United States District Court,
S.D. New York.

INTELLECTUAL PROPERTY DEVELOPMENT,
INC. Plaintiff.
v.
UA-COLUMBIA CABLEVISION OF WESTCHESTER, INC. and TELE-COMMUNICATIONS,
INC. Defendants.

No. 94 CIV. 6296(SS)

March 26, 1998.

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THE MARKMAN FINDINGS OF FACT AND CONCLUSIONS OF LAW

SOTOMAYOR**, D.J.**

Plaintiff Intellectual Property Development Corporation ("IPDC") maintains that defendant UA-Columbia Cablevision of Westchester, Inc. ("UA") directly infringed one or more claims of U.S Patent No. 4,135,202 ("the '202 Patent"). Plaintiff also claims that defendant Tele-Communications, Inc. ("TCI"), the largest cable system operator in the United States, caused UA and other cable systems which TCI indirectly owns or operates to infringe the Patent. The '202 Patent describes a wired broadcasting system in which a signal path between a central station and at least some of a plurality of subscribers includes an optical fiber. After a *Markman* hearing held on June 4, 5, 6, 10 and 18, 1997, the Court renders the following Findings of Fact and Conclusions of Law interpreting Claim 1 of the '202 Patent.

FINDINGS OF FACT

I. *The* '202 Patent

1. On January 16, 1979, U.S. Patent No. 4,135,202 (the " '202 Patent") entitled "BROADCASTING

SYSTEMS WITH FIBRE OPTIC TRANSMISSION LINES" issued to Albert E. Cutler ("Cutler"). (Defendants Composite Trial and Demonstrative Exhibit (hereinafter "Def. Comp. Exh. __") 1.)

3. The '202 Patent resulted from U.S. Patent Application Serial No. 05/528,849, filed December 2, 1974 (the "Original Application") and U.S. Patent Application Serial No. 05/666,267, filed March 12, 1976 (the "Continuation Application"). (Def.Comp.Exh. 2.)

4 The Original Application claims priority from U.K. Patent Application Serial No. 55933/73, filed on December 3, 1973, in the British Patent Office (the "U.K. Patent Application"). (Def.Comp.Exh. 22.)

5. Cutler filed several international applications deriving priority from and corresponding to the U.K. Patent Application, including the Original Application and an application filed in Canada (the "Canadian Application"). (Def.Comp.Exh. 3.)

6. The '202 Patent in its Specification describes two types of wired broadcasting systems which were known prior to the filing date of the Original Application. In the first, a plurality of television signals, frequency distinctive, were transmitted to subscribers over a single signal path, usually in coaxial cables, at frequencies in the VHF (very high frequency) spectrum, about 40 MHZ to 300 MHZ. (The '202 Patent, Def. Comp. Exh. 1 at Col. 1, ln. 10-16.) In an aerial system, the coaxial cable, a transmission line, is strung over telephones polls interspersed over great distances. (*See* Defendants' Responses to Questions 1-4 of the Court's August 19, 1997 Order at 11-16; Responses of Plaintiff IPDC to the Questions Raised by the Court's August 19, 1997 Order at Tab 3.) Repeater amplifiers and other signal processing devices designed to minimize the loss of signal strength are intermittently placed throughout segments of the cable path. (Id.) In the second system, a plurality of television signals were delivered over separate signal paths, usually on a plurality of twisted pairs of conductors, on the same nominal carrier frequency in the range of 2 MHZ to 20 MHZ. (Def Comp. Exh. 1 at Col. 1, ln. 9-26.)

7. The '202 Patent Specification identifies disadvantages with both systems. In the first, despite attempts at minimization, transmission losses are high and intermodulation in the repeater amplifiers is a problem because of the large number of signals to be amplified simultaneously. (Id. at Col. 1, ln. 27-31.) In the second system, crosstalk commonly occurs between the signals because each program is transmitted on its own individual conductive wire pair, bundled together in a common cable with many other pairs, and the programs are transmitted on the *same* carrier frequency. (Id. at Col. 1, ln. 32-37.)

8. To overcome the foregoing disadvantages, Cutler in his Patent Specification proposes four embodiments of a wired broadcasting system, each having optical fiber extending between an electro-optical transducer and a photo-sensitive detector.

a. The first system, shown in FIG. 1 of the Patent, includes an optical fiber arranged to extend over the whole length of the transmission path between the central station and at least some of the plurality of subscribers. (Id. at Col. 1, ln. 42-46.) In the event that the signals applied to the input line 9 are high frequency modulated carrier waves, the output signals provided by the photo-sensitive detectors 6, 7 may be of a form suitable for direct application to the television receivers 10, 11, if these receivers are of a type designed for use in high frequency wired broadcasting systems. (Id. at Col. 2, ln. 48-58.)

b. In the second system, shown in FIG. 2, the optical fiber extends between the central station and a distribution point, from which signals may be conveyed to a relatively small group of subscribers over

conventional conductive paths. (Id. at Col. 2, ln. 58-61.) Each distribution station is provided with a photo-sensitive detector 18, output signals from which are passed to a launching amplifier 19 from which a conductive network 20 extends to the receivers 21, 22. In this second system, the modulation signals applied to line 15 comprise high frequency modulated carrier waves. In this event, receivers 21, 22 could be of the kind then employed in high frequency wired broadcasting systems. (Id. at Col. 3, ln. 5-10.)

c. In the third system, shown in FIG. 3, a plurality of optical fibers may be provided to extend over the whole length of the transmission path between the central station and each of the plurality of subscribers. (Id. at Exh. 1, Col. 1, ln. 47-50.) The separate optical fibers extend to each subscriber 31, 32. Each subscriber is provided with program selecting means 33, 34 to which each of the optical fibers are connected and by means of which signals may be derived from a photo-sensitive detector associated with that optical fiber which carries the desired program signal. The desired signal from the program selection device 33, 34 is then applied to the associated television receiver 35, 36. (Id. at Col. 3, ln. 18-27.)

d. In the fourth system, shown in FIG. 4, a single optical fiber is arranged to extend between each of the plurality of subscribers and a program exchange from which subscribers may select by remote means one of a plurality of available programs. (Id. at Col. 1, ln. 62-66.)

9. The '202 Patent has five claims. Claim 1 is the only independent claim. Claims 2-5 depend from Claim 1.

10. Claim 1 recites:

A broadcasting system conveying signals by a signal path between a central station and a plurality of subscribers, comprising in combination, a common optical fibre in said signal path carrying signals to said plurality of subscribers from said central station, said fibre extending between an electro-optical transducer at said central station producing a light beam and photo-sensitive detector means at a reception position near the subscribers station, transmission means at the central station modulating the light beam for transmission through said optical fibre, said transmission means including modulation means producing a light beam modulated by a high frequency carrier which itself is modulated with video broadcast signals, conventional television receivers at the subscriber stations responsive to receive said high frequency carrier modulated with video broadcast signals, light beam demodulation means at said reception position responsive to said photo-sensitive detector means to convert said light beam into demodulated high frequency carrier radio wave signals modulated with video broadcast signals, and means coupling said demodulated signals from said reception position to said subscriber stations in a form suitable for direct application to said conventional television receivers without further signal processing.

(Id. at Exh. 1, Col. 4, ln. 6-31.)

11. Plaintiff maintains that Claim I reads on FIG. 2. Defendants instead insist that Claim 1 reads on FIG. 1. FIG. 2 is the system architecture most commonly used in the deliver of cable television today:

Zaslowsky: ...I can tell you that what is really going on here, and the reason you have got lawyers sitting at these tables can be summarized in three words: Hybrid fiber co-ax [co-axial].

* * *

Zaslowsky: .... That is the system [hybrid fiber co-ax] that is being offered all over today to deliver cable television to vast numbers of subscribers, and as its name connotes, it's a hybrid system. You use optical fiber in the equivalent of the trunk portion of an all co-ax system to bring a strong, clear signal relatively near a group of subscribers and then use a conventional tree-and-branch co-ax network to take the signal from the distribution point to the subscribers

(Zaslowsky Trial Tr. at 582-83. FN1)

FN1. "_____ Trial Tr. at _____" refers to the trial transcript page number of the designated witness or lawyer statement.

