United States District Court,
S.D. Indiana, Indianapolis Division.

TRILITHIC, INC,
Plaintiff.
v.
WAVETEK U.S., INC,
Defendants.

No. IP 97-0421 C M/S

Feb. 24, 1999.

Owner of patents related to detecting electromagnetic radiation leakage in cable television systems sued competitor for infringement. The District Court, McKinney, J., construed claim language.

Claims construed.

5,608,428, 5,633,582. Construed.

Lynn C. Tyler, Barnes & Thornburg, Indianapolis, IN, for Plaintiff.

John C. Altmiller, Kenyon & Kenyon, Washington, DC, for.

John C. Altmiller, Kenyon & Kenyon, Washington, D.C., Jay G. Taylor, Ice Miller Donadio & Ryan, Indianapolis, IN, for Defendant.

ORDER ON MARKMAN HEARING

McKINNEY**, District Judge.**

[1] [2] The plaintiff, Trilithic, Inc. ("Trilithic"), has filed suit against the defendant, Wavetek U.S. Inc. ("Wavetek"), alleging that Wavetek has infringed its 5,608,428 (the " '428 patent") and 5,633,582 (the "582 patent") patents. Trilithic also alleges that Wavetek has violated unfair competition law. When deciding whether a party has infringed a patent, the Court must first construe the claims of the patent and then compare the allegedly infringing device to the scope and meaning of the claims as determined by the Court. Genentech, Inc. v. Wellcome Found. Ltd., 29 F.3d 1555, 1560 n. 6 (Fed.Cir.1994). It is within the Court's jurisdiction to construe the claims of the patent, as the Supreme Court has affirmed that claim construction presents questions of law that are to be determined by the Court. Markman v. Westview Instruments, Inc., 517 U.S. 370, 390, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). When the Court construes the claims of the patents in question, the Court determines what is covered by the patents by examining the patents' claims, specifications, and prosecution histories.

In order to assist the Court in construing the claims, the Court held a Markman hearing on July 29-30, 1998. At this hearing the Court was able to gather extrinsic evidence, including expert testimony, that assists the Court in construing the claims in question. Isogon Corp. v. Amdahl Corp., 47 F.Supp.2d 436, 438-39 (S.D.N.Y.1998). Dr. Roy Silva ("Silva"), a professor of Electrical Engineering at Purdue University testified for Trilithic. In addition to publishing numerous articles in the field, Silva has taught courses in electronics, electromagnetism, and television and radio circuit design. Hearing Transcript ("Tr.") at 9-10. He has experience designing components that are used in cable television ("CATV") equipment and components for television receivers. *Id*. at 8-9. Wavetek presented the testimony of Mr. David Large ("Large"), a telecommunications consultant, in support of its contentions. *Id*. at 183. Large does consulting for companies in the cable industry and has been working in the cable television industry for over twenty-five years. *Id*. at 184. He has experience designing CATV test equipment and has received a patent for a piece of test equipment that is used to align the frequency response of CATV systems. *Id*. at 185. He is certified as a broad band communications engineer by the Society of Telecommunication Engineers and has published numerous articles. *Id*. at 186.

At issue in this hearing were the meanings of various terms found in Trilithic's '428 and '582 patents. The '428 patent describes Trilithic's invention as it relates to detecting electromagnetic radiation leakage as it either egresses from or ingresses into communication circuits. '428 patent, col. 1, ln. 1-3. The information is disclosed in the context of detecting leaks in a CATV system. Id. ln. 3-4. With the increased sensitivity of Trilithic's proposed system, the detecting instrument is able to detect lower level leaks or detect leaks from greater distances from the circuit than with the prior art systems. Id. ln. 64-66. Moreover, Trilithic's system does not require that a revenue generating circuit bandwidth be employed to tag a particular circuit with a circuit identifier. Id. ln. 59-62. The terms at issue in the '428 include "oscillator," "means for coupling," "amplitude modulator" and "detector."

The '582 patent provides for a combined signal level meter and leakage detector presented in one hand-held unit having a built-in antenna for leakage detection. '582 Patent col. 2, ln. 15-16. In the preferred embodiment, the description calls for maximizing the common circuitry between the two functions while keeping other portions appropriately separate in light of the circuit complexity, costs, the RF interference and other performance considerations. Id. The combined signal level meter and leakage detector is an improvement on the prior art because the multiple conversion receiving system is able to avoid receiver spurs by combined switching of multiple local oscillators and frequencies. Id.

I. Claim Construction

[3] [4] The purpose of construing the claims of a patent is to determine the meaning and scope of the patent claims that the plaintiff is asserting have been infringed. Markman v. Westview Instruments, Inc., 52 F.3d 967, 979 (Fed.Cir.1995). The focus of the court when it construes a disputed claim term is not the subjective intent of the parties when they employed a certain term, but the objective test of what one of ordinary skill in the art at the time of the invention would have understood the term to mean. Id. at 986. When the court undertakes its duty of construing the claims, it must first look to intrinsic evidence: the claims, the specification and the prosecution history. Markman, 52 F.3d at 979; Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996). Generally, the intrinsic evidence will provide sufficient information for construing the claims. Vitronics, 90 F.3d at 1583.

[5] [6] [7] The claims " 'particularly point out and distinctly clai[m] the subject matter which the applicant

regards as his invention.' " Markman, 517 U.S. at 373, 116 S.Ct. 1384 (citing 35 U.S.C. s. 112). When construing claims, the appropriate starting point for the court's inquiry is always with the words of both the asserted and nonasserted claims. Comark Communications, Inc. v. Harris Corp., 156 F.3d 1182, 1186 (Fed.Cir.1998); see Vitronics, 90 F.3d at 1582; *see also* Renishaw PLC v. Marposs Societa' per Azioni, 158 F.3d 1243, 1248 (Fed.Cir.1998). It is the claim, not the specification, that defines the scope of the patent and accordingly, the patentee's rights. York Prods. v. Central Tractor Farm & Family Ctr., 99 F.3d 1568, 1572 (Fed.Cir.1996); Markman, 52 F.3d at 970-71. As the Federal Circuit has recently noted, "[a]bsent a special and particular definition created by the patent applicant, terms in a claim are to be given their ordinary and accustomed meaning." Renishaw, 158 F.3d at 1249. The court further clarified that when there are several common meanings for a term, "the patent disclosure serves to point away from the improper meanings and toward the proper meaning." Id. at 1250. A claim will not automatically be given its common dictionary meaning if such a reading would be nonsensical in light of the patent disclosure. *Id*. Accordingly, the correct claim construction is the one that "stays true to the claim language and most naturally aligns with the patent's description of the invention." *Id*. A patent claim should be interpreted "only as broadly as its unambiguous scope." Ethicon Endo-Surgery, Inc. v. U.S. Surgical Corp., 93 F.3d 1572, 1581 (Fed.Cir.1996) (citing Athletic Alternatives, Inc. v. Prince Mfg., Inc., 73 F.3d 1573, 1581 (Fed.Cir.1996)).

