,1</td><td>1113</td><td>1000101001</td><td>110001100</td></tr>
<tr><td>00··0 1 1111111
500 7</td><td>500,7</td><td>4007</td><td>1111101001111</td><td>010101000</td></tr>
<tr><td>000···00
511</td><td>511,0</td><td>4088</td><td>1111111111000</td><td>010111000</td></tr>
<tr><td>0000 1
511</td><td>511,1</td><td>4089</td><td>1111111111001</td><td>010001110</td></tr>
<tr><td>00··0 111111
511</td><td>511,6</td><td>4094</td><td>1111111111110</td><td>001010001</td></tr>
<tr><td>00··00 1111111
511</td><td>511,7</td><td>4095</td><td>1111111111111</td><td>001010100</td></tr>
</table></td><td>Chen assigns a sequence of bits that represents a particular event or events in accordance with a predefined set of rules. In particular, Chen assigns a sequence of bits to represent a run of zeroes followed by a non-zero coefficient comprised of a code word for the run-length prefix, a code word for the run length and a code word for the non-zero coefficient (See pp. 228-229, Tables I and II.) to form a composite code word that is a sequence of bits</td></tr>
</table>

US 4,901,075 CLAIM ELEMENTS	Subramaniam '222 Patent	Chen Article

RUN LENGTH	RUN FEATURE	ENCODING SYMBOL	BINARY PROM ADDRESS	VARIABLE LENGTH CODE WORD
10	1,0	512	1000	10
100	1,1	513	10000	1100
10 00000··00 (511)	1,511	1023	1111111111	01000
110	2,0	1024	10000000000	111000
1100	2,1	1025	10000000001	001111
110 00··000 (511)	2,511	1535	1011111111	001110
1110	3,0	1536	11000000000	1110010
1110 000··00 (510)	3,510	2046	11111111110	1101110
1110 00·00 (511)	3,511	2047	11111111111	1101100
110 0000 (199)	2,199	1223	10011000111	1111100
11111000	5,2	2562	10100000010	00100100
1111110	7,1	3585	11100000001	00110111
11111111000	7,3	3587	11100000011	00100101
1111111 00·0·0 (511)	7,511	4095	11111111111	00001101

See Figures 2A and 2B.

that represent a particular event or events in accordance with a predefined set of rules.

Consider for example, the event of four zero coefficients followed by a non-zero coefficient equal to four (00004):

According to Chen this event is represented by a sequence of bits as follows:

First the run length prefix, 010, is included in the composite code word to indicate the beginning of the run of four zeroes. (*See p. 228, Table I.*)

Next, the Huffman code word for a run length of 4, 0101, is included in the composite code word. (*See p. 229, Table II.*)

Finally, the Huffman code word for the non-

US 4,901,075 CLAIM ELEMENTS	Subramaniam '222 Patent	Chen Article
		zero coefficient with an amplitude of 4, 00001, is included in the composite code word. (*See p. 228, Table I.*) Thus the composite codeword that is a sequence of bits that represents the event 00004 is: 010010100001. This is true every time the event 00004 occurs, and thus that composite codeword is assigned according to a predefined set of rules. *See Girod Tr. at 118:9 – 120:6.*
4. The method of claim 3, wherein said code words are Huffman code words.	The variable length codes may be Huffman codes. *See Col. 1:21-22.*	Chen discloses that the codewords assigned are Huffman codewords. *See pp. 228-229 and Tables 1 and II.*
8. A method for coding a signal for transmission at a reduced	A method is disclosed for reducing the number of bits of information when transmitting a video image. *See Col. 1:7-11.* In the method, an image is divided into a series of rows of data elements of different types, such as black and white colors, so that a series of digital elements (white	Chen discloses a system and method wherein transform image coding (which was

US 4,901,075 CLAIM ELEMENTS	Subramaniam '222 Patent	Chen Article
bandwidth, comprising the steps of:	areas generate a "0" output and black areas generate a "1" output) are generated which correspond to the sequence of signal values. *See Col. 2:30-38*.	developed 15 years before 1984) may be used for bandwidth compression for video signals. *See pp. 225-227*.
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	When working with documents, the image processor 10 converts the original image data into long strings of 0's followed by short strings of 1's and short strings of 1's followed by long strings of 0's. *See Col. 2:62-66*.	The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227. See also Girod Tr. at 102:17-105:6*.
(b) deriving from said sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	From the image signals, events (runs length symbols) are located and these runs are white-black (WB) runs (a run of zeros followed by one or more 1 values) and black-white (BW) runs (a runs of 1 values followed by one or more zero values). *See Col. 2:66- Col. 3:8 and 3:4-8*.	Chen derives a plurality of events from the video signal and each event includes a run of zero coefficients and the value of the non-zero coefficient that precedes or follows that run. *See pg. 227-229. See also Girod Tr. at 115:9 – 116:3*.
(c) for each of said events, determining the run length	As shown in Figures 2A and 2B (reproduced below), the encoder codes events ("01", "001", 511 0s followed by a 1, "10", "100" and a 1 followed by 511 zeros) with the variable length code words "111",	Chen assigns a sequence of bits that represents a particular event or

US 4,901,075 CLAIM ELEMENTS	Subramaniam '222 Patent	Chen Article
and assigning a code word to represent said run length and said non-zero coefficient.	"01001", "010001110", "10", "1100" and "01000" respectively wherein a series of 0s or 1s are followed by a single bit of the other value.	events in accordance with a predefined set of rules. In particular, Chen assigns a sequence of bits to represent a run of zeroes followed by a non-zero coefficient comprised of a code word for the run-length prefix, a code word for the run length and a code word for the non-zero coefficient (*See pp. 228-229, Tables I and II.*) to form a composite code word that is a sequence of bits that represent a particular event or events in accordance with a predefined set of rules. Consider for example, the event of four zero coefficients followed by a non-zero coefficient equal to four (00004): According to Chen this event is represented by a sequence of bits as

RUN LENGTH	RUN FEATURE	ENCODING SYMBOL	BINARY PROM ADDRESS	VARIABLE LENGTH CODE WORD
01	1,0	8	1000	111
011	1,1	9	1001	011
01111111	1,6	14	1110	1010
011111111	1,7	15	1111	10111
001	2,0	16	10000	01001
00111111	2,6	22	10110	110011
001111111	2,7	23	10111	110000
0001	3,0	24	11000	100111
00···00 (8) 11···11 (7)	8,7	71	1000111	100001
00···0 (139) 11	139,1	1113	10001011001	110001100
00···0 (500) 1111111 (7)	500,7	4007	111110100111	010101000
000···00 (511)	511,0	4088	111111111000	010111000
0000 1 (511)	511,1	4089	111111111001	010001110
00···0 (511) 111111	511,6	4094	111111111110	001010001
00···00 (511) 1111111	511,7	4095	111111111111	001010100

RUN LENGTH	RUN FEATURE	ENCODING SYMBOL	BINARY PROM ADDRESS	VARIABLE LENGTH CODE WORD
10	1,0	512	1000	10
100	1,1	513	10000	1100
10 00000···00 (511)	1,511	1023	1111111111	01000
110	2,0	1024	10000000000	111000
1100	2,1	1025	10000000001	001111
110 00···000 (511)	2,511	1535	10111111111	001110
1110	3,0	1536	11000000000	1110010
1110 000···00 (510)	3,510	2046	11111111110	1101110
1110 00·00 (511)	3,511	2047	11111111111	1101100
110 0000 (199)	2,199	1223	10011000111	1111100
11111000	5,2	2562	101000000010	00100100
1111111 0	7,1	3585	111000000001	00110111
111111000	7,3	3587	111000000011	00100101
1111111 00·0·0 (511)	7,511	4095	111111111111	00001101

See Figures 2A and 2B.

US 4,901,075 CLAIM ELEMENTS	Subramaniam '222 Patent	Chen Article
		follows: First the run length prefix, 010, is included in the composite code word to indicate the beginning of the run of four zeroes. (*See p. 228, Table I.*) Next, the Huffman code word for a run length of 4, 0101, is included in the composite code word. (*See p. 229, Table II.*) Finally, the Huffman code word for the non-zero coefficient with an amplitude of 4, 00001, is included in the composite code word. (*See p. 228, Table I.*) Thus the composite codeword that is a sequence of bits that represents the event 00004 is: 010010100001. This is true every time the event 00004 occurs, and thus that

US 4,901,075 CLAIM ELEMENTS	Subramaniam '222 Patent	Chen Article
		composite codeword is assigned according to a predefined set of rules. *See Girod Tr. at 118:9 – 120:6.*
11. The method of claim 8, comprising the additional steps of: determining whether the run length of each event exceeds a predetermined run length and if so, splitting said respective event into a plurality of sections so that each of said sections has a run length below said predetermined run length, and assigning a code word to each section.	In Subramaniam '222, if the first half or second half of an event exceeds the maximum length specified for that particular value, then that event (run length) must be broken down by using both the general rule and its exception. *See Col. 3:44- Col. 4:68.*	

4. US Patent No. 4,494,151 to Liao (the "Liao Patent") in view of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder", IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

The Liao Patent was filed on February 9, 1982 and issued on January 15, 1985 and is prior art to the Vogel Patent under 35 USC 102(a) or 35 USC 102(b) and is properly used as prior art in this re-examination request. The Chen Article was published in March 1984 and is prior art to the Vogel Patent under 35 USC 102(a) or 35 USC 102(b) and is properly used as prior art in this re-examination request. The Liao Patent was not submitted to the examiner during prosecution. The Chen Article was submitted to the examiner during the prosecution towards the end of prosecution. However, the examiner never used this combination of prior art to reject the claims of the Vogel Patent.

Claims 3-4, 8 and 11 of the Vogel Patent are unpatentable under 35 USC 103 over the Liao Patent in view of the Chen Article because:

1) The prior art (disclosed in the Chen Article as set forth below in the chart) discloses a method for coding signals that may include transform coding (using discrete cosine transforms (DCTs)) in which a sequence of coefficients having zero values and non-zero values are coded using codewords. In Chen, a run of zero coefficients are coded with a codeword and the non-zero coefficients are coded with a separate codeword. In Chen, Huffman codewords are used to code the run of zero coefficients as well as the non-zero coefficients.

2) In the Vogel patent, transform coded coefficients having zero and non-zero values are coded such that a run of zero coefficients and a preceding or subsequent non-zero coefficient are coded together.

3) The prior art (disclosed in the Liao Patent as set forth below in the chart) discloses a known combined coding technique to code a run of zero values and a non-zero value together using a single codeword which results in a higher level of compression.

4) One of ordinary skill in the art would have recognized that applying the known combined coding technique of the Liao Patent to the method of coding signals disclosed in the Chen Article would have yielded the predictable result of a higher compression coding system

and also resulted in an improved coding system with the higher compression. *See Ebrahimi Declaration at ¶ 10.*

Therefore, claims 3-4, 8 and 11 of the Vogel Patent would have been obvious over the combination of the Chen Article and the Liao Patent.