II. ***The Limitations Considered at the Markman Hearing***

12. For purposes of the *Markman* hearing, only the following limitations of Claim 1 of the '202 Patent-key language in *italics*-are at issue: FN2

FN2. Claims 1 and 5 have been asserted in the case. Claim 5 reads: "A system as defined in claim 1 including means at said central station conveying over said single optical fiber a plurality of programmes modulated on different carrier frequencies." Claim 5 by its terms depends from Claim 1, and neither party has addressed in their briefing or at trial a dispute with claim 5 that is separate from their interpretation disputes relating to Claim 1. Accordingly, this Court addresses only Claim 1.

(a) " *high frequency;* "
(b) "a *common optical fibre* in said signal path *carrying signals to said plurality of subscribers* from said central station, *said fibre extending between* an electro-optical transducer at *said central station* producing a light beam *and* photo-sensitive detector means at *a reception position near the subscribers station;* " and

(c) " *means coupling said demodulated signals from said reception position to said subscribers station in a form suitable for direct application to said conventional television receivers without further signal processing*."

III. ***The "High Frequency" Limitation***

A. "*High Frequency*" *as Used in* the '202 Patent

13. The phrase "high frequency" is used in three limitations in claim 1 of the '202 Patent:

(a) "said transmission means including modulation means producing a light beam modulated by a *high frequency* carrier which itself is modulated with video broadcast signals;"

(Id. at Exh. 1, Col. 4, ln. 16-19),

(b) "conventional television receivers at the subscriber stations responsive to receive said *high frequency* carrier modulated with video broadcast signals;" and

(Id. at Exh. 1, Col. 4, ln. 19-22),

(c) "light beam demodulation means at said reception position responsive to said photo-sensitive detector means to convert said light beam into demodulated *high frequency* carrier radio wave signals modulated with video broadcast signals."

(Id. at Exh. 1, Col. 4, ln. 22-25.)

13. The '202 Patent's Specification recognizes two types of pre-existing wired broadcasting systems operating at two different frequency ranges. With respect to the first system, the '202 Patent states that "the range of frequencies employed extends throughout the VHF spectrum, for example, from about 40-300 MHZ." (Id. at Col. 1, ln. 10-16). With respect to the second system, the '202 Patent states "the signals all have the same nominal carrier frequency somewhere in the range 2-20 MHZ." (Id. at Col. 1, ln. 16-26.)

14. The FIG. 4 embodiment of the '202 Patent includes a program exchange. In describing this embodiment, the '202 Patent states:

Control of each subscribers programme selection means at the programme exchange may be effected either over a conductive signaling path associated with his optical fibre or over an auxiliary optical fibre. The signals transmitted over the optical fibers may comprise a light beam modulated in respect of video frequency signals, one of more *high frequency* modulated carrier waves of different carrier frequency or a combination of video frequency signals and one or more *high frequency* modulated carrier waves.

(Id. at Col. 1, ln. 67 to Col. 2, ln. 8.)

15. In describing the embodiment of FIG. 1, the '202 Patent discloses three different signal formats which may be used to deliver the television signals: "The signals applied to the input line 9 may comprise [1] video frequency signals, [2] one or more *high frequency* modulated carrier waves of different carrier frequency or [3] a combination of video frequency signals and one or more *high frequency* modulated carrier waves." (Id. at Col. 2, ln. 48-52.)

16. In connection with the FIG. 1 embodiment, the '202 Patent further states that "[i]n the event that said signals are *high frequency* modulated carrier waves [*i.e.*, the second signal format] the output signals provided by the photo-sensitive detectors 6, 7, *may be of a form suitable for direct application to the television receivers 10, 11, if these are of a type designed for use in high frequency wired broadcasting systems*." (Id. at Col. 2, ln. 52-58 (emphasis added).)

17. Defendants maintain that high frequency as used in the '202 Patent must mean the frequency range of 2-30 MHZ. In support of this conclusion, defendants rely essentially on two main points.FN3 First, Cutler's employer, the Rediffusion Companies, understood and treated the Cutler's Patent as limited to an HF system in the range of 3-30 MHz. Second, Cutler told the Canadian Patent Office that high frequency as used in his claim was limited to 3-30 MHz, the internationally recognized radio frequencies of the Federal Communications Commission ("F.C.C.") and the Consultative Committee on International Radio ("C.C.I.R.") I disagree with the defendants' position and credit the plaintiff's position that high frequency as used in the '202 Patent would have been understood by a person skilled in the art to mean the VHF range, 54 to 216 MHz, received by conventional television receivers of the time.

FN3. During the prosecution of the '202 Patent on August 11, 1977, Cutler amended Claim 1 to recite "a

high frequency carrier in the range of 40-300 MHZ ". (Def. Comp. Exh. 2 at IPD 00154-159.) Just over one week later, on August 19, 1977, Cutler further amended Claim 1 by deleting "[in the range of 40-300 MHZ]" (deletion by amendment indicated by the bracketed material). In the "Remarks" accompanying the Amendment, Cutler stated that "[u]pon review of the Amendment filed August 11, 1977, it does not seem that the Specification would adequately support the *particular* frequency range stated." (Id. at IPD 00160-161 (emphasis added).) What Cutler meant by this amendment and retraction is unclear. Defendants maintain this statement means that Cutler was advising the Patent and Trademark Office that the reason for the deletion of the claimed range was that there was no written description or enabling disclosure in the Specification to support that range as required by 35 U.S.C. s. 112, para. 1. (Peterson Decl. p. 51, last paragraph, through p. 52, first full paragraph). From this, the defendants' expert, Taylor concludes that the range of 40-300 MHZ was not within the high frequency range. (Taylor Decl. para. 24.) Plaintiff's expert, Adelman, instead argues that Cutler retracted the frequency range of 40-300 MHZ in order to avoid the possibility of limiting his patent to a disclosed range of 40-300 MHZ when, without the amendment, the broadest definition of high frequency would apply to his Patent, possibly 30-300 MHz. (Adelman Decl. para. 16.) As conceded in the Defendants' Proposed Findings of Fact and Conclusions of Law, para. 25, however, under either interpretation of the Remarks, the Remarks standing alone do not definitely answer what "high frequency" means as recited in Claim 1.

B. ***The Rediffusion History***

18. Cutler's research leading to the '202 Patent arose from his employment as a research consultant the with the Rediffusion Companies in England. (Quinton Decl. para. 9.) Communications Patents Limited (CPL), Cutler's assignee of the '202 Patent, was "essentially a patent holding company for the Rediffusion Companies ." (Id. at para. 3). From about 1973 to 1986, almost all of Rediffusion's CATV television subscribers used an HF receiver or terminal unit rented to them by Rediffusion. (Id. at para. 7; Quinton Trial Tr. at 533, ln. 14 to 534, ln. 11.) This receiver received a frequency in the range of 3-30MHZ, hence the name HF receiver or "high frequency" receiver. (Quinton Decl. at para. 4.)

19. Ken C. Quinton, Director of Research at Rediffusion from 1974 to 1985 and Cutler's superior, understood the Cutler Patent to be limited to an HF transmission similar to the system utilized by Rediffusion. In the late 1980s, Quinton repeatedly recommended to CPL that no further annuities be paid on the Cutler Patents because they were limited to the 3-30 MHZ HF frequency range and therefore were outdated because HF technology "enabled an unacceptably limited number of channels." (Id. at para. 15.)

20. Although most of the Cutler patents throughout the world lapsed based upon Quinton's recommendation, the '202 Patent continued because the Patent issued about one year before the maintenance fee provisions of 35 U.S.C. s. 41(b) took effect. Similarly, the Canadian Cutler Patent was never subject to a maintenance fee and therefore never lapsed.

C. ***The Canadian Prosecution***

21. Cutler's Canadian counterpart to the U.S. Original Application was initially filed with substantially identical specification and claims as filed in the U.S. Original Application. *(Compare* Def. Comp. Exh. 2 at IPD 00027-33 *with* Def. Comp. Exh. 3 at 00017-23.).

22. In an initial Office Action of May 5, 1977, the Canadian Examiner rejected some of the pending 45 claims over prior art. (Def. Comp. Exh. 3 at 00006-7.)

23. In response, Cutler canceled Canadian Application claims 1-45 and added new claims 1-5, expressly stating that those new claims "*correspond to those being prosecuted in the United States*." (*Id*. at 9, ln. 16-18 (emphasis added).)

24. The Canadian Application's claims to which Cutler's comments were directed were substantially identical to the claims then pending in the U.S. The then-pending claims in the U.S. application were Application claims 1-3, 5 and 47 as amended through the Amendment of August 19, 1977. (Def. Comp. Exh. 2 at IPD 00160.)