[8] [9] [10] A patentee may be his or her own lexicographer and use terms in a manner different from their ordinary meaning. Vitronics, 90 F.3d at 1582. If the patentee chooses to do that, he or she must clearly state the special definition in the specification or file history of the patent. *Id*. The specification then serves as a dictionary when it defines terms, either expressly or by implication, that are used in the claims. *Id*. Therefore, it is important to review the specification in order to discern whether the patentee has used a term in a way that is inconsistent with its ordinary meaning. *Id*. As the Federal Circuit has noted, however, the specification should be used to clarify unclear claim terms, but the specification should not "trump the clear meaning of a claim term." Comark, 156 F.3d at 1187 (citing E.I. du Pont de Nemours & Co. v. Phillips Petroleum, 849 F.2d 1430, 1433 (Fed.Cir.1988)).

[11] The specification serves another important purpose. In the specification, the patentee must provide a written description of the invention that would allow a person of ordinary skill in the art to make and use the invention. Markman, 52 F.3d at 979. The applicable statute requires that "[t]he specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains ... to make and use the same ...." 35 U.S.C. s. 112, para. 1. Under the proper conditions, "drawings alone may provide a 'written description' of an invention as required by s. 112." Vas-Cath v. Mahurkar, 935 F.2d 1555, 1565 (Fed.Cir.1991). When evaluating whether the drawing has met the statutory requirement, it is essential that the court consider what the drawing conveyed to a person of ordinary skill in the art and determine whether the drawing conveyed to that skilled person that the patentee had in fact invented the invention recited in the claims. Id. at 1566.

[12] Claims must be read in light of the specification. Markman, 52 F.3d at 979. However, the Federal Circuit has made clear that limitations from the specification may not be read into the claims. Comark, 156 F.3d at 1186 (citing Sjolund v. Musland, 847 F.2d 1573, 1581 (Fed.Cir.1988)); *see also* Laitram Corp. v. NEC Corp., 163 F.3d 1342, 1347 (Fed.Cir.1998). The court should not limit the invention to the specific examples or preferred embodiment found in the specification. Texas Instruments, Inc. v. United States Int'l Trade Comm'n, 805 F.2d 1558, 1563 (Fed.Cir.1986); *see also* Comark, 156 F.3d at 1186. Thus, the "repetition in the written description of a preferred aspect of a claim invention does not limit the scope of an invention that is described in the claims in different and broader terms." Laitram, 163 F.3d at 1348; *see also*

Electro Med. Sys. v. Cooper Life Sciences, Inc., 34 F.3d 1048, 1054 (Fed.Cir.1994). Furthermore, the court cannot interpret the meaning of a word found in a claim by adding an extraneous limitation found in the specification. Laitram, 163 F.3d at 1348 (citing Intervet Am., Inc. v. Kee-Vet Lab., Inc., 887 F.2d 1050, 1053 (Fed.Cir.1989)). An extraneous limitation is a limitation added "wholly apart from any need to interpret what the patentees meant by particular words and phrases in the claim." Hoganas AB v. Dresser Indus., Inc., 9 F.3d 948, 950 (Fed.Cir.1993) (quoting E.I. du Pont de Nemours, 849 F.2d at 1433); see also Renishaw, 158 F.3d at 1249. Although there is a fine line between reading a claim in light of the specification and reading a limitation from the specification, the court must cautiously look to the specifications for assistance in defining unclear terms instead of assistance in limiting terms. Comark, 156 F.3d at 1186-87.

A final source of intrinsic evidence is the prosecution history of the patent. Vitronics, 90 F.3d at 1582. The history contains the complete record of the patent proceedings before the Patent and Trademark Office. *Id*. This means that the prosecution history contains both express representations made by the patentee concerning the scope of the patent, as well as interpretations of the patent that were disclaimed during the prosecution process. *Id*. at 1582-83; *see also* Southwall Tech. Inc. v. Cardinal IG Co., 54 F.3d 1570, 1576 (Fed.Cir.1995).

[13] [14] When construing claims, the court may consider extrinsic evidence only if after reviewing all the intrinsic evidence some genuine ambiguity still exists in the claims. Vitronics, 90 F.3d at 1584. As previously noted, generally, intrinsic evidence alone resolves the ambiguity of a disputed claim, and therefore extrinsic evidence cannot be used to resolve ambiguities. *Id*. In fact, the Federal Circuit has made clear that when the "public record unambiguously describes the scope of the patented invention, reliance on any extrinsic evidence is improper." *Id*. Extrinsic evidence includes expert testimony, dictionaries, and learned treatises. Markman, 52 F.3d at 979-80. Should the court be required to rely on extrinsic evidence and a claim is susceptible to both a broader and narrower meaning, if the narrower meaning is supported by extrinsic evidence and the broader meaning raises a question of enablement under s. 112, para. 1, the Court should choose the narrower meaning. Digital Biometrics v. Identix, 149 F.3d 1335, 1344 (Fed.Cir.1998).

[15] However, even though the court may not rely on extrinsic evidence to resolve ambiguities in its claim construction analysis, extrinsic evidence is often necessary for informing the court about the patent language. Markman, 52 F.3d at 986. The offer of extrinsic evidence allows the court to educate itself about the patent and the patent's relevant technology. Mantech v. Hudson Environmental Servs., 152 F.3d 1368, 1373 (Fed.Cir.1998). This type of information can assist the court in coming to the "correct conclusion." Markman, 52 F.3d at 980 (citations omitted). Thus, it is proper for the court to accept and admit extrinsic evidence, such as an expert's testimony, but then base its construction solely on the intrinsic evidence. Mantech, 152 F.3d at 1373.