US 4,901,075 CLAIM ELEMENTS	**US Patent No. 4,494,151 to Liao**	**Chen Article**
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	Liao discloses a method for coding a signal that is a sequence of predictive values "0" and "1" values from an image predictor 31 as shown in Figures 2 and 3 which are input to an encoder 32. See Figures 2 and 3. In Liao, "*The object of the invention, therefore, is to provide a modified run-length encoding circuit which allows the efficient encoding/decoding of binary data at high data rates*." *See Col. 2:15-19*.	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227. See also Girod Tr. at 102:17-105:6*.
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	In Liao, the encoder maximizes the compression of these strings by grouping the input data into data words comprising an uninterrupted line of nibbles containing all 0s (a run of zero values), regardless of how many that may be, followed by a terminating nibble having at least one 1 bit (a non-zero value). *See Col. 1:64 – Col. 2:5*.	Chen derives a plurality of events from the video signal and each event includes a run of zero coefficients and the value of the non-zero coefficient that precedes or follows that run. *See pg. 227-229. See also Girod Tr. at 115:9 – 116:3*.
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	A first code word portion is assigned to the number of all-zero nibbles, and a second code word portion is assigned to the data pattern of the terminating nibble. The final code word is the combination of the first and second code word portions." *See Col. 1:64 – Col. 2:5*. The code words assigned to each portion is shown in Figure 1A and the code words are of	Chen assigns a sequence of bits that represents a particular event or events in accordance with a predefined set of rules. In particular, Chen assigns a sequence of bits to represent a run of zeroes followed by a non-zero coefficient comprised of a code word for the run-

US 4,901,075 CLAIM ELEMENTS	US Patent No. 4,494,151 to Liao	Chen Article
	variable length and wherein the code words are shorter than the original data and the more frequently occurring run lengths are assigned to short code words. *See Figure 1A and Col. 6:20-44*. Thus, Liao discloses that a series of Huffman codewords are formed from the signal values. *See Figure 2 and Col. 3:13-18*. Thus, a terminating nibble such as "1000" and a preceding run of all zero nibbles (such as 31 all-zero nibbles) are coded using a codeword.	length prefix, a code word for the run length and a code word for the non-zero coefficient (*See pp. 228-229, Tables I and II.*) to form a composite code word that is a sequence of bits that represent a particular event or events in accordance with a predefined set of rules. Consider for example, the event of four zero coefficients followed by a non-zero coefficient equal to four (00004): According to Chen this event is represented by a sequence of bits as follows: First the run length prefix, 010, is included in the composite code word to indicate the beginning of the run of four zeroes. (*See p. 228, Table I.*) Next, the Huffman code word for a run length of 4, 0101, is included in the composite code word. (*See p. 229, Table II.*) Finally, the Huffman code word for the non-zero coefficient with an amplitude of 4, 00001, is included in the composite code word. (*See p. 228, Table I.*) Thus the composite codeword that is a sequence of bits that represents the

US 4,901,075 CLAIM ELEMENTS	US Patent No. 4,494,151 to Liao	Chen Article
		event 00004 is: 010010100001. This is true every time the event 00004 occurs, and thus that composite codeword is assigned according to a predefined set of rules. *See Girod Tr. at 118:9 – 120:6.*
4. The method of claim 3, wherein said code words are Huffman code words.	The code words assigned to each portion is shown in Figure 1A and the code words are of variable length which are Huffman codewords. *See Figure 1A and Col. 6:20- 44.*	Chen discloses that the codewords assigned are Huffman codewords. *See pp. 228-229 and Tables 1 and II.*
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	Liao discloses a method for coding a signal that is a sequence of predictive values "0" and "1" values from an image predictor 31 as shown in Figures 2 and 3 which are input to an encoder 32. See Figures 2 and 3. In Liao, "*The object of the invention, therefore, is to provide a modified run-length encoding circuit which allows the efficient encoding/decoding of binary data at high data rates*." *See Col. 2:15-19.*	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. *See pp. 225-227.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	In Liao, the encoder maximizes the compression of these strings by grouping the input data into data words comprising an uninterrupted line of nibbles containing all 0s (a run of zero values), regardless of how many that may be, followed by a terminating nibble having at least one 1 bit (a non-zero value). *See Col. 1:64 – Col. 2:5.*	The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227. See also Girod Tr. at 102:17-105:6.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero	In Liao, "The encoder maximizes the compression of these strings by grouping the input data into data words comprising an uninterrupted	Chen derives a plurality of events from the video signal and each event includes a run of zero coefficients and the

US 4,901,075 CLAIM ELEMENTS	US Patent No. 4,494,151 to Liao	Chen Article
coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	line of nibbles containing all 0s, regardless of how many that may be, followed by a terminating nibble having at least one 1 bit. A first code word portion is assigned to the number of all-zero nibbles, and a second code word portion is assigned to the data pattern of the terminating nibble. The final code word is the combination of the first and second code word portions." *See Col. 1:64 – Col. 2:5*.	value of the non-zero coefficient that precedes or follows that run. *See pg. 227-229*. *See also Girod Tr. at 115:9 – 116:3*.
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	A first code word portion is assigned to the number of all-zero nibbles, and a second code word portion is assigned to the data pattern of the terminating nibble. The final code word is the combination of the first and second code word portions." *See Col. 1:64 – Col. 2:5*. The code words assigned to each portion is shown in Figure 1A and the code words are of variable length and wherein the code words are shorter than the original data and the more frequently occurring run lengths are assigned to short code words. *See Figure 1A and Col. 6:20-44*. Thus, Liao discloses that a series of Huffman codewords are formed from the events. *See Figure 2 and Col. 3:13-18*. For example, a terminating nibble such as "1000" and a preceding run of all zero nibbles (such as 31 all-zero nibbles) are coded using a codeword.	Chen assigns a sequence of bits that represents a particular event or events in accordance with a predefined set of rules. In particular, Chen assigns a sequence of bits to represent a run of zeroes followed by a non-zero coefficient comprised of a code word for the run-length prefix, a code word for the run length and a code word for the non-zero coefficient (*See pp. 228-229, Tables I and II.*) to form a composite code word that is a sequence of bits that represent a particular event or events in accordance with a predefined set of rules. Consider for example, the event of four zero coefficients followed by a non-zero coefficient equal to four (00004): According to Chen this event is represented by a sequence of bits as follows: First the run length prefix,

US 4,901,075 CLAIM ELEMENTS	US Patent No. 4,494,151 to Liao	Chen Article
		010, is included in the composite code word to indicate the beginning of the run of four zeroes. (*See p. 228, Table I.*) Next, the Huffman code word for a run length of 4, 0101, is included in the composite code word. (*See p. 229, Table II.*) Finally, the Huffman code word for the non-zero coefficient with an amplitude of 4, 00001, is included in the composite code word. (*See p. 228, Table I.*) Thus the composite codeword that is a sequence of bits that represents the event 00004 is: 010010100001. This is true every time the event 00004 occurs, and thus that composite codeword is assigned according to a predefined set of rules. *See Girod Tr. at 118:9 – 120:6.*
11. The method of claim 8, comprising the additional steps of: determining whether the run length of each event exceeds a predetermined run length and if so, splitting said respective event into a plurality of sections so that each of said sections has a run	Liao discloses that "*If there are 64 or more all-zero nibbles before a non-zero terminating nibble, the data string is converted into a first part comprising a number of sets of 64 all-zero nibbles and a second part comprising the remaining 0 to 63 all-zero nibbles and the terminating nibble.*" *See Col. 3:2-7.* Thus, when a run of non-zero nibbles together with the terminating nibble exceeds a predetermined length (more than 64	

US 4,901,075 CLAIM ELEMENTS	US Patent No. 4,494,151 to Liao	Chen Article
length below said predetermined run length, and assigning a code word to each section.	all-zero nibbles), the run of non-zero nibbles and the terminating nibble are split into sections (the first and second parts) wherein the length of each section is below a predetermined value (64 all-zero nibbles), and each section has a codeword assigned to the section.	

5. US Patent No. 4,136,363 to Saran (the "'363 Saran Patent") in view of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder", IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

The '363 Saran Patent was filed on December 29, 1976 and issued on January 23, 1979 and is prior art to the Vogel Patent under 35 USC 102(a) or 35 USC 102(b) and is properly used as prior art in this re-examination request. The Chen Article was published in March 1984 and is prior art to the Vogel Patent under 35 USC 102(a) or 35 USC 102(b) and is properly used as prior art in this re-examination request. The '363 Saran Patent was never submitted to the examiner during prosecution. The Chen Article was submitted to the examiner during the prosecution towards the end of prosecution. However, the examiner never used this combination of prior art to reject the claims of the Vogel Patent.

Claims 3-4, 8 and 11 of the Vogel Patent are unpatentable under 35 USC 103 over the Saran '363 Patent in view of the Chen Article because:

1) The prior art (disclosed in the Chen Article as set forth below in the chart) discloses a method for coding signals that may include transform coding (using discrete cosine transforms (DCTs)) in which a sequence of coefficients having zero values and non-zero values are coded using codewords. In Chen, a run of zero coefficients are coded with a codeword and the non-zero coefficients are coded with a separate codeword. In Chen, Huffman codewords are used to code the run of zero coefficients as well as the non-zero coefficients.

2) In the Vogel patent, transform coded coefficients having zero and non-zero values are coded such that a run of zero coefficients and a preceding or subsequent non-zero coefficient are coded together.

3) The prior art (disclosed in the Saran '363 Patent as set forth below in the chart) discloses a known combined coding technique to code a run of zero values and a non-zero value together using a single codeword which results in a higher level of compression.

4) One of ordinary skill in the art would have recognized that applying the known combined coding technique of the Saran '363 Patent to the method of coding signals disclosed in the Chen Article would have yielded the predictable result of a higher compression coding

system and also resulted in an improved coding system with the higher compression. *See Ebrahimi Declaration at ¶ 10.*

Therefore, claims 3-4, 8 and 11 of the Vogel Patent would have been obvious over the combination of the Chen Article and the Saran '363 Patent.

US 4,901,075 CLAIM ELEMENTS	Saran '363 Patent	Chen Article
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	Saran discloses a system and method for encoding a video signal generated based on a scan of a document wherein the video signal includes black (1 value) terminated white (zero value) runs (in difference modulated and unmodulated signals) that are encoded to reduce redundancies and compress binary video signals. *See Col. 1:67 – Col. 2:38; Col. 3:31-34; Col. 4:50- Col. 5:7; Col. 9:7-26 and Col. 9:27-45.*	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227. See also Girod Tr. at 102:17-105:6.*
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	Events that are black terminated white runs (a run of zero values terminated by a 1 value) are derived. *See Col. 9:7-26 and Figure 4.*	Chen derives a plurality of events from the video signal and each event includes a run of zero coefficients and the value of the non-zero coefficient that precedes or follows that run. *See pg. 227-229. See also Girod Tr. at 115:9 – 116:3.*
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	Saran discloses that the codeword formed for the black terminated white runs (a run of zeros with a "1" at the end), such as 3W+B and 6W+B as shown in Figure 4, are the codewords "10111" and "11010" respectively that represent run of zeros with a "1" at the end. *See Col. 9:7-26 and Figure 4.*	Chen assigns a sequence of bits that represents a particular event or events in accordance with a predefined set of rules. In particular, Chen assigns a sequence of bits to represent a run of zeroes followed by a non-zero coefficient comprised of a code word for the run-length prefix, a code word for the run

US 4,901,075 CLAIM ELEMENTS	Saran '363 Patent	Chen Article
		length and a code word for the non-zero coefficient (*See pp. 228-229, Tables I and II.*) to form a composite code word that is a sequence of bits that represent a particular event or events in accordance with a predefined set of rules. Consider for example, the event of four zero coefficients followed by a non-zero coefficient equal to four (00004): According to Chen this event is represented by a sequence of bits as follows: First the run length prefix, 010, is included in the composite code word to indicate the beginning of the run of four zeroes. (*See p. 228, Table I.*) Next, the Huffman code word for a run length of 4, 0101, is included in the composite code word. (*See p. 229, Table II.*) Finally, the Huffman code word for the non-zero coefficient with an amplitude of 4, 00001, is included in the composite code word. (*See p. 228, Table I.*) Thus the composite codeword that is a sequence of bits that represents the event 00004 is: 010010100001.

