EXHIBIT D

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