Because it is the court's unfamiliarity with the patent's terminology and technology, and not the ambiguity of the terms that allows for the admission of extrinsic evidence, the court must be cautious in using that evidence only as an aid in its endeavor to understand the terms. Markman, 52 F.3d at 981, 986. It cannot be used to vary or contradict the terms of the claim. Id. at 981. Accepting expert testimony on technology is proper; relying on expert testimony concerning the proper construction of a disputed claim may be improper. Vitronics, 90 F.3d at 1585. The *Markman* decision warns that

[w]hen legal "experts" offer their conflicting views of how the patent should be construed, or where the legal expert's view of how the patent should be construed conflicts with the patent document itself, such a

conflict does not create a genuine fact nor can the expert opinion bind the court or relieve the court of its obligation to construe the claims according to the tenor of the patent.

52 F.3d at 983. The Federal Circuit has, however, taken special note of the use of dictionaries by the courts. In its *Vitronics* opinion, the court explained that although technical treatises and dictionaries are extrinsic evidence, judges are free to consult these resources at any time in order to get a better understanding of the underlying technologies. 90 F.3d at 1584 n. 6. The court continued with the statement that judges may rely on dictionaries when construing claim terms as long as the dictionary definition does not contradict the definition found in, or ascertained by, a reading of the patent. *Id*.

II. The 428 Patent

A. Oscillator

[16] In construing the claims in question, the Court first looks at the term "oscillator" found in the claims of Trilithic's '428 patent, specifically in claims 1, 8, 15, and 22. Those claims contain the element "an oscillator for generating at an oscillator output a signal having a frequency within the AGC bandwidth." '428 patent, col. 9, ln. 29-31; col. 10, ln. 8-10, 59-61; col. 12. ln. 1-2. Most of the remaining claims of the '428 patent contain the word "oscillator." *See generally* '428 patent. Both parties appear to agree that the term "oscillator" is given no special meaning in the claims, the specification or the prosecution history. Tr. at 91. Def.'s Post-Hearing Br. at 12. Therefore, the term should be given its ordinary meaning in the context of the '428 patent. Renishaw, 158 F.3d at 1249. Accordingly, it must be determined what a person of ordinary skill in the art would have understood that term to mean as it applies to the patent.

Conflicting testimony has been presented to the Court concerning the ordinary meaning of the term "oscillator." After testifying early on in the hearing that an oscillator is an instrument that produces oscillations, Silva presented a definition of oscillator from the *McGraw-Hill Dictionary of Scientific and Technical Terms* (" *McGrawHill Dictionary* ") as being an accurate, commonly understood definition of oscillator from a respected source. Tr. at 46, 88; Pltf.'s Ex. 9 at 1414 (*McGraw-Hill Dictionary of Scientific and Technical Terms* 1414 (5th ed.1994)). That dictionary defines "oscillator" as "[a]n electronic circuit that converts energy from a direct current source to a periodically varying electronic output." Pltf.'s Ex. 9 at 1414. Silva explained that such a definition was consistent with how an oscillator would be used with a heterodyning circuit or with a modulator. Tr. at 90. He stated that the definition was an accurate description of how a person of ordinary skill in the art would understand the term "oscillator." *Id*. at 91-93.

Wavetek suggests that Trilithic's definition from the *McGraw-Hill Dictionary* is too broad and is not the ordinary meaning that a person of ordinary skill in the art, reading the claims in the context of the '428 patent, would give the term. At the hearing, Large explained that a person of ordinary skill in the art would understand "oscillator" within the context of the '428 patent to describe "essentially one family of circuits which has some kind of a gain control or amplifier and has some kind of frequency sensitive feedback such that a portion of the output of the amplifier is fed back in phase to the input of at least one frequency." Id. at 214. Large submitted a definition of oscillator that defines oscillator as "a circuit that consists primarily of an amplifier in which some portion of the output is applied, in phase, to the input to produce a periodically-varying output." Id. at 243; Def.'s Dem. Ex. 18. This definition was derived from a description given in the *Encyclopedia of Electronics* (" *Encyclopedia* "), which reads:

an oscillator is a circuit designed specifically to produce electric oscillation. All oscillators use the feedback principle. Although there are many different types of oscillator circuits, they all consist basically of an

amplifier in which some of the output is applied, in phase to the input.... Specialized devices, such as the Gunn diode and the klystrom tube produce oscillation because of negative-resistance effects.

Def.'s Ex. 9 at 606 (*Encyclopedia of Electronics* 606 (2nd ed.)).

Large explained that the definition from the *Encyclopedia* came closest to how he believed a person of ordinary skill in the art would define oscillator. Tr. at 214-15. He modified the definition because there are oscillators that do not have a discreet amplifier or discreet feedback, though Large quickly noted that such oscillators would not be suitable for the '428 patent. Id. at 215. In response to Silva's remark that there is no evidence in the specification that the output of the low frequency oscillator depicted in Figure 1 is tied back into the input, Large commented that he would not expect to see internal parts of the oscillator, such as a feedback loop, depicted in a block diagram. Id. at 91, 219-20. Commenting on the awkwardness of such a definition, Silva did acknowledge that he would agree with the *Encyclopedia*'s definition if it read to the effect that an oscillator is either an amplifier with a positive feedback or a multi-vibrator, a negative resistance device, or an atomic standard oscillator which provides a periodically varying output. Id. at 153-54. Large acknowledged that his definition, which did not contain the word "all," could not be found in the patent claims, specification, file history, or in any dictionary or article. Id. at 243. According to his testimony, Large issued his opinion based on his understanding of the technology and how he believed the term would be interpreted by people of ordinary skill in the art. Id. at 259.

Finding additional fault with Large's proposed definition, Silva pointed out that specifically, frequency synthesizers, a type of oscillator, do not have feedback. Id. at 168. In response to that criticism, Large explained that while a frequency synthesizer may contain an oscillator output, the instrument in its entirety is not an oscillator. Id. at 221-22. Furthermore, he posited that an average equipment designer in 1993 or 1994 would not have considered using a frequency synthesizer for the low frequency oscillator in the context of the '428 patent. Id. Large also stated that direct digital synthesizers would not be considered an oscillator by a person of ordinary skill in the art. In an attempt to show that Large's understanding of oscillators was deficient, Trilithic directed Large's attention to an excerpt from a book and a product information sheet from Stanford Telecom. Id. at 257-59; Pltf.'s Exs. 90 & 91. Both documents referenced a direct digital synthesizer as a type of oscillator. Id. Large answered that although he had not researched such items when forming his definition, such evidence did not alter his opinion on the definition of an oscillator. Id.