25. Along with amending claim 1 as described above, Cutler argued that: "[b]y their amendment, applicants have completely redrafted the claims to define the invention more clearly. *The new claims are distinguished from the prior art which does not suggest H .F. carry a modulation*." (Def. Comp. Exh. 3 at 9, ln. 2-5 (emphasis added).)

26. The newly added claims were rejected in the next Canadian Office Action (dated March 7, 1978) over several references (*Id*. at 24-25), including the Grodner et al. Patent No. 3,751,670 (Def.Comp.Exh. 4) and Kell et al. Patent No. 2,506,672 (Def.Comp.Exh. 5) references that were likewise the basis for corresponding rejections in the U.S. Original and Continuation Applications. (*E.g.*, Def. Comp. Exh. 2 at IPD 00163 (Continuation Application claims 1-3, 5 and 47 rejected over Grodner *et al*. in view of Kell *et al*.).)

27. In an Amendment of May 31, 1978, Cutler amended the pending Canadian claims and submitted several arguments about the frequency spectrum:

Thus, as shown in the drawing, a central station 1 serves a plurality of subscriber stations 2, 3 by means of a common or shared optical fiber 4. Signals are electro-optically transduced into the fiber 4 at a central station transducer 5 to produce a light beam modulated by the usual *h-f carriers* received by standard TV receivers 10, 11. Thus, when the local demodulating transducers 6, 7 convert light modulation, the *h-f carriers* carrying TV programs are received in a standard way on receivers 10, 11. No converters are necessary to use the demodulated light waves, and the *h-f carriers* modulated side by side on the light waves do not produce noise beat interference as when mixed and heterodyned on a carrier as required in a wire cable transmission system to come within the cable band width capacity.

* * *

Grodner and Kell show systems "producing light beam modulated with video signals" as the Examiner states, but neither reference shows the use of a light beam modulated with an *HF carrier* which is itself modulated with a video signal.

* * *

... it is once again emphasized that none of the prior art documents. Nor indeed any obvious combinations thereof, provides an arrangement as defined in claim 1 of the present invention in which the individual subscribers are able to select different channels by using their ordinary television receivers and without the addition of complex de-multiplexing equipment. This result is only achieved by the novel features of the

invention, particularly the fact that the light beam is modulated by a high frequency carrier which itself it (sic) modulated with video broadcast signals. *This means that the light demodulator produces high frequency television signals similar to those which a standard TV receiver would receive from its aerial*. It is respectfully submitted this feature is not obvious over the prior art and constitutes a significant patentable advance in the art.

(Def.Comp.Exh. 3 at 27-29 (emphasize added).)

28. In an Office Action of July 4, 1978, Id. at 32-33, the Canadian Examiner again rejected the claims (which still paralleled those in the U.S. Application) over several references including the Walker No. 3,617,750 patent FN4 . (Def.Comp.Exh. 6).

FN4. Although the Walker '750 patent (Def.Comp.Exh. 6) was prominently relied upon by the Canadian Examiner and correspondingly distinguished at length by Cutler, Cutler never cited the Walker '750 patent to the U.S. Patent Office even though the U.S. and Canadian claims were nearly identical.

29. In response, Cutler again amended the claims and argued:

The Examiner supports his opinion by referring, for example, to Walker's system which he considers "includes a transceiver 11 to receive the *high frequency* RV [sic, "RF"] signal." It is pointed out that this statement is simply not correct, as Walker is concerned only with *broadband* systems and the Examiner's attention is directed to column 2, lines 52 and 53. These systems must be in the very high or ultra high frequency range in view of the bandwidth occupied by a single television signal. The F.C.C. official designation of frequencies classifies high frequency as covering 30 to 300 MHZ [sic 3 to 30 MHZ FN5] and classifies very high frequency as covering 30 to 300 MHZ. Thus, the system set forth by Walker is completely different in its conception from that of the present invention.

FN5. In a letter dated October 31, 1978, P.J. Allan, an attorney responsible for prosecuting Cutler's Canadian Application, advised Mr. Storey, a patent agent, that Cutler's submission included an error in identifying the high frequency range:
It seems that typewriters on both sides of the Atlantic are having difficulties in distinguishing between 3, 30 and 300 in that in the initial copy of the response high frequency was defined as covering 30-300 MHZ to distinguish from very high frequency which was defined as covering 30 to 300 MHZ! The error in the response has of course been dealt with.

(Def.Comp.Exh. 10.)
(Def. Comp. Exh. 3 at 35, ln. 6-17 (emphasis in original).)

30. Cutler also pointed out to the Examiner that the claims of the Canadian Application "correspond" to the claims of the U.S. Continuation Application, stating, "[i]t is pointed out to the Examiner, in this direction, that [while] the corresponding U.S. application now stands allowed *with claims corresponding* to those at present on file in the Canadian application, no patent has yet issued." (Id. at 36.)

31. Additionally, Cutler anticipated a possible rejection from the Examiner that "high frequency" as used in the specification simply meant a frequency high enough (*e.g.,* including VHF or 30-300 MHZ) to

accomplish television transmission rather than specifically meaning the 3-30 MHZ range. He advised the Examiner:

In anticipation of the Examiner's consideration that the term "high frequency" as used in the specification means any high frequency sufficiently high to cope with the transmission of television signals, the Examiner's attention is directed to page 5 of the disclosure as first filed, wherein lines 17 to 22, the sentence set forth forces a more precise interpretation of the term "high frequency". If the term "high frequency" is to be taken as covering the HF, VHF and UHF spectrum, the question naturally arises is "how can a television receiver be of a type which is *not designed* for use in high frequency wired broadcasting systems?". It is pointed out to the Examiner that there are currently two available types of wired CATV systems in widespread use, that is broadband systems such as form the majority of systems installed in North America and HF systems which have found wide application in for example, the United Kingdom. Obviously there are some broadband systems in the U.K. and some HF systems in the U.S. Persons experienced in the wired CATV business would not however fail to appreciate the significance of the term "high frequency". To exemplify the scale of HF cable systems it is pointed out to the Examiner that the present applicants serves many hundreds of thousands of subscribers. It is of course well known that optical fibers can be used for communication purposes with most interest being focused on the data transmission capabilities of such fibers. *The large bandwidth of optical fibers does however have obvious implications for broadband CATV systems and proposals have been made accordingly. No proposals had however been made prior to the present invention for applying optical fibers with their obvious broadband capabilities to HF-based systems.*

(Id. at 35-36.)

32. In the previous quotation, Cutler specifically directed the Examiner's attention "to page 5 of the disclosure as first filed, wherein lines 17 to 22, the sentence set forth *forces a more precise interpretation* of the term 'high frequency'." (Id. at 35 (emphasis added).) Page 5, lines 17 to 22 of the Canadian Application disclosure provides that "[i]n the event that said signals are high frequency modulated carrier waves the output signals provided by the photosensitive detectors 6, 7, may be of a form suitable for direct application to the television receivers 10, 11, if these are of a type designed for use in high frequency wired broadcasting system." (Id. at 49.) Identical language appears in the '202 Patent, but only in connection with the description of the embodiment of FIG. 1. (Def.Comp.Exh. 1, Col.2, ln.52-58.)

33. To further support his point, Cutler provided the Examiner with a copy of a chart setting forth the internationally recognized radio frequency designations as promulgated by the F.C.C. in 1943 and by the C.C.I.R.:

Radio Frequency Classification

Frequency in Kilocycles per Second (KHz)	*Frequency In MHZ*	Designations	Abbreviations
10-30	.01-.03	Very Low	VLF
30-300	.03-.3	Low	LF
300-3000	.3-3	Medium	MF
3,000-30,000	*3-30*	*High*	*HF*
30,000-300,000	30-300	Very High	VHF

300,000-3,000,000	300-3,000	Ultra High	UHF
3,000,000-30,000,000	3,000-30,000	Super High	SHF

(See Def. Comp. Exh. 3 at 37 and Def. Comp. Exh. 7.)

34. In response to these representations, the Examiner allowed claims 1-5 of the Cutler Canadian Application.

D. *The Court's Interpretation of "High Frequency"*

35. For the reasons to be discussed more fully, the Court does not agree that Rediffusion's belief or Cutler's belief as expressed in the Canadian Patent prosecution history controls what ordinary persons skilled in the art would have understood "high frequency" to mean in the '202 Patent. Instead, the Court finds that the use of the phrase "conventional televisions receivers" in connection with "high frequency transmissions" would have stated to a person skilled in the art that Cutler referred to a VHF system operating in at least a range of 54 to 216 MHz.