US 4,901,075 CLAIM ELEMENTS	Saran '363 Patent	Chen Article
		This is true every time the event 00004 occurs, and thus that composite codeword is assigned according to a predefined set of rules. *See Girod Tr. at 118:9 – 120:6.*
4. The method of claim 3, wherein said code words are Huffman code words.	Saran discloses that, "Thus, it should be recalled that the basic Huffman rule for taking advantage of variable length run length message codes is that the code assigned to any given run length should be no longer than the code assigned to any less probable run length. *See Col. 2:27-38 and Col. 9:39-43.*	Chen discloses that the codewords assigned are Huffman codewords. *See pp. 228-229 and Tables 1 and II.*
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	Saran discloses a system and method for encoding a video signal generated based on a scan of a document wherein the video signal includes black (1 value) terminated white (zero value) runs (in difference modulated and unmodulated signals) that are encoded to reduce redundancies and compress binary video signals. *See Col. 1:67 – Col. 2:38; Col. 3:31-34; Col. 4:50- Col. 5:7; Col. 9:7-26 and Col. 9:27-45.*	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. *See pp. 225-227.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	In Saran, a difference modulator 31 generates difference modulated picture elements and unmodulated picture elements of opposite logic levels (i.e., "1" and "0"). *See Col. 6:9-19* and *Col. 4:50-59 and Col. 5:56-62*. An example of the series of difference modulated and unmodulated picture elements are shown lines a-c of Figure 4. *See Col. 9:7-17.*	The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227. See also Girod Tr. at 102:17-105:6.*
(b) deriving from said sequence, a plurality of events each comprised of a run of zero	Events that are black terminated white runs (a run of zero values terminated by a 1 value) are derived. *See Col. 9:7-26 and Figure 4.*	Chen derives a plurality of events from the video signal and each event includes a run of zero coefficients and the

US 4,901,075 CLAIM ELEMENTS	Saran '363 Patent	Chen Article
coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and		value of the non-zero coefficient that precedes or follows that run. *See pg. 227-229. See also Girod Tr. at 115:9 – 116:3.*
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	Saran discloses that the codeword formed for the black terminated white runs (a run of zeros with a "1" at the end), such as 3W+B and 6W+B as shown in Figure 4, are the codewords "10111" and "11010" respectively that represent run of zeros with a "1" at the end. *See Col. 9:7-26 and Figure 4.*	Chen assigns a sequence of bits that represents a particular event or events in accordance with a predefined set of rules. In particular, Chen assigns a sequence of bits to represent a run of zeroes followed by a non-zero coefficient comprised of a code word for the run-length prefix, a code word for the run length and a code word for the non-zero coefficient (*See pp. 228-229, Tables I and II.*) to form a composite code word that is a sequence of bits that represent a particular event or events in accordance with a predefined set of rules. Consider for example, the event of four zero coefficients followed by a non-zero coefficient equal to four (00004): According to Chen this event is represented by a sequence of bits as follows: First the run length prefix, 010, is included in the composite code word to indicate the beginning of the run of four zeroes. (*See p. 228, Table I.*) Next, the Huffman code word

US 4,901,075 CLAIM ELEMENTS	Saran '363 Patent	Chen Article
		for a run length of 4, 0101, is included in the composite code word. (*See p. 229, Table II.*) Finally, the Huffman code word for the non-zero coefficient with an amplitude of 4, 00001, is included in the composite code word. (*See p. 228, Table I.*) Thus the composite codeword that is a sequence of bits that represents the event 00004 is: 010010100001. This is true every time the event 00004 occurs, and thus that composite codeword is assigned according to a predefined set of rules. *See Girod Tr. at 118:9 – 120:6.*
11. The method of claim 8, comprising the additional steps of: determining whether the run length of each event exceeds a predetermined run length and if so, splitting said respective event into a plurality of sections so that each of said sections has a run length below said predetermined run length, and assigning a code word to each section.	In Saran events that are black terminated white runs (a run of zero values terminated by a "1") in excess of a predetermined block length are represented by a block length multiple code d plus, if the run happens to be a noninteger multiple of the block length, a run length residue code e." *See Col. 13:1-16.* In the example shown in Figure 4 of Saran, a black terminated white run of 258W+B is encoded as eight 32W Huffman codes ("10011001") and then a 2W+B Huffman code ("1010") to form 9 sections with each section being less than a predetermined value (a run length of 33 in this example) and each section has a Huffman codeword assigned to the section.	

6. US Patent No. 4,092,676 to Saran (the "'676 Saran Patent") in view of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder", IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

The '676 Saran Patent was filed on December 29, 1976 and issued on May 30, 1978 and is prior art to the Vogel Patent under 35 USC 102(a) or 35 USC 102(b) and is properly used as prior art in this re-examination request. The Chen Article was published in March 1984 and is prior art to the Vogel Patent under 35 USC 102(a) or 35 USC 102(b) and is properly used as prior art in this re-examination request. The ' 676 Saran Patent was never submitted to the examiner during prosecution. The Chen Article was submitted to the examiner during the prosecution towards the end of prosecution. However, the examiner never used this combination of prior art to reject the claims of the Vogel Patent.

Claims 3-4, 8 and 11 of the Vogel Patent are unpatentable under 35 USC 103 over the Saran '676 Patent in view of the Chen Article because:

1) The prior art (disclosed in the Chen Article as set forth below in the chart) discloses a method for coding signals that may include transform coding (using discrete cosine transforms (DCTs)) in which a sequence of coefficients having zero values and non-zero values are coded using codewords. In Chen, a run of zero coefficients are coded with a codeword and the non-zero coefficients are coded with a separate codeword. In Chen, Huffman codewords are used to code the run of zero coefficients as well as the non-zero coefficients.

2) In the Vogel patent, transform coded coefficients having zero and non-zero values are coded such that a run of zero coefficients and a preceding or subsequent non-zero coefficient are coded together.

3) The prior art (disclosed in the Saran '676 Patent as set forth below in the chart) discloses a known combined coding technique to code a run of zero values and a non-zero value together using a single codeword which results in a higher level of compression.

4) One of ordinary skill in the art would have recognized that applying the known combined coding technique of the Saran '676 Patent to the method of coding signals disclosed in the Chen Article would have yielded the predictable result of a higher compression coding

system and also resulted in an improved coding system with the higher compression. *See Ebrahimi Declaration at ¶ 10.*

Therefore, claims 3-4, 8 and 11 of the Vogel Patent would have been obvious over the combination of the Chen Article and the Saran '676 Patent.

US 4,901,075 CLAIM ELEMENTS	Saran '676 Patent	Chen Article
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	Saran discloses a system and method for encoding a video signal generated based on a scan of a document wherein the video signal includes black terminated white runs (in difference modulated and unmodulated signals) that are run length encoded using a code to reduce redundancies and compress binary video signals. *See Col. 1:67 – Col. 2:38; Col. 3:31-34; Col. 4:50-Col. 5:7; Col. 9:7-26 and Col. 9:27-45.*	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227. See also Girod Tr. at 102:17-105:6.*
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	Events that are black terminated white runs (a run of zero values terminated by a 1 value) are derived. *See Col. 9:7-26 and Figure 4.*	Chen derives a plurality of events from the video signal and each event includes a run of zero coefficients and the value of the non-zero coefficient that precedes or follows that run. *See pg. 227-229. See also Girod Tr. at 115:9 – 116:3.*
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	Saran discloses that the codeword formed for the black terminated white runs (a run of zeros with a "1" at the end), such as 3W+B and 6W+B as shown in Figure 4, are the codewords "10111" and "11010" respectively that represent run of zeros with a "1" at the end. *See Col. 9:7-26 and Figure 4.*	Chen assigns a sequence of bits that represents a particular event or events in accordance with a predefined set of rules. In particular, Chen assigns a sequence of bits to represent a run of zeroes followed by a non-zero coefficient comprised of a code word for the run-length prefix, a code word for the run

US 4,901,075 CLAIM ELEMENTS	Saran '676 Patent	Chen Article
		length and a code word for the non-zero coefficient (*See pp. 228-229, Tables I and II.*) to form a composite code word that is a sequence of bits that represent a particular event or events in accordance with a predefined set of rules. Consider for example, the event of four zero coefficients followed by a non-zero coefficient equal to four (00004): According to Chen this event is represented by a sequence of bits as follows: First the run length prefix, 010, is included in the composite code word to indicate the beginning of the run of four zeroes. (*See p. 228, Table I.*) Next, the Huffman code word for a run length of 4, 0101, is included in the composite code word. (*See p. 229, Table II.*) Finally, the Huffman code word for the non-zero coefficient with an amplitude of 4, 00001, is included in the composite code word. (*See p. 228, Table I.*) Thus the composite codeword that is a sequence of bits that represents the event 00004 is: 010010100001.

US 4,901,075 CLAIM ELEMENTS	Saran '676 Patent	Chen Article
		This is true every time the event 00004 occurs, and thus that composite codeword is assigned according to a predefined set of rules. *See Girod Tr. at 118:9 – 120:6.*
4. The method of claim 3, wherein said code words are Huffman code words.	Saran discloses that, "Thus, it should be recalled that the basic Huffman rule for taking advantage of variable length run length message codes is that the code assigned to any given run length should be no longer than the code assigned to any less probable run length. *See Col. 2:27-38 and Col. 9:39-43.*	Chen discloses that the codewords assigned are Huffman codewords. *See pp. 228-229 and Tables 1 and II.*
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	Saran discloses a system and method for encoding a video signal generated based on a scan of a document wherein the video signal includes black terminated white runs (in difference modulated and unmodulated signals) that are run length encoded using a code to reduce redundancies and compress binary video signals. *See Col. 1:67 – Col. 2:38; Col. 3:31-34; Col. 4:50-Col. 5:7; Col. 9:7-26 and Col. 9:27-45.*	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. *See pp. 225-227.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	In Saran, a difference modulator 31 generates difference modulated picture elements and unmodulated picture elements of opposite logic levels (i.e., "1" and "0"). *See Col. 6:9-19* and *Col. 4:50-59 and Col. 5:56-62*. An example of the series of difference modulated and unmodulated picture elements are shown lines a-c of Figure 4. *See Col. 9:7-17.*	The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227. See also Girod Tr. at 102:17-105:6.*
(b) deriving from said sequence, a plurality of events each comprised	Events that are black terminated white runs (a run of zero values terminated by a 1 value) are derived.	Chen derives a plurality of events from the video signal and each event includes a run

US 4,901,075 CLAIM ELEMENTS	Saran '676 Patent	Chen Article
of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	*See Col. 9:7-26 and Figure 4*.	of zero coefficients and the value of the non-zero coefficient that precedes or follows that run. *See pg. 227-229. See also Girod Tr. at 115:9 – 116:3*.
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	Saran discloses that the codeword formed for the black terminated white runs (a run of zeros with a "1" at the end), such as 3W+B and 6W+B as shown in Figure 4, are the codewords "10111" and "11010" respectively that represent run of zeros with a "1" at the end. *See Col. 9:7-26 and Figure 4*.	Chen assigns a sequence of bits that represents a particular event or events in accordance with a predefined set of rules. In particular, Chen assigns a sequence of bits to represent a run of zeroes followed by a non-zero coefficient comprised of a code word for the run-length prefix, a code word for the run length and a code word for the non-zero coefficient (*See pp. 228-229, Tables I and II.*) to form a composite code word that is a sequence of bits that represent a particular event or events in accordance with a predefined set of rules. Consider for example, the event of four zero coefficients followed by a non-zero coefficient equal to four (00004): According to Chen this event is represented by a sequence of bits as follows: First the run length prefix, 010, is included in the composite code word to indicate the beginning of the run of four zeroes. (*See p. 228, Table I.*)