Wavetek has attempted to make the issue of the "oscillator" claims one of whether the definition should include wording to the effect that oscillators generally have some portion of the output applied to the input. Both experts would likely agree that a person of ordinary skill in the art has a general idea of what an oscillator is. Trilithic has offered a more all-encompassing definition of an oscillator than has Wavetek. Trilithic's definition, though not stating that some oscillators work on the feedback principle, does not rule out such a conclusion. The Court does not accept the argument that a person of ordinary skill in the art would be so puzzled as to what an oscillator is or as to what type of oscillator to use in the context of the '428 patent that the term must be defined as operating on a feedback principle before a person of ordinary skill in the art would understand it. Accepting Silva's testimony as accurate, the Court interprets oscillator as "an electronic circuit that converts energy from a direct-current source to a periodically varying electronic output," thereby giving the term its plain and ordinary meaning. Such a reading is not disingenuous to the context of the oscillator's use in the '428 patent. The Court finds this definition from the *McGraw-Hill Dictionary* to be a reliable source for determining how a person of ordinary skill in the art would define the term "oscillator."

The Court notes that both experts agreed that the description of "oscillator" in the *Encyclopedia* was not exactly accurate. At Large's own admittance, his definition was not found in any patent, dictionary or article, and accordingly, is not as good of a source for an ordinary and plain definition of the term as is the definition from the *McGraw-Hill Dictionary*. Even assuming that Large is correct in his statement that a person of ordinary skill in the art would know that in many oscillators some portion of the input is applied in phase to the output, the person or ordinary skill can apply that knowledge in choosing an oscillator in the context of the '428 patent. There is no intrinsic evidence that suggests the term oscillator should not be given a broader definition.

The '428 patent is not concerned with the development of a specific type of oscillator. The testimony of both experts indicates that people of ordinary skill in the art know generally how an oscillator works, know that some run on the feedback principle, and know what types of oscillators could properly be used in the '428 patent. How an oscillator works is not the pertinent inquiry in reading this patent. The emphasis instead is on what an oscillator accomplishes. Therefore, the definition does not have to include a description of how an oscillator works. A person of ordinary skill in the art will know that and know how a particular oscillator will operate within the context of the '428 patent. Accordingly, it is enough in the context of this patent that the oscillator be given its plain and ordinary meaning, one that a person of ordinary skill in the art would give the term. The *McGraw-Hill Dictionary* definition, as given by Silva, meets that requirement.

B. Means-Plus-Function Language

When construing the remaining claims in question in the '428 patent, the Court must first determine whether the claims are written in a mean-plus-function limitation, an issue of dispute between the two parties. Once that determination has been made, then the Court can properly construe the claim. In order to utilize the means-plus-function limitation, the patentee must follow the statutory guidelines. Under 35 U.S.C. s. 112 para. 6,

[a]n element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specifications and equivalents thereof.

35 U.S.C. s. 112 para. 6. *See also* Greenberg v. Ethicon Endo-Surgery, Inc., 91 F.3d 1580, 1582 (Fed.Cir.1996) (holding that although a patentee may use purely functional language in the claim, the scope of that claim language is limited to the structure disclosed in the specification and its equivalents).

Once the specified function is identified, the court looks to the specification to define the structure, materials or acts corresponding to the claimed function. 35 U.S.C. s. 112, para. 6; Sage Prods. v. Devon Indus. Inc., 126 F.3d 1420, 1428 (Fed.Cir.1997). Recently, the Federal Circuit noted that

[a] structure disclosed in the specification is only deemed to be 'corresponding structure' if the specification clearly links or associates that structure to the function recited in the claim. *See* B.Braun Medical, Inc. v. Abbott Laboratories, 124 F.3d 1419, 1424 (Fed.Cir.1997). The duty to link or associate structure in the specification with the function is a quid pro quo for the convenience of employing s. 112 para. 6.

Kahn v. General Motors Corp., 135 F.3d 1472, 1476 (Fed.Cir.) *cert. denied* 525 U.S. 875, 119 S.Ct. 177, 142

L.Ed.2d 144 (1998); see also O.I. Corp. v. Tekmar Co., 115 F.3d 1576, 1583 (Fed.Cir.1997). The "means" term "is essentially a generic reference for the corresponding structure disclosed in the specification." Chiuminatta Concrete Concepts v. Cardinal Indus., 145 F.3d 1303, 1308 (Fed.Cir.1998). Therefore, "a determination of the corresponding structure is a determination of the meaning of the 'means' term in the claim," and thus the determination of the structure is a matter of claim construction. *Id.; see also* B.Braun, 124 F.3d at 1424-25.

[17] An exception to the rule that prohibits reading specification limitations into the claim applies to means-plus-function claims. Valmont Indus., Inc. v. Reinke Manufacturing Co., 983 F.2d 1039, 1042 (Fed.Cir.1993). When dealing with a means-plus-function claim, specific alternative structures mentioned in the specifications are included in the scope of the patent. Serrano v. Telular Corp., 111 F.3d 1578, 1583 (Fed.Cir.1997). The alternative structures must be specifically identified, not just mentioned as possibilities, in order to be included in the scope of the patent. Fonar Corp. v. General Elec. Co., 107 F.3d 1543, 1551 (Fed.Cir.) *cert. denied* 522 U.S. 908, 118 S.Ct. 266, 139 L.Ed.2d 192 (1997); CellNet Data Sys. Inc. v. Itron, Inc., 17 F.Supp.2d. 1100, 1104 (N.D.Ca.1998). Furthermore, claims that are written in means-plus-function format are also subject to the definiteness requirement of patent law. B. Braun, 124 F.3d at 1424-25. Therefore, if a patentee in effect fails to set out an adequate disclosure, the patentee has " 'in effect failed to particularly point out and distinctly claim the invention required by the second paragraph of section 112." *Id.* (citing In re Donaldson, 16 F.3d 1189, 1195 (Fed.Cir.1994)).