36. In the United States, since about 1973 to the present, conventional television receivers have uniformly been understood by people skilled in the art to receive signals over-the-air at VHF frequencies. (Lechner Reply Decl. At para. 8; *see also* Quinton Trial Tr. at 533, ln. 14 to 534, ln. 11.)

37. Defendants' expert, Archer S. Taylor, admits that at the time of Cutler's application in the 1973 time frame, conventional television receivers in the United States operated in the VHF band and some operated in the UHF (ultra high frequency) band, but no conventional television receivers had ever been capable of receiving signals in the HF range of 3-30 MHz. Few, if any, television receivers were available in the United States that operated in the HF band. (Lechner Reply Decl. para. 8; Taylor Trial Tr.at 393, ln. 12-19; Id. at 397, ln. 19-23.)

38. Moreover, as noted previously, the HF television receivers operated in England by Cutler's employer, Rediffusion, were generally known as HF terminal units and not as conventional television receivers. (Quinton Trial Tr. at 533, ln. 14 to 534, ln. 11.)

39. R.P. Gabriel, Chairman of Rediffusion, in two articles describing the HF system, distinguished between "conventional" and "standard" television receivers, with tuners, which receive VHF signals, and the "HF receiver" with no tuner. (*Compare* Def. Comp. Exh. 8 at T 20747 *with* T 20748; Pl. Comp. Exh. C at 101, 104, and 105.)

40. Even though Cutler amended Claim 1 during the prosecution history to refer to a singular high frequency carrier (Def. Comp. Exh. at IPD 00161), which singular use generally referred to a system comparable to the HF system operating with a a single frequency carrier within the range of 3-30 MHz (*see* Lechner Trial Tr. at 309-10), a person skilled in the art in the United States would still have understood a reference to a conventional television receiver in the claim to mean a VHF television receiver.

41. The U.S. prosecution history further supports this conclusion. In a February 4, 1976 Amendment, Cutler distinguished the Grodner Patent, U.S. Patent No. 3,751,670 (Def.Com.Exh. 4) on the basis that "Grodner teaches the modulation of the light beam to a frequency range that cannot be received directly by the

conventional T.V. receiver " but instead required a frequency converter and channel selector for each conventional receiver. (Def. Comp. Exh. 2 at IPD 00055 (emphasis added).) Grodner in turn described the "conventional TV set" used in his system as one that should be permanently tuned to " *VHF* commercial video channels which are unused under present allocations." (Def. Comp. Exh. 4 at Col. 6, ln. 48 to Col. 7, ln. 5.)

42. In a August 10, 1977 Amendment, Cutler further distinguished Grodner by arguing that in the Grodner patent, "signal frequency converters (54, etc.) are necessary to use the signals on a *standard TV set,* which was a "complexity resolved by the claimed system." (Def. Comp. Exh. 2 at IPD 00158 (emphasis added).) In short, Cutler was equating his conventional television receiver with Grodner's standard TV set, which operated in the VHF range.FN6

FN6. In the earlier part of the Canadian prosecution history, Cutler also distinguished the Grodner Patent by referring to his "patentable advance in the art" by a "light demodulator [which] produces high frequency television signals similar to those which a standard TV receiver would receive from its aerial." (Def. Comp. Exh. 3 at 27-29 (emphasis added).) VHF receivers had tuners and aerials, not HF receivers. Whether Cutler's decision to limit the MHz range of his Patent to 3-30 was necessary to distinguish himself from the Walker Patent, is an issue which may be pertinent to an obviousness over prior art defense but it is not pertinent to the *Markman* hearing because the Court finds that a reasonable person skilled in the art would have understood the term high frequency as used in the '202 Patent and prosecution history to refer to the MHz range received by a conventional VHF television receiver.

43. In his Appeal Brief, Cutler again distinguished Grodner and emphasized that in his, Cutler's, claimed invention, "the only tuner required is the standard TV tuner 60 [found in Grodner]." (Id. at IPD 00175.) As previously noted, the HF receiver had no tuner. (*See* Def. Comp. Exh 8 at T 20748; *see also* Lechner Reply Decl. at para. 15.)

44. In the United States at the time, persons skilled in the art would have known that the definitions of "high frequency" and "low frequency" as used in television broadcasting were context-based and not understood to mean the international radio frequencies. (*See* Lechner Reply Decl. at para. 17.) "Low frequency" or "high frequency" in television broadcasting and related activities were not understood exclusively to mean radio frequencies, but were understood to refer to frequencies that were relatively high or low compared to other frequencies. (Id. at para.para. 18-19.) High frequency was often used to refer to signals in standard television broadcasting, and those signals transmitted at the VHF and UHF ranges. (Id. at para. 19.) In various television related patents of the period contemporaneous with the Cutler Patent, the term "high frequency" was given a meaning outside the international radio frequency range and within the VHF range. (*See* Pl. Comp. Exh. E.) Published articles, textbook references, and web pages similarly used the term "high frequency" in a generic sense. (*See* Pl. Comp. Exh. F.) These materials clearly specified the frequency range the author intended by the use of high frequency and Cutler did not. A person skilled in the art, however, would have understood to look to the context of Cutler's use of high frequency within the claim and prosecution history to understand that Cutler, by referring to a "conventional television receiver ... responsive to receive said high frequency carrier modulated with video broadcast signals" meant the VHF range.

45. Unlike Cutler in his explanation to the Canadian Examiner and as the defendants argue, I do not find Cutler's use of the phrases "high frequency" and "conventional television receiver responsive to receive said

high frequency carrier modulated with video broadcast signals" to be redundant or circular. The use of "conventional television receiver" gave context and meaning to the phrase "high frequency."

46. Until he read the Canadian prosecution history, Archer Taylor, the defendants' expert as to the state of the art at the time, understood high frequency in the Patent to mean the VHF range. (Taylor Trial Tr. at 411.) Statements in other prosecution histories, like the statements in the Canadian prosecution, may help inform a Court's understanding of the state of the art at the time, but as extrinsic evidence they cannot change a natural reading and understanding of a claim in a patent. *(See* Tanabe Seiyaku Co. v. United States Int'l Trade Co., 109 F.3d 726, 733 (Fed.Cir.), *cert. denied,* 522 U.S. 1027, 118 S.Ct. 624, 139 L.Ed.2d 605 (1997); Markman v. Westview Instruments Inc., 52 F.3d 967, 980-81 (Fed.Cir.1995)(*en banc*), *aff'd,* 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). Here, Taylor's initial reading, and the Court's reading, is consistent with the plain meaning of high frequency as person's skilled in the art at the time would have understood the phrase to be used in the context and language of the Claim.

IV. ***The "Optical Fiber" and "Near" Limitation***

A. "*Optical Fiber" and "Near" as Used in* the '202 Patent

47. The optical fiber and near requirement as recited in Claim 1 of the '202 Patent states as follows:

a *common optical fibre* in said signal path *carrying signals to said plurality of subscribers* from said central station, *said fibre extending between* an electro-optical transducer at *said central station* producing a light beam *and* photo-sensitive detector means at *a reception position near* the *subscribers station*.

(Def. Comp. Exh. 1 at Col. 4, ln. 8-14 (emphasis added).)

47a. The Specification discloses two embodiments of the optical fiber:

If desired, the optical fibre may be arranged to extend over the *whole length* of the transmission path between said central station and each of the plurality of subscribers. In such an arrangement, a plurality of optical fibers may be provided extending over the whole length of the transmission path between the central station and each of the plurality of subscribers, each subscriber being able to select a desired programme signal on any one of the optical fibers by deriving the signals from a photo-sensitive detector associated with the said one optical fibre.

Alternatively, the optical fibre may extend between the central station and a distribution point from which the signals may be conveyed to a relatively small group of subscribers over conventional conductive paths.

(Id. at Col. 1, ln. 47-61)(emphasis added).)

48. With respect to FIG. 1, the '202 Patent states:

In the wired broadcast system shown in FIG. 1 a central station 1 is connected to each of a plurality of subscribers 2, 3, by means of an *optical fibre 4 extending between an electro-optical transducer 5 and a photo-sensitive detector 6, 7.*

(Id., at Col. 2, ln. 28-32 (emphasis added).)