US 4,901,075 CLAIM ELEMENTS	Saran '676 Patent	Chen Article
		Next, the Huffman code word for a run length of 4, 0101, is included in the composite code word. (*See p. 229, Table II.*) Finally, the Huffman code word for the non-zero coefficient with an amplitude of 4, 00001, is included in the composite code word. (*See p. 228, Table I.*) Thus the composite codeword that is a sequence of bits that represents the event 00004 is: 010010100001. This is true every time the event 00004 occurs, and thus that composite codeword is assigned according to a predefined set of rules. *See Girod Tr. at 118:9 – 120:6.*
11. The method of claim 8, comprising the additional steps of: determining whether the run length of each event exceeds a predetermined run length and if so, splitting said respective event into a plurality of sections so that each of said sections has a run length below said predetermined run length, and assigning a code word to each section.	In Saran events that are black terminated white runs (a run of zero values terminated by a "1") in excess of a predetermined block length are represented by a block length multiple code d plus, if the run happens to be a noninteger multiple of the block length, a run length residue code e." *See Col. 13:1-16.* In the example shown in Figure 4 of Saran, a black terminated white run of 258W+B is encoded as eight 32W Huffman codes ("10011001") and then a 2W+B Huffman code ("1010") to form 9 sections with each section being less than a predetermined value (a run length of 33 in this example) and each section has a Huffman codeword assigned to	

US 4,901,075 CLAIM ELEMENTS	Saran '676 Patent	Chen Article
	the section.	

7. US Patent No. 3,984,833 to Van Voorhis (the "Van Voorhis Patent") in view of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder", IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

The Van Voorhis Patent was filed on July 17, 1975 and issued on October 5, 1976 and is prior art to the Vogel Patent under 35 USC 102(a) or 35 USC 102(b) and is properly used as prior art in this re-examination request. The Chen Article was published in March 1984 and is prior art to the Vogel Patent under 35 USC 102(a) or 35 USC 102(b) and is properly used as prior art in this re-examination request. The Van Voorhis Patent was never submitted to the examiner during prosecution. The Chen Article was submitted to the examiner during the prosecution towards the end of prosecution. However, the examiner never used this combination of prior art to reject the claims of the Vogel Patent.

Claims 3-4 of the Vogel Patent are unpatentable under 35 USC 103 over the Van Voorhis Patent in view of the Chen Article because:

1) The prior art (disclosed in the Chen Article as set forth below in the chart) discloses a method for coding signals that may include transform coding (using discrete cosine transforms (DCTs)) in which a sequence of coefficients having zero values and non-zero values are coded using codewords. In Chen, a run of zero coefficients are coded with a codeword and the non-zero coefficients are coded with a separate codeword. In Chen, Huffman codewords are used to code the run of zero coefficients as well as the non-zero coefficients.

2) In the Vogel patent, transform coded coefficients having zero and non-zero values are coded such that a run of zero coefficients and a preceding or subsequent non-zero coefficient are coded together.

3) The prior art (disclosed in the Van Voorhis Patent as set forth below in the chart) discloses a known combined coding technique to code a run of zero values and a non-zero value together using a single codeword which results in a higher level of compression.

4) One of ordinary skill in the art would have recognized that applying the known combined coding technique of the Van Voorhis Patent to the method of coding signals disclosed in the Chen Article would have yielded the predictable result of a higher compression coding

system and also resulted in an improved coding system with the higher compression. *See Ebrahimi Declaration at ¶ 10.*

Therefore, claims 3-4 of the Vogel Patent would have been obvious over the combination of the Chen Article and the Van Voorhis Patent.

US 4,901,075 CLAIM ELEMENTS	Van Voorhis Patent	Chen Article
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	Van Voorhis discloses an apparatus for encoding for the compression of digital images that are a two-dimensional array of image points. *See Col. 1:13-19*. The compression of the digital images (using run length codes) reduces the storage requirements for digital images and reduces the bandwidth required for the transmission of the digital images *See Col. 1:27-31*. The value zero occurs far more frequency than the signal value one. From the examples, the value zero occurs most frequency in uninterrupted runs. For example, column 14, lines 64 to 66, mentions: *"For the purpose of the illustration, a run is defined as a one or as a string of one or more zeros and the first one following this string of zeros."*	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227. See also Girod Tr. at 102:17-105:6.*
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	Van Voorhis discloses that an event may be a binary encoded representation of an alphanumeric character, an analog voltage, a run of binary video information, a run of binary image information or any other type of information capable of recognition. *See Col. 6, lines 59-65*. Van Voorhis also describes that, from the signal, events are recognized as follows: "*In such a circumstance, the event recognizer 10 of Van Voorhis may recognize each sequence of consecutive bits of the same logic ,*	Chen derives a plurality of events from the video signal and each event includes a run of zero coefficients and the value of the non-zero coefficient that precedes or follows that run. *See pg. 227-229. See also Girod Tr. at 115:9 – 116:3*.

US 4,901,075 CLAIM ELEMENTS	Van Voorhis Patent	Chen Article
	which is denoted as a run. Runs may also be sequences of bits of one of the logic levels, or sequences of a level terminating in another level." *See Col. 7:11-15.* and *"For the purpose of the illustration, a run is defined as a one or as a string of one or more zeros and the first one following this string of zeros."* *See Col. 14:64-66; underlining was added.*	
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	Van Voorhis discloses coding of events where the event may include a string of one or more zeros and the first one following this string of zeros. *See Col. 14, lines 64-66.* The encoder then calculates and outputs code words for a specific class of ordinary and extended run-length codes. *See Col, 3, lines 58-61.* Examples of the codes used by the coder are shown in Tables 1 and 2. *See Col. 3, line 58 – Col. 4, line 64 and Tables 1 and 2.*	Chen assigns a sequence of bits that represents a particular event or events in accordance with a predefined set of rules. In particular, Chen assigns a sequence of bits to represent a run of zeroes followed by a non-zero coefficient comprised of a code word for the run-length prefix, a code word for the run length and a code word for the non-zero coefficient (*See pp. 228-229, Tables I and II.*) to form a composite code word that is a sequence of bits that represent a particular event or events in accordance with a predefined set of rules. Consider for example, the event of four zero coefficients followed by a non-zero coefficient equal to four (00004): According to Chen this event is represented by a sequence of bits as follows:

US 4,901,075 CLAIM ELEMENTS	Van Voorhis Patent	Chen Article
		First the run length prefix, 010, is included in the composite code word to indicate the beginning of the run of four zeroes. (*See p. 228, Table I.*) Next, the Huffman code word for a run length of 4, 0101, is included in the composite code word. (*See p. 229, Table II.*) Finally, the Huffman code word for the non-zero coefficient with an amplitude of 4, 00001, is included in the composite code word. (*See p. 228, Table I.*) Thus the composite codeword that is a sequence of bits that represents the event 00004 is: 010010100001. This is true every time the event 00004 occurs, and thus that composite codeword is assigned according to a predefined set of rules. *See Girod Tr. at 118:9 – 120:6.*
4. The method of claim 3, wherein said code words are Huffman code words.		Chen discloses that the codewords assigned are Huffman codewords. *See pp. 228-229 and Tables 1 and II.*

8. Henry H. J. Liao, "Upper Bound, Lower Bound and Run-Length Substitution Coding", NTC '77 Conference Record, Vol. 3, pp. 49:3-1 to 49:3-6 (1977) (the "Liao Article") in view of Wen-Hsiung Chen and William K. Pratt, "Scene Adaptive Coder", IEEE Transactions on Communications, Vol. COM-32, No. 3, March 1984, pages 225 to 232 (the "Chen Article")

The Liao Article was published in 1977 and is prior art to the Vogel Patent under 35 USC 102(a) or 35 USC 102(b) and is properly used as prior art in this re-examination request. The Chen Article was published in March 1984 and is prior art to the Vogel Patent under 35 USC 102(a) or 35 USC 102(b) and is properly used as prior art in this re-examination request. The Liao Article was never submitted to the examiner during prosecution. The Chen Article was submitted to the examiner during the prosecution towards the end of prosecution. However, the examiner never used this combination of prior art to reject the claims of the Vogel Patent.

Claims 3-4, 8 and 11 of the Vogel Patent are unpatentable under 35 USC 103 over the Liao Article in view of the Chen Article because:

1) The prior art (disclosed in the Chen Article as set forth below in the chart) discloses a method for coding signals that may include transform coding (using discrete cosine transforms (DCTs)) in which a sequence of coefficients having zero values and non-zero values are coded using codewords. In Chen, a run of zero coefficients are coded with a codeword and the non-zero coefficients are coded with a separate codeword. In Chen, Huffman codewords are used to code the run of zero coefficients as well as the non-zero coefficients.

2) In the Vogel patent, transform coded coefficients having zero and non-zero values are coded such that a run of zero coefficients and a preceding or subsequent non-zero coefficient are coded together.

3) The prior art (disclosed in the Liao Article as set forth below in the chart) discloses a known combined coding technique to code a run of zero values and a non-zero value together using a single codeword which results in a higher level of compression.

4) One of ordinary skill in the art would have recognized that applying the known combined coding technique of the Liao Article to the method of coding signals disclosed in the Chen Article would have yielded the predictable result of a higher compression coding system and also resulted in an improved coding system with the higher compression. *See Ebrahimi Declaration at ¶ 10.*

Therefore, claims 3-4, 8 and 11 of the Vogel Patent would have been obvious over the combination of the Chen Article and the Liao Article.

US 4,901,075 CLAIM ELEMENTS	Liao Article	Chen Article
3. In a method of coding a signal comprising a sequence of coefficients which results after a blockwise transform of pixels of a video signal with subsequent quantization, for transmission at a reduced bit rate, said signal comprising a plurality of zero coefficients, and a plurality of non-zero coefficients said method comprising the steps of:	The Liao Article a method for run-length coding for a facsimile signal quantized into a sequence of binary digits (1's and 0's) which directly represent black and white picture elements or prediction errors. *See pg. 49:3-1, left column, first paragraph of Introduction*. Thus, the Liao Article discusses bandwidth compression (bit rate reduction) bounds for run length coding of a sequence of binary digits or predictive error values.	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227. See also Girod Tr. at 102:17-105:6.*
(a) deriving from said signal, a plurality of events each comprising a run of said zero-coefficients having a respective run length and preceded or followed by at least one non-zero coefficient, and	The events (run-length of prediction errors) are a message set for these prediction values as shown in Table 1 that have runs of W followed by B (a run of zeros followed by a "1"). *See pg. 49:3-2, left column, first paragraph of Maximum Entropy Lower Bound section and Table 1.*	Chen derives a plurality of events from the video signal and each event includes a run of zero coefficients and the value of the non-zero coefficient that precedes or follows that run. *See pg. 227-229. See also Girod Tr. at 115:9 – 116:3.*
(b) for each of said events, determining said respective run length and assigning a code word to represent said non-zero coefficient and said run length.	For the events, "The best code assignment will be the set of codes with the shortest average length, i.e., the minimum redundancy code. Huffman's coding is a systematic procedure for constituting such as code with minimum redundancy." *See pg. 49:3-1, left column, second paragraph of Introduction section*. The Liao Article also contains a table with a run-length substitution code that is a Huffman code that represent a run of W values (zero to nine) followed by a B value. (zero to nine	Chen assigns a sequence of bits that represents a particular event or events in accordance with a predefined set of rules. In particular, Chen assigns a sequence of bits to represent a run of zeroes followed by a non-zero coefficient comprised of a code word for the run-length prefix, a code word for the run length and a code word for the non-zero coefficient (*See pp. 228-229,*