1. Means for Coupling

[18] When construing the claims in question, the Court first looks at the term "means for coupling" found in claims 1 and 15 of Trilithic's '428 patent. Trilithic argues that this element is a meansplusfunction limitation that covers the corresponding structure in the specification and its equivalents. In support of this argument, Trilithic directs the Court's attention to Figure 1 of the '428 patent and suggests that the lines and arrows between the relevant components represent the "means for coupling." Furthermore, Trilithic maintains that the figure reveals the corresponding structure to a person of ordinary skill in the art. Wavetek contends that Trilithic has failed to disclose a particular structure in its specification that corresponds to the claimed coupling functions in the claims. According to Wavetek, Trilithic has not provided a structural description.

In using the term "means for coupling," Trilithic has attempted to utilize the meansplusfunction limitation. The elements in Claims 1 and 15 contested by Wavetek specifically include "means for coupling the program source to the modulators," "means for coupling the terminal apparatus to the circuit," "means for coupling said one of the program material-modulated carrier frequencies to the program material-modulated carrier frequency input" and "means for coupling the oscillator output to the control input." '428 patent, col. 9, ln. 16-17, 23, 31-34; col. 10, ln. 45-46, 53-54, 61-65. Wavetek also questions the "means for coupling the carrier frequency signal sources to the modulators" element that is found in claim 15. '428 patent, col. 10, ln. 47-48.

The "means for coupling" elements at issue are written in meansplusfunction language, as the claims contain functional language to describe the function of the "means." The structure for the means is not disclosed in the claim language. Instead, in accordance with the meansplusfunction statutory requirements, the corresponding structure must be adequately disclosed in the specification. 35 U.S.C. s. 112, para. 6. As previously discussed, a drawing may meet the written description requirement of the specification. Vas-Cath, 935 F.2d at 1564. In turn, that drawing may serve as the disclosure of the structure that corresponds to the functional language of a claim. *See* Lockwood v. American Airlines, Inc., 107 F.3d 1565, 1572

(Fed.Cir.1997) (explaining that a patentee may show the required possession of an invention by descriptive means such as words, structures, figures, diagrams and formulas that fully set out the claimed invention). When determining whether a diagram is an adequate disclosure of a corresponding structure, the meaning of the diagram must be viewed from the point of view of a person of ordinary skill in the art. Trilithic points to Figure 1 of the specification as the disclosure of the corresponding structure that accomplishes the functional requirements. The specification reads "FIG. 1 illustrates a block diagram of a CATV system constructed according to the present invention. " '428 patent, col. 2, ln. 43-44. Following this description, the specification goes into greater detail concerning the diagram and its various components. Id. col. 2, ln. 62-col. 9, ln. 12. According to Trilithic, Figure 1 uses arrows to depict the "means for coupling" between the respective components.

Supporting its argument that the arrows in such a diagram adequately disclose a corresponding structure under s. 112, para. 6, Trilithic offered the testimony of Silva. He explained that a person of ordinary skill in the art who is familiar with the type of diagram found in Figure 1 would know that the arrows signify a means of coupling, for example, the program source and the modulator. Tr. at 63. Further, he explained that a person knowledgeable in the art would know what type of connector to use with a VCR, for example, because the person would know the frequencies coming out of the VCR and would know what type of coupling should be use to get good signal fidelity given those frequencies. *Id*. Silva was confident that a knowledgeable person in the art, such as an engineer or technician, would know that the arrows found in Figure 1 represent connections with coaxial cable ("coax"). *Id*. at 64. According to Silva, most of the disputed means for coupling could be done using coax, though he noted that depending on the frequency, other connections could be used in certain circumstances. *Id*. at 85, 92-93. For example, when connecting the low frequency oscillator to the variable attenuator, a different connection could be used because of the low frequency. *Id*. at 93. He admitted that the specification does not point out or limit how to couple, nor does it specify the use of coax. *Id*. at 154-55. However, Silva explained that a person of ordinary skill in the art would know the signal levels and frequencies involved with the component and from that knowledge, he or she is able to logically conclude what type of connection is proper. *Id*. at 63, 93, 155.

To reinforce Silva's testimony, Trilithic highlighted an article written by Large. Pltf.'s Ex. 20. In that article Large used a diagram, figure 4, depicting arrows between a VCR and a television but did not specifically identify the connection. *Id.;* Tr. at 267-68. When questioned about the diagram, Large made clear that he meant to show a physical connection between the VCR and the television and that a person of ordinary skill in the art would know he intended to connect the units because of the labeled output connectors on the VCR and the labeled input connectors on the television. Tr. at 268. Although he noted that for the purposes of the diagram the type of connector was not important, he suggested that the audio connection might have been copper wire or shielded wire and the VCR input/output would likely have been coax. *Id*.

Wavetek maintains that the issue as to these claims is not whether a person of ordinary skill in the art would know what type of connection to use but whether the specification identifies any particular structure that corresponds to the coupling function described in the claims. In support of this argument Wavetek presented the testimony of Large. He posited that Figure 1 of the '428 patent, a high level block diagram of a cable head end, does not convey structural details of the system that is depicted but only shows a general signal flow and the general interconnection. Tr. at 228. Large stated that the arrow between, for example, program source 10 and modulator 20, indicates to a person of ordinary skill in the art that the program source is being used as the modulation source for the modulator, but such information tells nothing about the structure used to couple the program source and modulator. Id. at 229. Acknowledging that the average equipment designer in 1994 could have determined some way to couple the program material source to the modulator,

Large emphasized that the '428 patent would be of no assistance in making that determination. Id. at 230. However, Large did agree that a person of ordinary skill in the art, especially one with head end design experience would be able to figure out how to connect a program source to a modulator, regardless of the type of program source, assuming that the type of source was one that is normally found in television head ends or cable television systems. Id. at 263. Moreover, he acknowledged that output modulators typically used in cable television systems generally require a coax connector. Id. at 269.