49. With respect to FIG. 3, the '202 Patent states:

Turning now to FIG. 3, the system shown therein is arranged to provide two television programmes each distributed over separate optical fibre lines 23, 24. The signals applied to each of these lines are provided by electro optical transducers 25, 26, having associated therewith corresponding modulation amplifiers 27, 28, arranged to receive input signals over the lines 29, 30 and arranged with a central station 31. The separate *optical fibers extend to each subscriber 31, 32*.

(Id., at Col. 3, ln. 11-19 (emphasis added).)

50. With respect to FIG. 4, the '202 Patent states:

The arrangement of FIG. 4 is an alternative system to that shown in FIG. 3. In this arrangement *an optical fibre 37, 38, 39, 40, is arranged to extend between a programme exchange 41 and each of a plurality of subscriber installations 42, 43, 44, 45*.

(Id., Col. 3 at ln. 28-32 (emphasis added).)

51. With respect to FIG. 2, the '202 Patent states:

In the system shown in FIG. 2 a central station 12 is provided with an electro-optical transducer 13 modulated by the output signals of a modulation amplifier 14 which receives its input signals over the line 15. The resulting modulated light signals are passed over an optical fibre 16 to distribution stations one of which is shown at 17. Each distribution station is provided with a photo-sensitive detector 18, output signals from which are passed to a launching amplifier 19 from which a conductive network 20 extends to the receivers 21, 22.

(Id., at Col. 2, ln. 64 to Col. 3, ln. 4.)

52. None of FIGS. 1-4 of the '202 Patent depict a "common" optical fiber extending the whole length between an electro-optical transducer and a plurality of subscribers. Rather, in each of FIGS. 1-4, the optical fiber includes a horizontal segment from which vertical segments are "tapped." The horizontal and vertical segments of fiber are not "common" with one another. For example, in FIG. 1, the optical fiber is depicted by a horizontal fiber segment identified by numeral 4, and two separate vertical fiber segments leading to the subscriber stations.. (*See* Taylor Trial Tr. at 333-34 (conceding that subscribers in FIG. 1 have non-common optical fibers); Quinton Trial Tr. at 527-38 (same).) Similarly, in FIG. 2, the optical fiber is depicted by a horizontal fiber segment 16 and a single vertical fiber segment leading to the distribution station. The horizontal fiber segments in FIGS. 1 and 2 are not "common" with the vertical segments. Further, neither the Specification nor Claims define the term "near" as used in Claim 1 in relationship to the subscriber station. Thus, resort to the prosecution history is warranted to see if a specific or special meaning can be given to these terms from that history.

B. "*Optical Fiber*" *as Described in the Prosecution History*

53. As originally filed, Application claims 1, 2 and 4 recited:

1. A wired broadcasting system in which a signal path between a central station and at least some of a

plurality of subscribers includes an *optical fibre* extending between an electro-optical transducer and a photo-sensitive detector.

2. A system according to claim 1, wherein the optical fibre *extends over the whole length* of the transmission path between the central station and each of the plurality of subscribers.

4. A system according to claim 1, wherein the optical fibre *extends between the central station and a distribution point* from which signals may be conveyed to a group of subscribers over conductive paths.

(Def. Comp. Exh. 2 at IPD 00027 (emphasis added).)

54. On July 24, 1975, all 45 original claims were rejected over prior art patents. (Id. at IPD 00038-00040.)

55. After several subsequent amendments and arguments failed, Cutler abandoned the Original Application and filed the Continuation Application on March 12, 1976. (Id. at IPD 00110.)

56. In the Continuation Application, Cutler amended claim 4 as follows:

4. (Amended) A system according to claim 1, wherein the optical fibre extends between the central station and [a] distribution [point] means including said detector, and a conductive wire network between said distribution means and said subscribers [from] over which said demodulated signals may be conveyed [to a group of subscribers over conductive paths].

(Id. at IPD 00143 (additions underlined, deletions bracketed).)

57. In an Office Action dated May 26, 1977, the Patent Examiner again rejected Claims 1, 2, and 4. With respect to Claim 1, the Examiner stated:

Grodner et al shows all the claimed elements except for the common optical fiber for connecting a central station to the subscribers .... It is obvious that subscribers of Grodner et al can be connected to the central station (20, 12) by a common link because such connection is well known in distribution systems as shown in Kell et al (36 or 26).

(Id. at IPD 00149.)

58. At that time, Claim 4 (without bracketing or underlining for easier reading) was directed to the embodiment depicted in Fig. 2 and recited:

4. A system according to claim 1, wherein the optical fibre extends between the central station and distribution means including said detector, and a conductive wire network between said distribution means and said subscribers over which said demodulated signals may be conveyed.

(Id. at IPD 00143.)

59. With respect to Claim 4, the Examiner said:

Fuller et al.... shows a wire network for connecting subscribers to a distribution station by a "wire network".

To use a wire link for an optical link in Grodner et al is an obvious substitution since it is a mere substitution of one communication link by another.

(Id. at IPD 00150.)

60. Further, in responding to Cutler's remarks in the preceding Amendment, the Examiner stated: "[a]pplicant's invention appears to be utilizing optical links (fibers) in well known CATV distribution system. The use of optical fibers as a communication link is so common that it can be used in any type of communication systems." (Id. at IPD 00152-53.)

61. In response to this rejection, on August 11, 1977, Cutler made three simultaneous amendments to Claims 1 and 4. (Id. at IPD 00154-159.) Cutler amended the Claims by: (1) specifying in Claim 1 that optical fiber carries signals *to* the subscribers; (2) adding to Claim 1 the requirement that the direct application of demodulated signals to subscriber TV receivers occurs "without further signal processing"; and (3) canceling Claim 4, which was dependent on Claim 1 and specifically covered FIG. 2. (Id. at IPD 00154-156.) Before these amendments, Claim 1 specified that the optical fiber carries signals *for* the subscribers: "A wired broadcasting system in which a signal path between a central station and a plurality of subscribers includes a common optical fibre carrying signals *for* said plurality of subscribers...." (Id. at IPD 00142 (emphasis added).)

62. Along with these amendments, Cutler pointed out to the Examiner that he had misapplied Grodner to the claims, stating: "... the optical links [of Grodner] relied upon by the Examiner are only between the distribution station 12 and the subscriber and not between the central station and distribution station as in applicant's system." (Id. at IPD 00158, ln. 8-11.)

63. In an Office Action dated November 22, 1977, the Examiner issued a final rejection of all of the claims pending in the Continuation Application. (Id. at IPD 00162-165.) The Examiner responded to Cutler's characterization of how Grodner was being applied, stating: "[i]n claim 1, circuits 20 and 12 are read as the central station in Grodner et al." (Id. at IPD 163.) The Examiner further stated: "[i]t is noted from page 5 lines 10-11 of the remarks [in Cutler's Amendment, IPD 00158, 1. 10-11] that the optical links between the central station and distribution station are *not found* in any of the claims." (Id. at IPD 00165, ln. 7-10 (emphasis added).)

64. Item "20" is Grodner's central station and "12" is Grodner's distribution station. (*See* Def. Comp. Exh. 4, FIGS. 2B and 2D). The Examiner further stated: "[i]t is obvious the subscribers of Grodner et al can be connected to the central station (20, 12) by a common link such as an optical fiber (claims 1, 2, 47) because such connection and the use of optical fibers as light conductors are well known in distribution systems as shown in Kell et al (36 or 26)." (Def. Comp. Exh. 2 at IPD 163.)

65. From the foregoing, the Examiner appears to have regarded Grodner's central station 20 (FIG. 2C of Grodner) and Grodner's distribution center 12 (FIG. 2B of Grodner) as equivalent to the "central station" of claim 1. In the Appeal Brief in which Cutler appealed the final rejection of the claims of the Continuation Application, Cutler took exception with this, stating:

Claim 1 defines the optical transducer at the central station and the receiving detector at a reception position near the subscribers station, and further "means coupling said demodulated signals from said reception position to said subscriber stations." *This could only be interpreted to mean that the fiber is extended from*

the program source to the subscriber. Thus, the Examiner erroneously reads Grodner et al. by interpreting both the distribution station 12 and the signal source 20 are the "central station" applicant defines.

Accordingly, a different system mode is claimed than in Grodner et al., *namely one where transmission is completely from the signal source through a common fiber channel (the wire 10 of Grodner et al.) to the subscriber vicinity* and not only locally from a distribution station through a private light beam (14 in Grodner et al.).