US 4,901,075 CLAIM ELEMENTS	Liao Article	Chen Article
	zero values) followed by a B value (a "1" value) *See pg. 49:3-3, left and right columns, Run-Length Substitution section, Table 2 and pg. 49:3-6, Table 5*.	*Tables I and II.*) to form a composite code word that is a sequence of bits that represent a particular event or events in accordance with a predefined set of rules. Consider for example, the event of four zero coefficients followed by a non-zero coefficient equal to four (00004): According to Chen this event is represented by a sequence of bits as follows: First the run length prefix, 010, is included in the composite code word to indicate the beginning of the run of four zeroes. (*See p. 228, Table I.*) Next, the Huffman code word for a run length of 4, 0101, is included in the composite code word. (*See p. 229, Table II.*) Finally, the Huffman code word for the non-zero coefficient with an amplitude of 4, 00001, is included in the composite code word. (*See p. 228, Table I.*) Thus the composite codeword that is a sequence of bits that represents the event 00004 is: 010010100001. This is true every time the

US 4,901,075 CLAIM ELEMENTS	Liao Article	Chen Article
		event 00004 occurs, and thus that composite codeword is assigned according to a predefined set of rules. *See Girod Tr. at 118:9 – 120:6.*
4. The method of claim 3, wherein said code words are Huffman code words.	The Liao Article also contains a table with a run-length substitution code that is a Huffman code that represent a run of W values (zero to nine zero values) followed by a B value (a "1" value). *See pg. 49:3-3, left and right columns, Run-Length Substitution section, Table 2 and pg. 49:3-6, Table 5.* Table 5 shows the frequency of each run-length and the Huffman length assigned to each run-length based on the frequency. In these tables, Huffman codes are formed from the prediction error values.	Chen discloses that the codewords assigned are Huffman codewords. *See pp. 228-229 and Tables 1 and II.*
8. A method for coding a signal for transmission at a reduced bandwidth, comprising the steps of:	The Liao Article a method for run-length coding for a facsimile signal quantized into a sequence of binary digits (1's and 0's) which directly represent black and white picture elements or prediction errors. *See pg. 49:3-1, left column, first paragraph of Introduction*. Thus, the Liao Article discusses bandwidth compression (bit rate reduction) bounds for run length coding of a sequence of binary digits or predictive error values.	Chen discloses a system and method wherein transform image coding (which was developed 15 years before 1984) may be used for bandwidth compression for video signals. *See 225-227.*
(a) transforming said signal into a sequence comprising zero coefficients occurring in runs and non-zero coefficients;	The facsimile image signal in Liao is transformed into a set of prediction error values. *See pg. 49:3-1, left column, first paragraph of Introduction*.	The Chen Article discloses that discrete cosine transforms (DCT) may be used to generate DCT coefficients that are quantized which results in zero coefficients and non-zero coefficients. *See pp. 225-227. See also Girod Tr. at 102:17-105:6.*
(b) deriving from said	The events (run-length of prediction	Chen derives a plurality of

US 4,901,075 CLAIM ELEMENTS	Liao Article	Chen Article
sequence, a plurality of events each comprised of a run of zero coefficients having a respective run length, which is preceded or followed by at least one non-zero coefficient, and	errors) are a message set for these prediction values as shown in Table 1 that have runs of W followed by B (a run of zeros followed by a "1"). *See pg. 49:3-2, left column, first paragraph of Maximum Entropy Lower Bound section and Table 1*.	events from the video signal and each event includes a run of zero coefficients and the value of the non-zero coefficient that precedes or follows that run. *See pg. 227-229*. *See also Girod Tr. at 115:9 – 116:3*.
(c) for each of said events, determining the run length and assigning a code word to represent said run length and said non-zero coefficient.	For the events, "The best code assignment will be the set of codes with the shortest average length, i.e., the minimum redundancy code. Huffman's coding is a systematic procedure for constituting such as code with minimum redundancy." *See pg. 49:3-1, left column, second paragraph of Introduction section*. The Liao Article also contains a table with a run-length substitution code that is a Huffman code that represent a run of W values (zero to nine) followed by a B value. (zero to nine zero values) followed by a B value (a "1" value) *See pg. 49:3-3, left and right columns, Run-Length Substitution section, Table 2 and pg. 49:3-6, Table 5*.	Chen assigns a sequence of bits that represents a particular event or events in accordance with a predefined set of rules. In particular, Chen assigns a sequence of bits to represent a run of zeroes followed by a non-zero coefficient comprised of a code word for the run-length prefix, a code word for the run length and a code word for the non-zero coefficient (*See pp. 228-229, Tables I and II.*) to form a composite code word that is a sequence of bits that represent a particular event or events in accordance with a predefined set of rules. Consider for example, the event of four zero coefficients followed by a non-zero coefficient equal to four (00004): According to Chen this event is represented by a sequence of bits as follows: First the run length prefix, 010, is included in the composite code word to indicate the beginning of the

US 4,901,075 CLAIM ELEMENTS	Liao Article	Chen Article
		run of four zeroes. (*See p. 228, Table I.*) Next, the Huffman code word for a run length of 4, 0101, is included in the composite code word. (*See p. 229, Table II.*) Finally, the Huffman code word for the non-zero coefficient with an amplitude of 4, 00001, is included in the composite code word. (*See p. 228, Table I.*) Thus the composite codeword that is a sequence of bits that represents the event 00004 is: 010010100001. This is true every time the event 00004 occurs, and thus that composite codeword is assigned according to a predefined set of rules. *See Girod Tr. at 118:9 – 120:6.*
11. The method of claim 8, comprising the additional steps of: determining whether the run length of each event exceeds a predetermined run length and if so, splitting said respective event into a plurality of sections so that each of said sections has a run length below said predetermined run length, and assigning a	The Liao Article discloses that in run-length substitution, "a fixed number of runs is picked from the entire message set." *See pg. 49:3-3, left column, first paragraph of Run-Length Substitution section*. The Liao Article further discloses that, "Runs without codes can be represented by two or more shorter runs with codes. For example, in Table 2, the run-length 4W is selected and 5W+B is not selected, the run 5W+B is substituted by 4W + (W+B)." *See pg. 49:3-3, left and right columns, first paragraph of Run-Length Substitution section and Table*	

US 4,901,075 CLAIM ELEMENTS	Liao Article	Chen Article
code word to each section.	*2*.	

III. STATEMENT POINTING OUT SUBSTANTIAL NEW QUESTION OF PATENTABILITY

Since claims 3-4, 7-8 and 11 of the Vogel patent are not patentable over the prior art references cited above for the reasons set forth above (the claims being anticipated by prior art and/or obvious over the prior art), a substantial new question of patentability is raised for each claim. Further, the prior art references cited above are material to the subject matter of the Vogel patent. In particular, these prior art references provide teachings not provided during the prosecution of the Vogel patent. Therefore, a substantial new question of patentability has been raised and reexamination is respectfully requested.

CONCLUSION

Based on the above remarks, it is respectfully submitted that substantial new question(s) of patentability have been raised with respect to claims 3-4, 7-8 and 11 of the Vogel patent. Therefore, reexamination of claims 3-4, 7-8 and 11 is respectfully requested.

Any fee due for this reexamination may be charged to Deposit Account No. 07-1896.

Respectfully submitted,

Dated: February 7, 2008

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EXHIBIT

I

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Ex Parte Reexamination Filing Data - December 31, 2007

1. Total requests filed since start of ex parte reexam on 07/01/81 ..... 9060[1]

a. By patent owner	3495	39%
b. By other member of public	5400	59%
c. By order of Commissioner	165	2%

2. Number of filings by discipline

a. Chemical Operation	2703	30%
b. Electrical Operation	3023	33%
c. Mechanical Operation	3334	37%

3. Annual Ex Parte Reexam Filings

Fiscal Yr.	No.	Fiscal Yr.	No.	Fiscal Yr.	No.	Fiscal Yr.	No.
1981	78 (3 mos.)	1989	243	1997	376	2005	524
1982	187	1990	297	1998	350	2006	511
1983	186	1991	307	1999	385	2007	643
1984	189	1992	392	2000	318	2008	165
1985	230	1993	359	2001	296		
1986	232	1994	379	2002	272		
1987	240	1995	392	2003	392		
1988	268	1996	418	2004	441		

4. Number known to be in litigation 2398 26%

5. Determinations on requests 8714

a. No. granted ..... 7998 ..... 92%

(1) By examiner	7885
(2) By Director (on petition)	113

b. No. denied ..... 716 ..... 8%

(1) By examiner	681
(2) Order vacated	35

[1]Of the requests received in FY 2008, 23 requests have not yet been accorded a filing date, and preprocessing of 3 requests was terminated for failure to comply with the requirements of 37 CFR 1.510. See Clarification of Filing Date Requirements for *Ex Parte* and *Inter Partes* Reexamination Proceedings, Final Rule, 71 Fed. Reg. 44219 (August 4, 2006).

6. Total examiner denials (includes denials reversed by Director) 794

a. Patent owner requester	439	55%
b. Third party requester	355	45%

7. Overall reexamination pendency (Filing date to certificate issue date)

a. Average pendency	24.0 (mos.)
b. Median pendency	18.6 (mos.)

8. Reexam certificate claim analysis:

	Owner Requester	3rd Party Requester	Comm'r Initiated	Overall
a. All claims confirmed	23%	29%	12%	26%
b. All claims cancelled	7%	12%	21%	10%
c. Claims changes	70%	59%	67%	64%

9. Total ex parte reexamination certificates issued (1981 - present) 6066

a. Certificates with all claims confirmed	1556	26%
b. Certificates with all claims canceled	636	10%
c. Certificates with claims changes	3874	64%

10. Reexam claim analysis - requester is patent owner or 3rd party; or Comm'r initiated.

a. Certificates - PATENT OWNER REQUESTER 2607

(1) All claims confirmed	592	23%
(2) All claims canceled	194	7%
(3) Claim changes	1821	70%

b. Certificates - 3rd PARTY REQUESTER 3313

(1) All claims confirmed	946	29%
(2) All claims canceled	413	12%
(3) Claim changes	1954	59%

c. Certificates - COMM'R INITIATED REEXAM 146

(1) All claims confirmed	18	12%
(2) All claims canceled	30	21%
(3) Claim changes	98	67%

EXHIBIT

J

United States Court of Appeals for the Federal Circuit

Median Time to Disposition in Cases Terminated After Hearing or Submission[1]

Docketing Date[2] to Disposition Date, in Months
FY 1999 - FY 2007

	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07	Overall Median per Origin
District Court	11.7	12.8	13.3	12.3	11.3	11.7	11.6	11.5	11.6	11.9
Court of Federal Claims	10.6	11.4	12.0	11.4	9.8	11.0	11.2	10.0	10.0	11.0
Court of International Trade	12.6	13.1	14.5	14.7	11.2	12.0	11.5	11.7	11.9	12.4
Court of Appeals Veterans Claims	9.1	10.6	11.3	12.9	10.6	10.0	9.9	8.4	8.4	10.1
Board of Contract Appeals	12.1	13.1	12.0	11.3	12.6	9.7	10.5	11.7	10.4	11.6
Department of Veterans Affairs	n/a	15.0	19.9	11.1	13.8	n/a	14.4	13.7	11.3	14.3
International Trade Commission	11.9	24.3	6.8	n/a	17.1	16.0	16.4	15.6	13.6	15.4
Merit Systems Protection Board	6.6	7.2	7.5	7.2	7.6	6.9	7.5	6.5	6.4	7.0
Office of Compliance	12.5	7.2	10.2	n/a	19.6	10.1	13.3	14.0	n/a	13.2
Patent and Trademark Office	9.3	10.0	10.6	10.7	9.5	9.6	10.3	10.0	9.6	9.9
Overall Median per Fiscal Year	9.8	10.1	11.2	10.5	9.6	10.0	9.9	9.3	9.1	

[1] Excludes cross and consolidated appeals, writs, and OPM petitions
[2] Calculated from Date of Docketing or Date of Reinstatement, whichever is later

EXHIBIT

K

UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF DELAWARE

- - - - - - - - - - - - - - - - - -x

U.S. PHILIPS CORPORATION, :

Plaintiff, :

vs. : Case No. 06-251-GMS

EASTMAN KODAK COMPANY, :

Defendant. :

- - - - - - - - - - - - - - - - - -x

Certified Copy

Palo Alto, California

Thursday, January 31, 2008

Videotaped Deposition of TOURADJ EBRAHIMI, Ph.D., held at the offices of Finnegan, Henderson, Farabow, Garrett & Dunner, 3300 Hill View Avenue, Palo Alto, California, commencing at 9:05 a.m., before Sharon Lancaster, a Certified Shorthand Reporter of the State of California.

basically, to the best of your ability, followed the legal standard you believe is set forth in paragraphs 23 and 24?