The specification adequately discloses a corresponding structure to the "means" functional language of the claims at issue. For example, the claims talk of a "means for coupling the program source to the modulators." The specification identifies the program sources and the modulators both in the body of the specification and in the diagram. '428 patent, col. 2, ln. 64-66. The arrows connect those two units. Although Large states that such arrows show only a signal flow or interconnection, the written specification states that the program sources "are coupled" to the inputs of the respective modulator. There is an indication through the words of the specification that the program source and the modulator are "coupled" and the only symbol that links those two units, so that they may be coupled, is the arrow. Accordingly, the connection for coupling is the structure that corresponds to the "means for coupling" language, and that structure is disclosed in Figure 1.

The meaning of the arrow is to be interpreted from the view point of a person of ordinary skill in the art. Such an arrow indicates to a person skilled in the art, and perhaps even a person not skilled in the art, that the program source and the modulator are somehow connected. When their testimony is closely examined, according to both Silva and Large, given the knowledge of the frequencies involved, the input and output requirements of the various units, and the fact that the specification is written in terms of a cable television system, a person of ordinary skill in the art would be able to determine what type of connector to use in order to fulfill that structure requirement. As Large's article demonstrates, the use of arrows can depict the physical connection of two units. When the claims and specification are read together in the context of this patent, a person of ordinary skill in the art knows what the arrows symbolize. If conventional features are disclosed in descriptions or claims and a "detailed illustration is not essential for the proper understanding of the invention," those features should be illustrated in the drawing by the use of a symbol or labeled representation. 37 C.F.R. s. 1.83. Trilithic does not have to specify what type of connector should be used. The arrow specifies that a connector is to be used and those of ordinary skill in the art can apply their specialized knowledge regarding the units that are to be connected in order to determine which connector to use.

2. Amplitude Modulator

[19] The parties also dispute the meaning of "amplitude modulator" as it appears in claims 15 and 22. Claim 15 reads "the improvement wherein the means for coupling one of the program material-modulated carrier frequencies in the circuit comprises an amplitude modulator having a control input, a program material-modulated carrier frequency input, and an amplitude modulated, program material-modulated carrier frequency output ...." '428 patent, col. 10, ln. 54-59. Trilithic asserts that the amplitude modulator is a structure, a device that "imposes on the envelope of the carrier, or on the amplitude of the carrier, a signal of interest." Tr. at 104. Therefore, Trilithic argues that no part of the clause in claim 15, nor the clause in claim 22, is properly interpreted as a means-plus-function limitation because the structure, the amplitude modulator, has been disclosed in the claim. Wavetek contends that the clauses should be construed under s. 112, para. 6, and accordingly, the Court should construe amplitude modulator as being limited to the variable attenuator disclosed in Figure 1 of the specification and its equivalent. Def.'s Br. on Claim

Construction at 22. Maintaining that claims should be construed consistently throughout the patent, Wavetek urges that amplitude modulator be given the same meaning in claim 22 as it is given in claim 15, even though it admits that claim 22 is not written in means-plus-function language. *Id*. at 22.

[20] Although it is not required that the word "means" be in used in the claim before s. 112, para. 6 can be utilized, the use of the term "means" is central to the Court's analysis. Greenberg, 91 F.3d at 1583-84; see Personalized Media v. International Trade Comm'n, 161 F.3d 696, 703 (Fed.Cir.1998). However, the use of the term "means" and particularly "means for" is so closely associated with the means-plus-function format that the use of such words generally invokes s. 112, para. 6, whereas other formulations generally do not. Greenberg, 91 F.3d at 1583-84; *see* Personalized Media, 161 F.3d at 703. Using the word "means" gives rise to a presumption that the inventor meant to invoke s. 112, para. 6, the mean-plus-function clause. Sage Prods., 126 F.3d at 1427 (citing York Prods., 99 F.3d at 1572). Failing to use the word "means" creates a presumption that s. 112, para. 6 does not apply. Personalized Media, 161 F.3d at 704.

These presumptions, however, are not always conclusive and may be rebutted by intrinsic and, at times, extrinsic evidence. *Id*. If a claim contains the word "means" but does not specify a corresponding function for the means, s. 112, para. 6 is not implicated. Sa ge Prods., 126 F.3d at 1427; *see also* York Prods., 99 F.3d at 1574. Similarly, if a claim uses the term "means" and describes a function but also "goes on to elaborate sufficient structure, material, or acts within the claim itself to perform entirely the recited function, the claim is not in mean-plus-function format." Sage Prods., 126 F.3d at 1427-28; *see also* Cole v. Kimberly-Clark Corp., 102 F.3d 524 (Fed.Cir.1996). Yet, if a claim does not contain the word "means" but is drafted as a function to be performed instead of a definite structure, s. 112, para. 6 is invoked. Mas-Hamilton Group v. LaGard, Inc., 156 F.3d 1206, 1214 (Fed.Cir.1998).

When the entire "means for coupling one of the programmed material-modulated carrier frequencies ..." clause of claim 15 is examined, the wording used by the patentee indicates that the clause was not written in means-plus-function form, even though the term "means" is used in the clause. '428 patent, col. 10., ln. 54-59. The intrinsic evidence overcomes the presumption established by previous case law. The claim states "the means for coupling one of the program material-modulated carrier frequencies in the circuit." Id. ln. 54-55. This language, standing alone would be functional language. However, the claim continues that the means for coupling "comprises an amplitude modulator having control input, a program material-modulator carrier frequency input, and an amplitudemodulated, program material-modulated carrier frequency output." Id. ln. 55-59. With that language the patentee disclosed within the claim a specific structure, an amplitude modulator, to support the "means for coupling" function. *See* Cole, 102 F.3d at 531.

In *Cole*, a case concerning a patent for disposable training pants, the Federal Circuit examined an element of a claim which read "perforation means extending from the leg band means to the waist band means through the outer impermeable layer means ...." *Id*. at 530. The Court determined that such language did not invoke s. 112, para. 6. *Id*. In coming to this conclusion, the court emphasized that the claim described not only the structure that supports the function but also the structure's location and extent. *Id*. at 531. The court commented, "[a]n element with such a detailed recitation of structure, as opposed to its function, cannot meet the requirements" of s. 112 para. 6. *Id*.