(Id. at IPD 00179 (emphasis added).)

66. The '202 Patent issued following the Appeal Brief. (Id. at IPD 182.)

67. Defendants argue that in the foregoing quotation of the Appeal Brief described in paragraph 65 *supra,* Cutler distinguished his invention to the Examiner in two respects:(1) that the fiber of his claimed system extended entirely from the program source to the subscriber, and (2) that unlike Grodner (which Cutler admitted disclosed a fiber channel locally from a distribution station through a private light beam), the common fiber channel of his claimed invention extended completely from the signal source to the subscriber. Whereas, according to Cutler, Grodner disclosed signal transmission first over wire 10 (Def.Comp.Exh. 4, FIG.1) and then over a common fiber channel, Claim 1 by contrast was directed to signal transmission entirely over fiber (*i.e.,* no wire 10 as in Grodner). From this conclusion, the defendants argue that Claim 1 reads only on FIG. 1. I disagree and find that the plain meaning of Claim 1 reads more literally on FIG. 2.FN7

FN7. At trial, both parties' experts agree that a typographical error is contained in Claim 1 where the Claim recites "means at a reception position near the *subscribers* station." The defendants argue that "subscribers station" should read "subscriber's station", a reading consistent with their position that Claim 1 reads on FIG. 1. The plaintiff argues that the phrase should read "subscriber stations" in the same manner that Claim 1 uses "subscriber stations" in two other places, or, alternatively, the misspelling could simply be the omission of an apostrophe, i.e "subscribers' station." This reading supports the plaintiff's position that Claim 1 reads on FIG. 2. The Court is not persuaded by either party's argument. The parties arguments are circular, informed by their preferred choice of embodiments. The erroneous phrase can only be given meaning by the arguments directed to other portions of the Claim.

B. *The Court's Interpretation of the Optical Fiber and Near Limitations*

68. Claim 1 first recites "a common optical fiber in said signal path carrying signals to said plurality of subscribers from said central station." This phrase refers to an optical fiber, such as the optical fiber [16] in FIG. 2, which is common to the plurality of subscribers-that is, it belongs to or is shared by two or more subscribers. According to this phrase, the common optical fiber is *in* the signal path, which signal path carries the signals from the central station to the subscribers. The common optical fiber [16] in FIG. 2 is *in* the signal path which carries signals to subscribers. This conclusion also applies to FIG. 1. As noted in paragraph 52 *supra,* in neither FIG. 1 nor FIG. 2 is the optical fiber common to all the subscribers, only the signal path in which a common optical fiber is contained is common or shared.

69. Following this initial phrase, Claim 1 next recites "said fiber extending between an electro-optical transducer at said central station producing a light beam and photo-sensitive detector means at a reception

position near the subscribers station ...." This phrase first requires the fiber, *i.e.,* the common optical fiber, to extend between a transducer and a detector. As noted in paragraph 52 *supra,* however, in neither FIG. 1 nor 2 does a "common optical fiber" extend directly either to the subscribers or a detector. The common optical fiber, *i.e.,* the fiber that carries signals for a plurality of subscribers, extends between the transducer [13] and detector [18] in FIG. 2 by way of a vertical fiber that extends from the optical fiber [16] to the detector [18]. Similarly, the common optical fiber in Figure 1 does not extend between the transducer [5] and detectors [6] and [7], but is taken to the detector by an off-shoot fiber from the optical fiber. (*See* description in paragraph 52 supra.)

70. The phrase at issue then requires the detector to be at a reception position *near* the subscriber stations, as in FIG. 2. "Near" is not defined in the Patent or patent prosecution history.

71. Claim 1, however, uses "at" in four places, but "near" only once:

... a common optical fibre in said signal path carrying signals to said plurality of subscribers from said central station, said fibre extending between an electro-optical transducer *at said central station* producing a light beam and photo-sensitive detector means at a reception position *near* the subscribers station, transmission means *at the central station* modulating the light beam for transmission through said optical fibre, said transmission means including modulation means producing a light beam modulated by a high frequency carrier which itself is modulated with video broadcast signals, conventional television receivers *at the subscriber stations* responsive to receive said high frequency carrier modulated with video broadcast signals, light beam demodulation means *at said reception position* responsive to said photo-sensitive detector means to convert said light beam into demodulated high frequency carrier radio wave signals modulated with video broadcast signals, ...

(Def. Comp. Exh. 1, Col. 4, ln. 8-27 (emphasis added).)

72. The ordinary meaning of the word "near" is "close to" or "in the proximity of" and there is no indication that the word was intended to be given a different meaning in the Cutler Patent. The FIG. 2 embodiment of the Cutler Patent has a reception position "near" the subscriber stations.

73. Claim 1 continues to recite that the "means coupling said demodulated signals from said reception position to said *subscriber stations* in a form suitable for direct application to said conventional television receivers without further signal processing." (Id. at Col. 4, ln. 27-30.) Employing the ordinary meaning of these words, the "means coupling" couples demodulated signals from the reception position, *i.e.,* a *single* reception position, to the subscriber stations, *i.e.,* a *plurality* of subscriber stations. The only embodiment in which demodulated signals are coupled from a single reception position (where the photo-sensitive detector is located) to multiple subscriber stations is the embodiment shown in FIG. 2.

74. In contrast to the coupling in FIG. 2, the short wires depicted in FIGS. 1, 3, and 4 each couple demodulated signals only from a single detector to a *single* television receiver.

75. The "means coupling" element is expressed in means-plus-function form. Therefore, it must be interpreted as a corresponding structure disclosed in the Specification which performs the same function. *See* 35 U.S.C. s. 112; Valmont Industries, Inc. v. Reinke Mfg. Co.,, 983 F.2d 1039, 1042 (Fed.Cir.1993). As used in Claim 1, to a person of ordinary skill in the art, the structure disclosed in the Specification which couples demodulated signals from the reception position to the subscriber stations is the conventional

conductive network [20] in FIG. 2 and as described in the Specification at Def. Comp. Exh. 2, Col. 1, ln. 58-61, and Col. 3, ln. 1-4. In fact, defendant's expert, Archer S. Taylor, admitted at trial that without looking at the prosecution history after talking to the lawyers, he understood the means coupling to refer to the conventional conductive network described in the Specification. (Taylor Trial Tr. at 320, 322-24.)

76. Cutler's statement in his Appeal Brief that the work "near" and "means coupling" "could only be interpreted to mean that the fiber is extended from the program source to the subscriber" is troubling. (Def. Comp. Exh. 2 at IPD 00179.) Nevertheless, read in context, particularly the paragraph following this initial statement by Cutler, it is clear that Cutler was attempting to distinguish Grodner's light beam transmission from the distribution station to the subscriber with his system that ran a fiber from the program source "to the subscriber vicinity." (*Id*.) Thus, the defendants' attempt to read too much into Cutler's isolated statement in his Appeals Brief.

77. None of the foregoing discussion, however, answers what "near" actually means in the Patent. The Court, however, accepts the testimony of the plaintiff's expert, Lechner, that a person skilled in the art, an engineer, would understand that relative terms like "near" are common in patents. In the context used, "near" would be measured by a person skilled in the art by the performance criteria necessary to ensure that a strong signal with a reasonable number of channels could be brought to a small group of subscribers with minimum noise ratios and distortions. Accordingly, a person skilled in the art would understand that once geography was established and the number of subscribers established, "near" could mean the use of a conductive network with a relatively small number of amplifiers, *i.e.,* 2 or 3, necessary to reach the subscribers within the set performance criteria. (Lechner Trial Tr. at 272-76.)

V. ***The "Without Further Signal Processing" Limitation***

A. ***The "Without Further Signal Processing" Limitation in the Patent and its Prosecution***

78. As noted, Claim 1 describes the "without further signal processing" in the following context:

... means coupling said demodulated signals from said reception position to said subscriber stations *in a form suitable for direct application to said conventional television receivers without further signal processing*.

(Def.Comp.Exh. 1, Col.4, ln.27-31.)

79. FIGS. 1-4 of the '202 Patent each depict systems in which optical signals are demodulated by one or more photo-sensitive detectors. In FIG. 1, the photo-sensitive detectors are shown as elements 6 and 7, located at the subscriber's stations. In FIG. 2, the photo-sensitive detector is shown as element 18, located at the distribution station. In FIG. 3, the photo-sensitive detectors are shown as elements 33 and 34, located at the subscriber's stations. In FIG. 4, the photo-sensitive detectors are shown as elements 58, 59, 60 and 61, located at the subscriber's stations.