A. That is correct.

Q. Did you consider any other factors other than the factors set forth in 23 and 24?

A. I do not believe so.

Q. Are you aware, in patent law, that in deciding whether an invention is obviousness, one is supposed to also consider what are referred to as objective indicia or secondary considerations of non-obviousness?

A. Can you rephrase your question?

Q. Are you aware that under U.S. patent law, before you come to a conclusion or arrive at an opinion as to whether an invention is obvious, you are first supposed to look at objective indicia, also referred to as secondary considerations of non-obviousness?

A. I believe that I have -- I have been informed of that. And I believe it is also written maybe not with the terms and words you used, but it is in there.

Q. Where is it in there?

A. I will try to find it.

(Witness reviewing document.)

Okay. So here. The last few lines of paragraph 23 says, "I have further been informed that the inquiry as to whether a patent claim is obvious includes the steps of determining the scope and content of the prior art, determining the differences between the prior art and the claims, and determining the level of ordinary skill in the art. Against this background, the obviousness or nonobviousness of the claim is determined."

So my understanding is that the term that you used, that I have to -- you have to repeat to me -- is, in fact, part of determining the differences between the prior art and the claims issues.

Q. Actually, it's not. But let me just confirm this.

So you went through a three-step process in determining obviousness?

A. That is correct.

Q. You did not go through a four-step process?

A. I -- I do not think so.

Q. And the reason that you didn't go through a four-step process is you were never informed that there is a fourth step?

A. That I cannot confirm, because this is what I understood in my -- and put in my report. If they informed me or not -- if the message passed, I cannot know. But this is what I understood.

Q. Well, in paragraph 23 you indicate this standard that you applied came from counsel for Kodak; correct?

A. This is how I understood the information that was given to me from counsel for Kodak.

Q. So you asked them to tell you what the standard was, and to the best of your ability, you put it in down in paragraph 23?

A. This is my writing of what I received as information.

Q. So your understanding is it's a three-step process as opposed to a four-step process?

A. If you allow me, I have to look.

It will help me to answer to you if you tell

me what is the fourth step. But it is possible that I used it, but I do not know that I used it.

Q. Sure.

Before I mentioned the words "objective indicia of non-obviousness" in this deposition or "secondary indicia of non-obviousness," had you heard them before?

A. Well, you just told me that, and I couldn't repeat it. So it is possible that I heard it.

Q. But to the best of your knowledge, counsel for Kodak never informed you that you were supposed to consider objective indicia of non-obviousness or secondary considerations of non-obviousness?

A. I cannot confirm that. I just do not know the meaning of these words, and it is possible that it has been told to me. As I said, I have written in my own understanding, my own words, what are the steps.

Now, it is possible that one of the steps is what you are referring to in these terms.

Q. Well, for instance, in your claim charts -- take any of your claim charts for obviousness.

A. Yes, I'm -- one of them, yeah.

Q. Don't they all state the same analysis?

A. They follow --

Q. The witnesses are different, but isn't it identical for each of these 15 claim charts? Isn't that what you said?

A. These are, to the best of my understanding, the process I followed to field these charts.

Q. So, in other words, you looked at the differences --

A. Yes.

Q. -- and you said -- you concluded that they were predictable.

But nowhere in any of these claim charts and nowhere in the body the Exhibit 23 do you mention or take into account any secondary indicia or objective indicia of non-obviousness that may exist in this case; correct?

A. I cannot answer to you until I understand what is the meaning of these terms you use.

Q. Okay.

A. I'm not a lawyer.

Q. Correct. So you relied on counsel for Kodak

to tell you what the standard was?

A. This is obvious. Because I'm not a lawyer.

Q. Okay. So, for instance, were you informed by Kodak that you should consider, before you decide whether an invention is obvious: Whether it is commercially successful; whether the prior art teaches away from it; whether there were any unexpected results; whether the patent has been licensed; whether there has been professional approval of the invention; whether there has been copying of the invention; whether the invention fills a long but unsolved need?

Were any of those terms described to you?

A. Yes, in fact, some of them are familiar, and I have taken them into account. But if go one by one, I will tell you.

Q. Where in the report is any of that mentioned?

A. Yes. I can -- again, if you just -- if you just provide me words and like a machine gun tell me there's 200 words -- so give me one of them and the meaning, and I will try to find where they are.

Q. Licensing.

A. Licensing?

Q. Where is that mentioned in your report?

A. So my understanding of licensing is that I should have examined for the case of obviousness. This is what you say; right? For the case of proving obvious ness, I should show that any of the references has been licensed?

Q. No, that's not the standard at all.

A. So this is not something I --

Q. So obviously you didn't take it into account.

A. Sorry?

Q. So obviously you didn't take it into account.

A. No, I did not -- In this context of obviousness, I did not take it into account.

Q. Did you take into account whether there has been professional approval of the invention?

A. Yes. Because if I understand well what you refer to, when a patent is granted, there is a professional approval of a patent. And when a publication like Chen and Pratt is published, it has gone through review by peers, experts, a peer review. And so, therefore, what is in there has gone through the necessary steps of verifying its validity to a

reasonable degree.

Q. Do you understand that objective indicia had and secondary considerations apply not to the prior art but to the invention? You seem to be applying it to the prior art.

A. This is, I think, where the confusion is. So to the invention itself -- but this is a part of the -- I don't understand it should be part of the annex C. To the best of my understanding, I don't see that this is part of annex C.

Q. I agree. You didn't put it in annex C.

A. No. Yeah.

Q. And you didn't put it anywhere in your report.

A. Well, that I don't know, because we are just talk about that. My report is not annex C only. So I'm understanding -- trying to understand, rather, whether -- what is this fourth step that you are mentioning in the study of obviousness. That is what you told me.

Q. Yes. There is a fourth step --

A. Yes.

Q. -- that is well known, discussed in the case law, which involves: Before coming to a conclusion, you look at certain factors and facts, and you take those into account.

Now, nowhere in your report is there a mention of any of those. Is that because no one told you to take them into account?

A. I cannot tell you until you explain to me what they are.

Q. Well, I explained one of them; licensing.

A. Yes?

Q. Did you look into that?

A. Whether the Philips patent has been -- the Vogel patent has been licensed?

Q. Yes. Is that mentioned in your report?

A. It is not mentioned in my report.

Q. So you didn't take it into account?

A. It doesn't mean that I did not take it into account. It is not mentioned in my report.

Q. Did you make any attempt to find out if the patent was licensed before you came to these conclusions?

A. Personally, no.

Q. Okay. Let me move on to section E of your invalidity report on page 7.

A. I'm in section E.

Q. Now, your indefiniteness conclusion was based on Kodak's interpretation of the preamble of claims 3 and 8; Isn't that correct?

A. So, you are referring to terms for transmission at a reduced bandwidth and for transmission at a reduced bit rate?

Q. That's correct.

A. To the best of my knowledge, I took indeed these two in my report into account, these two terms, yes.

Q. Now, it's your understanding that in paragraphs 21 and 22 of the Court's order, the Court rejected Kodak's interpretation?

A. I am aware of that.

Q. And you're also aware that the Court, in paragraphs 21 and 22, indicated -- if you look at footnotes 20 and 22 -- actually, not even the footnotes. Let's look at paragraphs 21 and 22. The

UNITED STATES OF AMERICA)

ss:

STATE OF CALIFORNIA)

I, SHARON LANCASTER, CSR NO. 5468, Certified Shorthand Reporter, do hereby certify that the witness whose deposition is hereinbefore set forth was duly sworn and that the within transcript is a true record of the testimony given;

That the testimony of the witness and all objections made at the time of the examination were recorded stenographically by me and were thereafter transcribed by me or under my direction;

I further certify that I am not a relative or employee of any attorney or of any of the parties, nor financially interested in the action.

Dated this January 31, , 2008.

Sharon Lancaster

SHARON LANCASTER, C.S.R. NO. 5468

EXHIBIT

L

CONFIDENTIAL — OUTSIDE ATTORNEYS' EYES ONLY

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

U.S. PHILIPS CORPORATION, Plaintiff, v. EASTMAN KODAK COMPANY, Defendant.	)	Civil Action No. 06-00251-GMS

EXHIBIT I2:
TRIAL BRIEF OF DEFENDANT EASTMAN KODAK COMPANY

Defendant Eastman Kodak Company ("Kodak") submits its trial brief as of February 7, 2008. Kodak reserves the right to submit additions and revisions to its trial brief for any reason including without limitation after meeting and conferring with defendant Plaintiff U.S. Philips Corporation ("Philips") and after receiving the Court's rulings on the parties' respective motions *in limine*.

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Attorneys for Defendant

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MISCELLANEOUS

6 Del. C. § 2532 12

I. NATURE OF THE CASE.

This lawsuit arises out of efforts by Philips to enforce a patent it now alleges covers the JPEG Standard for still image compression. Although Philips' effort fails because the patent is invalid and not infringed, Philips' infringement claims in this lawsuit suffer from an even more fundamental defect because Philips failed to disclose U.S. Patent No. 4,901,075 during the JPEG standardization process despite having a duty to do so. Philips' conduct renders the patent unenforceable and also constitutes fraud.

The JPEG Standard is an international standard that has played a key role in the rapid growth of the digital imaging industry over the past 15 years. Since its formal adoption in 1992, hundreds of manufacturers worldwide have implemented the JPEG Standard in their products. Although it is difficult to pinpoint the worldwide revenue for all products incorporating the JPEG Standard, it is in the many billions of dollars. The widespread success of the JPEG Standard is largely the result of the universal understanding that it was and is an "open" standard, unencumbered by patents and free from royalty demands.