[21] Here, the language in the element of the claim clarifies that the means for coupling is composed of or consists of the amplitude modulator that specifically has a control input, a program material-modulated carrier frequency input, and an amplitude-modulated carrier frequency program. '428 patent, col. 10, ln. 57-59. An amplitude modulator is a structure which ordinary skilled people in the art understand to be "any

device which imposes amplitude modulation upon a carrier wave in accordance with a desired program." Pltf.'s Ex. 9 at 85 (*McGraw-Hill Dictionary*). What is required of the structure is set forth directly in the claim language. As in *Cole*, there is greater emphasis on the detail of the structure than on the detail of the function. The structure which corresponds to the means for coupling is disclosed in the claim, as are the required components for that structure. Because a specific structure has sufficiently been disclosed in the claim, s. 112, para. 6 is not applicable to this clause.

Nothing in the specification indicates that the patentee meant to give "amplitude modulator" a different or unusual meaning. In the specification, specifically in Figure 1, the patentee depicts the amplitude modulator as a variable attenuator. Wavetek requests that the claim be limited to variable attenuators. However, given that the claim is not written in means-plus-function form, the limitation from the specification should not be read into the scope of the claim. A person of ordinary skill in the art would know that a variable attenuator can perform the function of an amplitude modulator. Tr. at 104-106; Pltf.'s Ex. 22 (technical data for a Hewlett Packard Voltage Variable Absorptive Attenuator stating that when combined with input/output match it is useful in applications such as amplitude modulation). The Court will not limit the interpretation of this clause to include only the variable attenuator or its equivalents as disclosed in the specification. Additionally, the Court notes that both parties agree that the language of claim 22 is not means-plus-function language. The construction of amplitude modulator in claim 15 is also applicable to claim 22, and therefore, the amplitude modulator noted claim 22 is also not limited to a variable attenuator.

3. Detector

[22] [23] The parties also disagree as to whether the "detector" elements of claims 4, 8, 11, and 15 should be construed as structural or means-plus-function claims. Trilithic argues that the elements are written in structural form and that it has adequately described the detector structure. In contrast, Wavetek contends that "detector" is a generic term that fails to connote a structure, and therefore, the "detector" elements are written in terms of what a detector does instead of what a detector is. As a result, Wavetek believes the "detector" elements should be construed under s. 112, para. 6, as a means-plus-function limitation and accordingly limited to the leakage detector described in the specification and its equivalents. All of the listed claims read:

[t]he improvement of claim ... further comprising a detector for receiving a signal representative of leakage from the communication circuit, for extracting from the signal representative of the leakage the variably attenuated, program material-modulated carrier frequency, for detecting in the variably attenuated, program material-modulated carrier frequency the oscillator output signal frequency, and for producing an indication of detection of the oscillator output signal frequency.

'428 patent, col. 9, ln. 43-50.

In *Personalized Media,* the Federal Circuit reviewed an initial determination made by an Administrative Law Judge ("ALJ") of a patent regarding systems used in television broadcasting. 161 F.3d at 698, 700. The ALJ had determined that the claim limitation " a digital detector for ...", which appeared in all the asserted claims, constituted a means-plus-function limitation that needed to be construed under s. 112, para. 6. *Id*. at 700. After consulting dictionaries and determining that the definitions of "detector" and "digital" and "digital circuit" did not resolve the issue of whether the "digital detector" conveyed an ordinary meaning to a person of ordinary skill in the art, the ALJ determined that the specification lacked specific structure and was only described in functional terms. *Id*.

The Federal Circuit reversed the ALJ's decision and held that the "digital detector" limitation was a structural limitation and therefore not subject to s. 112, para. 6. *Id*. at 704. First, the court noted that because the limitation did not include the word "means," the presumption was that s. 112, para. 6 was not implicated. Then the court confirmed that neither intrinsic nor extrinsic evidence rebutted that presumption. *Id*. The court held that "detector" is not "a generic structural term such as 'means,' 'element,' or 'device'; nor is it a coined term lacking a clear meaning such as 'widget' or 'ram-a-fram.' " *Id*. Explaining that "detector" has a well known meaning to a person of ordinary skill in the art that is connotative of structure, the court reasoned that the definiteness of the "detector" structure is not detracted from because "detector" is neither defined by its functions nor "connote[s] a precise physical structure in the minds of those of ordinary skill in the art." *Id*. at 705. In coming to this conclusion, the court accepted the definitions the ALJ noted including " ' (1) a device for determining the presence of a signal; (2) a rectifier of high-frequency current; (3) a device for extracting intelligence from a signal; (4) DEMODULATOR 1.' " *Id*. at 705 n. 12. The court found the claim sufficiently conveyed to a person of ordinary skill in the art a variety of structures known as detectors, even though it did not describe a particular detector structure. *Id*. at 705. Placement of the word "digital" in front of "detector" did not alter the court's analysis, as it noted that "digital" only "further narrows the scope of those structures covered by the claim and makes the claim more definite." *Id*.

Faced with a claim similar to the one found in *Personalized Media,* the Court comes to a similar conclusion; the "detector" language in the disputed claims is not means-plus-function language. The claim language at issue here does not contain the word "means." Again, the Court notes the means-plus-function limitation presumption; if the word "means" is not used in the language of the claim, the presumption is that s. 112, para. 6 is not applicable. Here, the intrinsic evidence does not overcome that presumption. The claim does contain functional language. The detector will serve the function of "receiving a signal representative of leakage ... extracting from the signal .. the variably attenuated, program material-modulated carrier signal .. detecting ... the carrier frequency the oscillator output signal frequency and ... producing an indication of detection of the oscillator output signal frequency." '428 patent, col. 9, ln. 43-50; col. 10, ln. 23-30; col. 11, ln. 7-14; col. 12, ln. 18-25. However, using functional language does not automatically mean the claim is a means-plus-function limitation. As previously discussed, if the claim contains functional language, but also discloses the structure within the language of the claim, s. 112, para. 6 is not applicable. As the Federal Circuit determined in *Personalized Media,* "detector" has a meaning for those of ordinary skill in the art. According the *McGraw-Hill Dictionary,* a detector is "the stage in a receiver at which demodulation takes place; ... [a]lso known as demodulator, envelope detector." Pltf.'s Ex. 9 at 550. These definitions are similar to the ones accepted by the Federal Circuit in Personalized Media. See 161 F.3d at 705.