80. In each of FIGS. 1, 3 and 4 of the '202 Patent, the demodulated signals leaving the photo-sensitive detectors are shown as being directly applied to television receivers. In these figures, no other element or structure, like an amplifier, is shown between the photo-sensitive detectors (where the optical signals are demodulated) and the television receivers.

81. In FIG. 2, however, the detector is at the distribution center with a launching amplifier following it.

82. The only mention of the phrase "direct application" in the Specification of the '202 Patent is in connection with a description of FIG. 1, which specifies: "the output signals provided by the photo-sensitive detectors 6, 7, may be of a form suitable for *direct application* to the television receivers 10, 11 ...." (Id. at Col. 2, ln. 54-56 (emphasis added).)

83. The description of FIG. 3 simply states: "[t]he desired signal from the programme selection device 33, 34, is then *applied* to the associated television receiver 35, 36." (Id. at Col. 3, ln. 24-27).

84. The description of FIG. 4 states: "Each subscriber installation comprises a photo-sensitive detector 58, 59, 60, 61 from which signals may be *applied* to the associated television receiver 62, 63, 64, 65." (Id. at Col. 3, ln. 43-45).

85. The description of FIG. 2 does not speak of application to television receivers but describes the transmission of the signal from the detector, through a launching amplifier "from which a conductive network extends to the receivers." The description further states:

In this system it is convenient to arrange that the modulation signals applied to the line 15 [the line leading to the central station optical transducer] comprise high frequency modulated carrier waves. In this event, the launching amplifier 19 and [television] receivers 21, 22 may be of the kind presently employed in high frequency wired broadcasting systems.

(Id. at Col. 3, ln. 5-10.)

86. The phrase "signal processing" does not appear in the Specification of the '202 Patent. Rather the phrase "without further signal processing" first appeared in an amendment to Claim 1 following a rejection over Grodner in view of Kell. (Id. at IPD 00149 (rejection) and IPD 00155 (first appearance of "without further signal processing").)

87. In his Appeal Brief, Cutler stated the following about signal processing:

A TV broadcasting distribution system has one or more optical transmission fibers disposed from a central station to a reception position for carrying TV programs to a plurality of subscribers with a common fiber path and produces the synergism not present in wires or former light transmission systems of using standard TV receivers responsive to photo sensing detector demodulators *without requiring frequency conversion or any other signal processing* with less equipment and avoidance of inter-channel noise ....

Thus, as shown in the drawings, a central station 1 serves a plurality of subscriber stations 2, 3 by means of a common or shared optical fiber 4 .... Thus, when the local demodulating transducers 6, 7 convert light modulations, the r-f carriers carrying TV programs are received in a standard way on receivers 10, 11. *No converters are necessary to use the demodulated light waves* .

(Id. at IPD 00172 (emphasis added).)

88. Cutler further stated:

A tuner 38 [in Grodner] must be used at the distribution center 12 for channel selection and it is there that a single channel selected by the tuner is modulated at 40 on the line of sight light transmission channel

through the atmosphere via 42, 44. Each subscriber station 16 is then demodulated at 46, 48, 50 to produce a carrier which is frequency converted downwardly at 54 to provide a useable signal at TV receiver 62. *No such conversion is required in applicant's claimed mode*. Also a separate tuner 56 from that 60 of the TV receiver is required in the Grodner mode to convert to the TV channel to which the TV receiver is tuned. In applicant's claimed mode the only tuner required is the standard TV tuner 60.

(Id. at IPD 00175 (emphasis in original).)

89. With respect to Grodner, Cutler further argued that: "[i]n fact the light beam of Grodner et al. *requires further signal processing and* the *frequency converter* 54 omitted by applicant's system and claim 1." (Id. at IPD 00176 (emphasis added).)

90. In Grodner, FIG. 2A discloses a detector 48 and a demodulator 50, the output of which is connected to an amplifier 52. The amplifier 52 is connected to a frequency converter 54, which in turn is connected to a subscriber's TV receiver 62. Grodner's frequency converter 54, however, also includes a channel selector switch 56, "which is manually movable to select among the 20 video channels provided by the multi-channel program source 18," (Def. Comp. Exh. 4 at Col 6, l. 45-47), and a channel 3 module 58. Grodner describes the channel 3 module 58 in his Specification as

Using New York City as an example, the frequency converter 54 is provided with a module 58 which converts all signals from amplifier 52 (i.e. all subscription channels 1 through 20) to the assigned frequency for commercial channel 3.

(*Id*. at Col. 6, ln. 59-63.)

91. The only other element in Grodner between Grodner's demodulator 50 and subscriber TV receiver 62 is amplifier 52. (*Id*. at FIG. 2A.)

92. Amplifiers, frequency converters, filters, descramblers, equalization, temperature compensation, slope control, optimizing signal-to-raise ratio, signal level control, control of relative sound and picture signal levels, and interference suppression are generally considered signal processing devices. (Taylor Decl. para. 33 .)

93. Defendants argue that because Grodner showed only a frequency converter and an amplifier between the demodulator and the television receiver, "direct application to said conventional television receivers without further signal processing" in Claim 1 must mean without an amplifier, a signal processing device. According to defendants, only this reading is consistent with Cutler's argument that he eliminated "frequency converter and other signal processing" in his invention. I disagree.

B. *The Court's Interpretation of "Without Other Signal Processing"*

94. Claim 1 ends with the phrase "in a form suitable for direct application to said conventional television receivers without further signal processing." A plain reading of the Claim is that this phrase does not modify the means coupling, but necessarily modifies "demodulated signals," a reading with which defendants' witnesses agreed. (Taylor Trial Tr. at 345-46; Quinton Trial Tr. at 528.) That is, the signals as demodulated by the demodulation means must be in a form suitable for direct application to conventional television receivers without further signal processing. As long as the signals coming out of the demodulation means

(detector [18]) can be applied to a television receiver without further signal processing being required, this limitation is met. Thus, whether signal processing such as amplification is in fact performed after the demodulation occurs is irrelevant to the limitation set forth in the Claim.

95. The Court views Cutler's use of the phrase "without other signal processing devices" as his way of distinguishing his invention over Grodner, in which a frequency converter [54] and channel 3 module [58] were required to convert Grodner's demodulated signal to a television signal before application to a standard television set. Each time Cutler distinguished his invention he emphasized that his invention did not *require* these signal processing devices. (*See* paragraphs 87 and 88 *supra*.) Thus, as long as a system does not require these devices, *i.e*. had demodulated signals from the detection system which were in the proper form, the use of signal process devices does not prevent that system from reading on Claim 2.

CONCLUSIONS OF LAW

96.. This Court has jurisdiction over this action pursuant to 28 U.S.C. s. 1338, and venue is proper in this district under 28 U .S.C. s. 1391(b) and (c) and s. 1400(b).

97.. I adopt herein any Finding of Fact previously set forth which might more properly be deemed a Conclusion of Law.

98. Claim construction is a matter of law for the court to determine. *See* Markman v. Westview Instruments Inc., 52 F.3d 967, 980-81 (Fed.Cir.1995)(*en banc*), *aff'd,* 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996)

99. In interpreting a claim, a court first looks to the intrinsic evidence of record: the patent itself, including the claims, the specification and, if in evidence, the prosecution history, including prior art cited therein. *See* Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582-83 (Fed.Cir.1996).

100. In most cases analysis of the intrinsic evidence will resolve any ambiguity in the claim term. Id. at 1583.

101. The words of a claim are generally to be given their ordinary and customary meaning, unless the patentee chooses to state clearly in the specification or file history a special definition. Id. at 1582.

102. First, the words of the claims themselves are read to define the scope of the patented invention. *Id*. A technical term used in a claim is interpreted as having the meaning that it would be given by persons of ordinary skill in the art, unless it is apparent from the patent and prosecution history that the inventor used the term with a different meaning. *See* Hoechst Celanese Corp. v. BP Chemicals Ltd., 78 F.3d 1575, 1578 (Fed.Cir.1996).

103. Claims are read in view of the patent specification. *See* Markman, 52 F.3d at 979. The description in the specification serves as a dictionary which explains the invention and may define terms used in the claims. *See id*.