Philips' present claim that the '075 patent covers the JPEG Standard is directly at odds with its many years of conduct to the contrary. Philips was a member and an active participant in the standard-setting organizations responsible for setting the JPEG Standard. JPEG and its parent organizations are governed by specific policies that required its participants to disclose patents that they believed were relevant to the developing standard. Despite these written policies, despite verbal and written requests to disclose related patents, and despite patent disclosures made by other participants, Philips never so much as hinted to the JPEG committees that the '075 patent might be relevant to JPEG. Philips' silence misled other JPEG participants,

including Kodak, into believing that Philips did not have any patents that might be relevant to the standard.

Had Philips disclosed its current position regarding its patents during the standard-setting process, JPEG could have chosen one of the readily available alternative techniques for its standard. Similarly, had Philips disclosed its patent interests pursuant to the JPEG policies and made the excessive royalty demands it is now making, companies and entire industries would not have incorporated the JPEG Standard into their products. Instead, for nearly a decade after the JPEG Standard was published, Philips remained silent regarding the '075 patent. During that decade, industries and consumers worldwide became locked into the standard. To this day, despite asserting the patent against Kodak and others in various district courts throughout the United States, Philips has never disclosed the '075 patent to the relevant JPEG standards committees.

The evidence in this case establishes that Philips was well-aware of the '075 patent's purported applicability to JPEG during the standardization process. Indeed, the '075 patent's inventor, Peter Vogel, testified during his deposition that he prepared handwritten notes on a draft version of the JPEG Standard dated October 1991—one year before the JPEG Standard was first published. Dr. Vogel's handwritten notes specifically identify the '075 patent as applicable to the JPEG Standard. Dr. Vogel also testified that he sent the draft standard along with his handwritten notes to Philips' International Corporate Patents and Trademarks department. Dr. Vogel's handwritten notes and testimony establish that Philips, its employees, and its lawyers were all alerted to the '075 patent's purported applicability to the JPEG Standard. Nevertheless, Philips chose to remain silent both during standardization and for the decade following.

Philips' silence was contrary to the patent disclosure policies of the standards committees in which it participated and the expectations of other members of the JPEG standards committees. One of those members is Kodak, who also participated in the JPEG standardization process. As a pioneer in digital photography, Kodak had a significant interest in developing an international standard for still image compression. Like other members of the JPEG committees, Kodak relied on Philips' misleading silence during the JPEG standardization process and spent billions of dollars researching and developing products that implement the JPEG Standard, including digital cameras. Philips' attempted patent ambush in this lawsuit is unreasonable, unexcused, and has substantially harmed Kodak. Philips' conduct renders the '075 patent unenforceable and also entitles Kodak to damages.

II. CONTESTED FACTS TO BE ESTABLISHED AT TRIAL

The contested facts Kodak will establish at trial are set forth in Exhibit B.

III. KODAK'S DEFENSES AND COUNTERCLAIMS

A. Kodak Does Not Infringe the '075 Patent.

Kodak's noninfringement positions are set forth in Dr. Touradj Ebrahimi's expert report and deposition testimony.

A finding of infringement requires that every limitation of a claim be met, either literally or equivalently, by the accused device. *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 29 (1997). There can be no infringement if even one limitation of a claim or its equivalent is not present in the accused device. *Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 935-36 (Fed. Cir. 1987) (en banc). Philips asserts that the accused products and services infringe claims 3, 4, 7, 8 and 11 of the '075 patent by virtue of encoding images using the JPEG Standard's baseline mode. As such, the parties agree it is appropriate to compare the

asserted claims as construed by the Court with the JPEG Standard itself. Accordingly, the JPEG Standard does not infringe the claims of the '075 patent for at least the following reasons:

- Claim 3 (and dependent claims 4 and 7) of the '075 patent contains the limitation "video signal," which the Court construed to mean "a sequence of values that represents sequential and interdependent image frames that when rapidly displayed are capable of depicting movement." Claim Construction Order at 6 (D.I. 158). The JPEG Standard is for still image and not video compression as clearly evidenced by its title—"*Digital compression of continuous-tone **still images***." The JPEG Standard plainly does not describe encoding a "video signal" as construed by the Court and there is no literal infringement. Furthermore, still image signals are not equivalent to video signals, and the "video signal" limitation was added during prosecution of the '075 patent to overcome a prior art rejection. As such, Philips is not entitled to any range of equivalents. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki*, 535 U.S. 722, 723 (2002).

- All asserted claims of the '075 patent contain an "event" limitation, which the Court construed to mean "a run of zero coefficients and the value of the non-zero coefficient which immediately precedes or follows that run." Claim Construction Order at 3 (D.I. 158). The JPEG Standard does not derive the claimed event from the still image signals. Rather, JPEG derives two different symbols from the still image signal. The first symbol derived for encoding in JPEG is the run of zero coefficients and the category of the non-zero coefficient which follows the run, not the value of that coefficient as required by the Court's construction. The second symbol derived for encoding is the value of the non-zero coefficient which follows the run. Neither the first symbol nor the second symbol can be the claimed "event" as construed by the

Court. Accordingly, the JPEG Standard does not satisfy this limitation literally or under the doctrine of equivalents.

- Each asserted independent claim also contains the limitation "assigning a code word to represent said non-zero coefficient and said run length," which the Court construed to have its plain and ordinary meaning. Claim Construction Order at 2 (D.I. 158). The plain and ordinary meaning of assigning a code word to represent said non-zero coefficient and said run length involves assigning just one code word. In JPEG, the two symbols described above are assigned two different code words and, therefore, this limitation is not met literally or under the doctrine of equivalents.

- Dependent claims 4 and 7 contain the limitation "Huffman code word" which the Court construed to mean "a sequence of bits assigned to represent a particular event or events in accordance with a predefined set of rules with the following characteristics: (i) the code words may be of different lengths; (ii) no code word is a prefix of another code word; and (iii) the predefined set of rules strives to minimize the average code word length by exploiting the distribution of event probabilities." *Id.* If Philips takes the position that the two code words assigned to the two symbols encoded using the JPEG Standard are a single code word, that single code word is not a Huffman code under the Court's construction or its equivalent because in JPEG, code words for combinations of the same run length with different following non-zero coefficients can have the exact same length, even if the probabilities of that combination are different. Thus Kodak does not infringe either literally or under the doctrine of equivalents.

- Dependent claim 7 also contains the limitation "Huffman codeword is independent of the sign of that non-zero coefficient" which the Court construed to have its plain and ordinary meaning. *Id.* If Philips takes the position that the two code words assigned to the

two symbols encoded using the JPEG Standard constitute a single Huffman code word, that single code word is not a Huffman code word independent of the sign of the following non-zero coefficient or its equivalent under the plain and ordinary meaning of the phrase.

- Claim 11 requires that the run length of each section be below the predetermined length. The Court construed these limitations to have their plain and ordinary meaning. Claim Construction Order at 6 (D.I. 158). In the JPEG Standard, the run length of the run of zeroes followed by a non-zero coefficient is examined to see if it exceeds a length of 15. If the run length exceeds 15, a symbol is created with a run length of 15 followed by a non-zero coefficient of category 0. Thus, even if this symbol is the claimed "event" (and it is not), its run length is equal to the predetermined amount, not below the predetermined amount as claimed. Therefore, this claim is not infringed literally or under the doctrine of equivalents.

B. The '075 Patent Is Invalid.

Invalidity is an affirmative defense to a charge of infringement. *Festo Corp.* 535 U.S. 722. The analysis focuses on whether the properly construed claims of a patent comply with the requirements for patentability set forth in Title 35, United States Code and in particular the novelty requirements of 35 U.S.C. §102 and the non-obviousness requirements of 35 U.S.C. §103. In order to anticipate a claim under 35 U.S.C. §102, each element of the claim must be found in a single prior art reference. *In re Paulsen*, 30 F.3d 1475 (Fed. Cir. 1994); *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542 (Fed. Cir. 1983). The claims of a patent may be found to be obvious if the differences between the subject matter sought to be patented and the prior art is such that the subject matter as a whole would have been obvious at the time of the invention to a person of ordinary skill in the art. *See* 35 U.S.C. § 103. If no single prior art reference discloses all of the elements of a claim, the claim may nevertheless be obvious under 35 U.S.C. § 103

based upon a combination of references. *Cable Electric Prods. v. Genmark, Inc.*, 770 F.2d 1015 (Fed. Cir. 1985).

Kodak will establish, by clear and convincing evidence, that the asserted claims of the '075 patent are invalid because several different single pieces of prior art anticipate those claims (with each element of the claims being found in the prior art) and because a number of different combinations of prior art render the asserted claims obvious. More specifically, one or more of the asserted claims of the '075 patent are anticipated by five different pieces of prior art: (1) the Widcom VTC-56 codec machine; (2) U.S. Patent No. 4,698,672 to Chen et al; (3) a "Block Coding Using a Two-Dimensional Run-Length Table" paper published to the COST 211bis Simulation Subgroup; (4) U.S. Patent No. 4,420,771 to Pirsch; and (5) the "Scene Adaptive Coder" article by Chen et al. (the "Chen Article").

In addition, the asserted claims are obvious over a number of different combinations of prior art, including: (1) U.S. Patent No. 3,984,833 to Van Voorhis in view of the Chen Article; (2) U.S. Patent No. 4,316,222 to Subramaniam in view of the Chen Article; (3) U.S. Patent No. 4,363,036 to Subramaniam in view of the Chen Article; (4) U.S. Patent No. 4,092,676 to Saran in view of the Chen Article; (5) U.S. Patent No. 4,136,363 to Saran in view of the Chen Article; (6) U.S. Patent No. 4,494,151 to Liao in view of the Chen Article; and (7) the "Upper Bound, Lower Bound and Run-Length Substitution Coding" article by Henry Liao in view of the Chen Article.

C. Kodak Has Not Willfully Infringed the '075 Patent.

A finding of willful infringement requires "at least a showing of objective recklessness." *In re Seagate Tech., LLC*, 497 F.3d 1360, 1371 (Fed. Cir. 2007). Accordingly, to establish willful infringement, Philips "must show by clear and convincing evidence" that Kodak "acted

despite an objectively high likelihood that its actions constituted infringement of a valid patent." *Id.*

The evidence establishes that Kodak's actions were not objectively reckless. Kodak and Philips were members of JPEG, and were present at meetings where the patent disclosure policies were discussed. At these meetings and in various documents distributed to members, it was announced on a number of occasions that members were conducting patent searches and that the baseline JPEG Standard was believed to be patent-free. And Philips never disclosed the '075 patent to JPEG members like Kodak. Moreover, a digital camera patent search conducted by Kodak in 1998 did not reveal the '075 patent.

Later in 2002 when Kodak first received notice of the '075 patent, Kodak reasonably determined that the patent did not cover JPEG, was invalid and would be unenforceable as a result of Philips standards-setting abuses. Courts in Korea, Germany and the Netherlands have agreed with Kodak's assessment, finding the '075 patent's foreign counterparts either not infringed by JPEG, invalid or unenforceable. Finally, Kodak filed a petition for reexamination of the '075 patent on February 7, 2008. If approved, the PTO's finding of a substantial new question of patentability is further evidence that Kodak's actions were not objectively reckless. Philips cannot satisfy its burden to demonstrate by clear and convincing evidence that Kodak has willfully infringed the '075 patent.

D. The '075 Patent Is Unenforceable Based on Equitable Estoppel, Waiver, and Implied License Resulting From Philips' Standard Setting Misconduct.