104. Finally, the court reviews the prosecution history, if in evidence, to help it understand the meaning of language used in the claims. *See id*. at 980. The prosecution history "is often of critical significance in determining the meaning of the claims." Vitronics, 90 F.3d at 1583. Arguments made during prosecution

regarding the meaning of a claim term are relevant to the interpretation of that term. *See* CVI/Beta Ventures, Inc. v. Tura LP, 112 F.3d 1146, 1155 (Fed.Cir.1997), *cert. denied,* 522 U.S. 1109, 118 S.Ct. 1039, 140 L.Ed.2d 105 (1998)(citing Southwall Techs. Corp. v. Cardinal IG Co., 54 F.3d 1570, 1579 (Fed.Cir.1995).) However, even the prosecution history cannot enlarge, diminish, or vary the limitations in the claims. Markman 52 F.3d at 980.

105. Extrinsic evidence, on the other hand, consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises. This evidence may be helpful to explain scientific principles, the meaning of technical terms, and terms of art that appear in the patent and prosecution history. Extrinsic evidence may demonstrate the state of the prior art at the time of the invention. *Id.*

106. Representations made to foreign patent offices in counterpart foreign applications may also assist in determining how a person skilled in the art would construe claim language. *See* Caterpillar Tractor Co. v. Berco, S.p.A., 714 F.2d 1110, 1116 (Fed.Cir.1983); *see also* Tanabe Seiyaku Co. v. ITC, 109 F.3d 726, 733 (Fed.Cir.1997); Liposome Co. v. Vestar, Inc., 36 U.S.P.Q.2d 1295, 1306 (D.Del.1994) (representations made to foreign patent office are relevant as to how one skilled in the art would read the words in a patent).

107. Extrinsic evidence, that is, any evidence other than the patent and the file history, cannot, however, vary the meaning of a claim that is established either by the claim itself or by the claim as correctly understood by reference to the specification and the file history. Vitronics, 90 F.3d at 1584; Markman, 52 F.3d at 979..

108. Dependent claims are also important in arriving at a proper interpretation of the claims. Claims must be construed, if possible, to sustain their validity. *See* ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577 (Fed.Cir.1984); *see also* Amhill Enters. Ltd. v. Wawa, Inc., 81 F.3d 1554, 1562 (Fed.Cir.1996). Evidence as to the scope of a particular claim can be found by review of other claims. *See* Fromson v. Advance Offset Plate, Inc., 720 F.2d 1565, 1570 (Fed.Cir.1983).

109. If the claims and specifications are unambiguous or if an analysis of the intrinsic evidence alone resolves any ambiguities in disputed claim terms, it is improper to rely on extrinsic evidence. *See CVI/Beta,* 112 F.3d 1153; Vitronics, 90 F.3d at 1583. It is also improper to use extrinsic evidence to *create* an ambiguity. *See* Markman, 52 F.3d at 981.

110. The Court may only consider extrinsic evidence such as expert testimony to help it interpret the meaning of technical terms as they are understood by those skilled in the art. *See* id. at 980-81. Because judges are usually not conversant in the particular technical art involved, extrinsic evidence may be necessary to inform the Court about the language used in the patent. *See* id. at 986. It is not ambiguity in the claim that creates the need for extrinsic evidence, but rather the Court's unfamiliarity with the terminology of the technical field. *See id.*

111. Expert testimony and other extrinsic evidence may not be used to vary or contradict the terms of the claims as understood from the intrinsic evidence. *See id.* at 981, 983. This is because the public is entitled to review the public record as represented by the intrinsic evidence to ascertain the scope of the claimed invention; allowing the public record to be altered or changed by extrinsic evidence destroys that right. *See* Vitronics, 90 F.3d at 1583. Even if a court decides to hear all the evidence-extrinsic as well as intrinsic-before construing a claim, expert testimony and other extrinsic evidence which is inconsistent with the

specification and prosecution history should be afforded no weight. *See* id. at 1584.

112, Except as documented in the prosecution history, the subjective intent of the inventor when using a particular term is of no probative weight in determining the scope of the claims. *See* Markman, 52 F.3d at 985; *see also* North American Vaccine Inc. v. American Cyanamid Co., 7 F.3d 1571, 1578 (Fed.Cir.1993)(scientific writings of inventor at time of invention held to be of no weight in construing claims). This is because it is not unusual to have a significant difference between what the inventor believes the patented invention to be and what the ultimate scope of the patent is after allowance. *See* Markman, 52 F.3d at 985.

113. Therefore, the focus in construing disputed claim terms is not the subjective intent of the inventor or others, but rather is always the objective test of what one of ordinary skill in the art at the time of the invention would have understood the terms to mean. *See* id. at 986. It is simply improper to search for the patentee's subjective intent not expressed in the patent or prosecution history. *See* id. at 987.

114. With these principles in mind and for the reasons fully discussed in my factual findings, I conclude the '202 Patent that a person of ordinary skill in art, after reviewing the '202 Specification and Claim 1, would most naturally read Claim 1 on Figure 2.

115. The Court is troubled by the either/or assumption of the two parties here that Claim 1 can read only either on FIG. 1 or 2. The language of Claim 1 is broad enough potentially to cover both figures and as the parties themselves have argued, Claims 2-4 are dependent claims and therefore, Claim 1 must read on them. As noted, both FIG. 1 and 2 have common optical fibers as that term is used in Claim 1. Similarly, in both figures, the demodulated signals can be coupled to conventional television receivers without requiring further signal processing. Claim 1 reads more naturally on FIG. 2 because the detector is at a reception position *near* the subscriber station, not *at* or *in* the station. Nevertheless, if near is understood by persons skilled in the art to be a relative terms as the Court has found and plaintiff maintains, then there is no reason why an embodiment, like FIG. 1, that fulfills the necessary performance criteria, could not be "at" a subscriber's station. Similarly, only FIG. 2 has a coupling *from* a singular reception position *to* plural subscriber stations and plural television receivers which is consistent with the language of Claim 1 that states "means coupling said demodulated signals from said reception position to said subscriber *stations* in a form suitable for direct application to said conventional television *receivers* without further signal processing". (Emphasis added.) Nothing in the Claim, however, suggests that a coupling from one reception position to one subscriber is prohibited by the Claim. If Claim 1 is broad enough to cover both figures, then the further limitations of Claims 2 to 4 as reflecting FIGs. 1, 3 and 4 would make sense. This reading would also eliminate any problem with the patent examiner's selection of FIG 1 to be printed in the Official Gazette because FIG. 1, dependent as it was on Claim 1, by necessity was consistent with the claim to be printed in the Official Gazette as required by the Manual of Patent Examining Procedure (" "MPEP") s. 1302.10. This too can account for Cutler's selection of selection of FIG. 1 in describing his invention in his Appeal Brief (*See* Def. Comp. Exh. 2, IPD 00172 and 179). Under this reading, Claims 2-4 would not be invalidated as a reading in the way either plaintiff's or defendants' readings would necessitate.

116. In any event, in accordance with the patent interpretation principles described above, the Court cannot use either prosecution history or extrinsic evidence to alter the plain and natural reading of the Claim and Specification. The requirements of Claim 1 that the detector be at a reception position *near* the subscriber station is most unambiguously satisfied by FIG. 2. Similarly, only FIG. 2 has a coupling *from* a singular reception position *to* plural subscriber stations and plural television receivers as Claim 1 requires. Thus,

even if the Court were to accept the defendants' argument that a presumption of correctness must be given to the selection of FIG. 1 for the Official Gazette pursuant to MPEP s. 1302 .10, the Court agrees with the plaintiffs that the presumption is rebutted by the plain meaning of the Claim. For similar reasons, Cutler's statements in his Appeals Brief cannot alter the plain meaning of a Claim as written. The Court does note, however, that some of the issues raised by defendants, including Cutler's treatment of Grodner, Kell and Walker in the patent prosecution history, do raise significant questions that will need to be addressed in the validity part of this case.

The parties are directed to attend a conference with the Court on April 15, 1997, 4:30pm, at Courtroom 14B, in order to discuss what other issues remain pending before the Court and what the future scheduling of discovery and trial preparation remain in this action. If any outstanding issues were the subject of letters to the Court before the *Markman* hearing, the parties are asked to combine the letters into one package and forward them to the Court ten days before the conference.

SO ORDERED

S.D.N.Y.,1998.
Intellectual Property Development, Inc. v. UA-Columbia Cablevision of Westchester, Inc.