Kodak will establish that the '075 patent is unenforceable in this case based on the doctrine of equitable estoppel. *A.C. Aukerman Co. v. R.L. Chaides Const. Co.*, 960 F.2d 1020, 1042-1043 (Fed. Cir. 1992). Members and participants of the various JPEG related committees

were required to disclose to their respective committees the existence of patents or patent applications relevant to any subject matter under consideration. These obligations attached to technology proposers and committee participants alike and applied even if the patent holder discovered the existence of a relevant patent after standardization was complete. These obligations arose not only from the relevant standards bodies' published patent statements, but also from numerous verbal and written requests by committee leaders for patent disclosure during promulgation of the JPEG Standard. *Rambus Inc. v. Infineon Technologies AG*, 318 F.3d 1081, 1098-99 (Fed. Cir. 2003).

Further, the conduct and expectation of the relevant committee members gave rise to a duty to disclose patents and patent applications. Numerous members of the relevant standards committees, including Kodak, made patent statements in accordance with the relevant disclosure policies and in response to specific disclosure requests. These members either disclosed known patents and/or patent applications and offered to license the same on reasonable and non-discriminatory terms or stated that the member was not aware of any relevant patents. Philips did neither. Given the cooperative environment of the standards-setting process, there was a wide spread expectation on the part of committee members that other members would simply act in good faith and timely disclose relevant patents. *Id.* Philips' own conduct in disclosing its patent applications in the context of MPEG (i.e. video compression) standardization—which was governed by the same rules as JPEG standardization—demonstrates Philips' knowledge and recognition of the aforementioned policies and obligations.

Despite its membership and participation in the JPEG related committees, Philips ignored its duties and never disclosed the '075 patent. Had Philips disclosed its purported belief that the '075 patent was applicable, JPEG could have chosen one of the other available techniques for the

standard. Instead, JPEG and Kodak relied on Philips' misleading conduct and chose a technique they believed to be royalty free. Kodak further relied to its detriment when it subsequently made substantial investments in products that practiced JPEG. Philips continued to mislead JPEG and Kodak when it remained silent for over a decade following JPEG's official publication in 1992 and while the entire digital imaging industry became locked into the standard.

JPEG and Kodak were robbed of the opportunity to pick an unencumbered technique for the standard, which they would have done had Philips disclosed. Kodak has also been harmed because it is forced to address Philips' infringement allegations 15 years following adoption of the JPEG Standard, after it has invested hundreds of millions of dollars in compliant products. Finally, Kodak has expended significant resources in defending Philips' patent infringement claims. The harm to Kodak is severe.

E. Philips Has Committed Fraud.

Fraud shares the common elements of misleading silence, reliance and harm with the defense of equitable estoppel—but with the added elements of (1) knowledge (or reckless indifference to the truth) and (2) intent. *Stephenson v. Capano Development, Inc.*, 462 A.2d 1069, 1074 (Del. 1983). Philips' fraud is established by at least the following facts: (1) Philips was a member of the standard-setting bodies involved in setting the JPEG Standard and attended numerous JPEG related committee meetings; (2) Those standards-setting bodies had policies requiring members to disclose patents that a member believed to apply to a standard; (3) While the JPEG Standard was being set, Philips analyzed a draft version and concluded that the '075 patent purportedly applied to the standard; (4) Philips chose not to disclose the '075 patent to JPEG; (5) Based on Philips' misleading silence, Kodak reasonably concluded that the JPEG Standard was patent-free and implemented the standard into its products; and (6) Philips

purposefully waited more than a decade until after Kodak had made a substantial investment in products using the JPEG Standard before asserting its patent. *Id.*

F. Negligent Misrepresentation.

Kodak will establish by a preponderance of the evidence that Philips made negligent misrepresentations regarding the '075 patent. Under Delaware law, a claim of negligent misrepresentation requires the same elements as fraud, yet a party need not demonstrate that the misrepresentation was made knowingly or recklessly. *In re Medical Wind Down Holdings III, Inc.*, 332 B.R. 98, 102 (Bkrtcy. D. Del. 2005). Through their participation in the JPEG committees and continued silence, beginning in 1987 and continuing on to this day, Philips misled their fellow participating members, including Kodak, into believing that they had no patents applicable to the JPEG Standard. Kodak justifiably relied on Philips' continued silence and chose to implement JPEG rather than pursue alternative, equally performing compression techniques. This reliance has subsequently damaged Kodak through accused infringement and potential damage liability that could have been averted.

G. Deceptive Trace Practices — 6 Del. C. § 2532 et seq.

Kodak will establish that Philips violated Delaware's Deceptive Trade Practices Act by a preponderance of the evidence. 6 Del. C. § 2532. The Delaware Deceptive Trade Practices Act is not solely limited to trademark actions. The Act forbids disparagement of the business of another by false or misleading misrepresentations of fact. *EDIX Media Group, Inc. v. Mahani*, 2006 WL 3742595, 12 (Del.Ch. Dec. 12, 2006). In the course of its business, Philips has made false and misleading allegations of fact that Kodak's products infringe the '075 patent. Philips' failure to disclose the '075 patent to the JPEG committee and failure to raise the patent with

Kodak before 2002 created a substantial likelihood of misunderstanding as to the applicability of the '075 patent to practice of the JPEG Standard and the products that implement it.

Through the pursuit of this litigation, Philips has disparaged Kodak's goods and services in alleging violation of the '075 patent. Kodak has been, and will be, harmed by Philips' deceptive trade practices and false assertions to the public that Kodak's products and services are infringing. Furthermore, Philips has acted in bad faith by maintaining continued silence to the JPEG committee by not disclosing the '075 patent and foreign counterparts and pursuing its patent ambush.

Finally, Kodak's claim of deceptive trade practices is not preempted by patent law. Philips' use of *Moore North America, Inc. v. Poser Business Forms, Inc.* is misplaced. Because Kodak has presented sufficient allegations of bad faith regarding Philips' failure to disclose the '075 patent, the state claim is not preempted. *Moore North America, Inc. v. Poser Business Forms, Inc.*, 2000 WL 1480992, 7 (D. Del. Sept. 29, 2000).

H. Laches.

Philips unreasonably and inexcusably delayed in filing suit from the time it knew or should have known of Kodak's alleged infringement. *Crown Packaging Technology, Inc. v. Rexam Beverage Can Co.*, 498 F. Supp. 2d 718, 726 (D. Del. 2007). In 1991, Kodak released the first digital professional camera, the Kodak DCS-100. The DCS-100 utilized JPEG image compression and was widely known and publicized. Publication of allegedly infringing activities starts the laches delay period. *Hall v. Aqua Queen Mfg., Inc.*, 93 F.3d 1548, 1552-1553 (Fed. Cir. 1996). In addition, files produced from Mr. Jan van der Meer, Philips' 30(b)(6) corporate designee, contained articles from the early1990s describing Kodak's JPEG based products.

Despite Philips' belief in 1991 that the '075 patent applied to JPEG and Kodak's widespread publication and sale of JPEG Standard enabled cameras, Philips delayed approximately 15 years before filing suit against Kodak on April 18, 2006. Because Philips' delay was greater than 6 years, its delay is presumptively unreasonable, inexcusable and prejudicial. *Crown Packaging,* 498 F. Supp. 2d at 726. During Philips' delay, Kodak invested many years and hundreds of millions of dollars into the design, development, manufacture and marketing of products compliant with the JPEG Standard. By the time Philips filed suit, Kodak and its customers were deeply locked in, making it no longer feasible for Kodak to abandon the JPEG Standard for an alternative compression technique. Further, relevant documents related to JPEG standardization and other issues that existed in the 1990's are now difficult to locate and many witnesses' memories have faded. Therefore Philips' unreasonable delay has resulted in both economic and evidentiary prejudice to Kodak, and Philips should be precluded from any damages occurring before April 18, 2006, when it filed suit. *Wanlass v. General Elec. Co.*, 148 F.3d 1334, 1337 (Fed. Cir. 1998).

I. Unclean Hands.

Due to Philips' fraud and deceit in connection with JPEG standardization as set forth above, Philips has unclean hands in connection with its assertion of the '075 patent against Kodak. *Princess Cruises, Inc. v. U.S.*, 397 F.3d 1358, 1369 (Fed. Cir. 2005).

IV. KODAK'S THEORY OF DAMAGES

Kodak's positions regarding Philips' claimed damages based on infringement of the '075 patent are set forth in detail in the expert report of Robert H. Wallace.

Assuming liability, Philips would be entitled to a reasonable royalty to compensate for Kodak's alleged infringement. 35 U.S.C. § 284. A reasonable royalty for a patent is that which

would have been agreed to in a hypothetical negotiation taking place on the eve of first infringement. *Rite-Hite Corp. v. Kelley Co.*, Inc., 56 F.3d 1538, 1554 (Fed. Cir. 1995). Here, Kodak's first allegedly infringing product (i.e., JPEG compliant) was the DCS 100 which Kodak brought to market in May, 1991. Because the evidence establishes that JPEG was seeking a royalty free technique for its baseline standard, had Philips asserted its patent in 1991 and demanded anything other than nominal fees, JPEG would have chosen one of the available alternatives. Specifically, IBM's arithmetic coding technique delivered equivalent or better performance than ADCT and IBM had offered to make all related patents available for a one-time fee of $15,000. Therefore, a reasonable royalty to Philips should be no greater than $15,000.

Assuming, contrary to the evidence, that JPEG would have knowingly included a patented technique subject to undetermined royalty fees into the baseline standard, a reasonable royalty calculated under the factors set forth in *Georgia-Pacific Corp. v. U.S. Plywood-Champion Papers Inc.*, 446 F.2d 295 (2d Cir. 1971) *cert. denied*, 404 U.S. 870 (1971), would not exceed $.05 per allegedly infringing product. This will be established at trial through expert and fact witness testimony and documentary evidence.

The evidence will further establish that Philips' royalty base figures are significantly exaggerated. A large percentage of the "intercompany sales" for which Philips seeks royalties involve products that were never manufactured, sold or imported into the United States. These products were shipped directly from manufacturing facilities abroad to Kodak's wholly owned foreign subsidiaries—transfers that do not constitute infringing sales. *See FAG (U.K.) Ltd. v. U.S.*, 24 F. Supp. 2d 297, 303 at n.5 (C.I.T. 1998); *see also Kearns v. Ford Motor Co.*, 726 F. Supp. 159, 163 (E.D. Mich. 1989).

In addition, Kodak has not willfully infringed Philips' patent and is therefore not liable for enhanced damages under 35 U.S.C. § 284. Nor is Philips entitled to attorney's fees and costs under 35 U.S.C. § 285. Indeed, to the contrary, Kodak is entitled to its attorneys' fees and costs based on Philips' standards setting misconduct.

Finally, Philips should be precluded from any pre-filing damages under the doctrine of laches. *A.C. Aukerman Co.*, 960 F.2d 1020. Philips is also barred from seeking any damages occurring prior to Philips providing notice to Kodak because of its failure to comply with the marking requirements of 35 U.S.C. § 287. And at the very least, any recovery by Philips is limited under 35 U.S.C. § 286 to any alleged infringement committed no more than 6 years prior to filing of the Complaint.

V. KODAK'S ANTICIPATED MOTIONS FOR JUDGMENT AS A MATTER OF LAW.

Based on the legal theories herein and subject to the evidence presented at trial, Philips anticipates moving for judgment as a matter of law regarding the following issues:

1. Noninfringement (either literally or under DOE) of at least claims 3, 4, 7 and 11;
2. Invalidity of each asserted claim under theories of anticipation or obviousness;
3. Unenforceability of the '075 patent based on Philips' standards-setting abuses;
4. Preclusion of pre filing damages on the grounds of laches;
5. Exclusion from the royalty base of any damages based on products not manufactured, sold or imported in the United States.

Kodak reserves its right to move for judgment as a matter of law on any other grounds as the evidence, or lack thereof, provides.