Wavetek's argument that without the functional language a person of ordinary skill in the art cannot determine the meaning of detector is misplaced for two reasons. First, the Court must look at the claim as a whole. Though both Silva and Large may have agreed that if the functional language was covered up, a person knowledgeable in the art may not know which type of detector to use, the fact remains that the functional language is there to assist a knowledgeable person in determining which type of detector would be appropriate. *See* Tr. at 155-56 (Silva), 226-28 (Large). Both experts acknowledged that upon reading the text of the claims in their entireties in the context of a patent, a person of ordinary skill in the art would know what type of detector is being referenced in the claims. Tr. at 98-99 (Silva), 272 (Large). Secondly, as the *Personalized Media* court noted, the use of the term "detector" indicates a structure, and the fact that the claim does not evoke a specific detector does not mean the patentee failed to disclose a structure. *See* 161 F.3d at 705. The term "detector" provides a sufficient description of a type of structure. The functional language that follows "detector" is not a detriment to the structural definition but instead narrows the scope

of possible applicable detectors, such as the term "digital" did in *Personalized Media*. *Id*. In fact, here the patentee has provided greater functional detail than did the patentee in *Personalized Media*. The claim discloses both a structure and the function of the structure and therefore may not be construed under s. 112, para. 6.

The plain and ordinary meaning of "detector" may apply to the claim because the specification does not provide an indication that any special meaning was to be given to the term "detector." The specification states that "[t]he detection system of the present invention will now be discussed with particular references to FIGS. 2a-c. FIG 2a illustrates to a substantial extent a presently commercially available SEARCHER+ leak detector available from Trilithic ...." '428 patent, col. 4, ln. 23-27. The specification continues to explain the detection system as noted in the figures. Though the claim needs to be construed in light of the specification, the description of the detection system as a leakage detection system does not limit the scope of the claims to a leakage detection system. The limitations from the specification are not to be imposed on the claims. Comark, 156 F.3d at 1186. Moreover, as was discussed, the "detector" claims are not in means-plus-function format and therefore are not limited to the corresponding structure of the leakage detector that is disclosed in the specification and its equivalents. A person of ordinary skill in the art would know that the SEARCHER + leakage detector described in the patent performs in the same manner as the detectors described in claims 4, 11, 18, and 25. Tr. at 99. The "detector" claims are structural claims and their scopes are not limited by the leakage detector description in the specification.

III. '582 Patent

A. Heterodyne Receiver Circuit, Common Heterodyne Receiver and Receiver

According to the parties, the prominent issues in dispute in the '582 patent are the meanings of the terms "heterodyne receiver circuit," "common heterodyne receiver" and "receiver," as those terms are used in claims 1, 26, 35 and 44. Trilithic maintains that those terms should be given their ordinary meanings, as such meanings are consistent with the dictionary definitions, as well as the use of the terms in the patent and in the prior art. According to Trilithic, the three terms are not interchangeable. Furthermore, Trilithic maintains that Wavetek's suggested definitions are incorrect as they violate the claim differentiation doctrine. In contrast, Wavetek maintains that the three terms are vague, generic terms that do not have an unambiguous definition that is consistent with the way the terms are used in the patent. Wavetek argues that the terms of the patent must be read in light of the specification and that the prosecution history should be examined in order to determine how a person of ordinary skill in the art would define the terms in the context of the patent. Highlighting that claim differentiation cannot broaden a claim beyond its proper scope, Wavetek contends that nothing in the specification provides a basis for construing the terms "heterodyne receiver circuit," "common heterodyne receiver" and "receiver" to have different meanings.

Trilithic urges that the terms "heterodyne receiver circuit," "common heterodyne receiver" and "receiver" be given their ordinary and well-understood meanings. Claim 1 of the '582 patent reads:

A combined signal level meter and leakage detector for a cable television system comprising: a CATV cable signal level input; a CATV leakage signal antenna; a heterodyne receiver circuit connected to said CATV cable signal level input and said CATV leakage signal antenna, said heterodyne receiver circuit having a greater sensitivity for CATV leakage measurement than for CATV cable signal level measurement; a detector having an input connected to said heterodyne receiver circuit; a processing and controlling circuit having an input connected to said detector .....

'528 patent, col. 10, ln. 61-col. 11, ln. 6. Claim 26 reads:

A method of measuring signal level and leakage in a cable television system comprising the steps: obtaining a CATV cable signal from a CATV cable; obtaining a CATV leakage signal radiated from the CATV cable using an antenna; supplying said CATV cable signal and said CATV leakage signal to a common heterodyne receiver; providing greater sensitivity for CATV leakage measurement than for CATV cable signal level measurement; demodulating the output signal of said heterodyne receiver; ....

Id. col. 12, ln. 66-col. 13, ln. 4. Claim 35 reads:

A cable television instrumentation system, comprising: a source of CATV signals; a cable distribution system connected to said source and carrying CATV signals; and a combined signal level meter and leakage detector coupled to said cable distribution system and compromising a) a CATV cable connector connected to said cable distribution system; b) a CATV leakage signal antenna in proximity to said cable distribution system; c) a receiver connected to said CATV leakage signal antenna, said receiver having greater sensitivity for CATV leakage measurement than for CATV cable signal measurement; ....

Id. col. 13, ln. 42-58. Claim 44 describes a cable television system comprising, among other things, "a receiver separately connected to said CATV cable connector and one of said CATV leakage antennas." '528 patent, col. 14., ln. 45-47. That receiver is to include a tuned preamplifier, at least one mixer for CATV signal level measurement, one mixer for CATV leakage measurement, one common mixer for CATV signal level measurement and CATV leakage measurement, an IF stage with a wide bandwidth for CATV signal level measurement and a relatively narrow bandwidth for CATV leakage measurement. Id. ln. 48-61.

Both parties agree that the term "heterodyning" refers to the process of beating two signals together in order to get the sum and the difference signals. Tr. at 118, 189. The parties also agree that the term "circuit" generally refers to a collection of components arranged in a loop that performs some type of function. Id. at 118, 191. Accordingly, Silva defined "heterodyne circuit: to be an electronic circuit that beats two frequencies together." Id. at 118. Silva then went on to offer a definition from the *McGraw-Hill Dictionary* for "heterodyne reception" which defines the term as "radio reception in which the incoming radio-frequency signal is combined with a locally generated RF signal of different frequency, followed by detection." Pltf.'s Ex. 9 at 929; Tr. at 119. The dictionary definition of "receiver" is "the complete equipment required for receiving modulated radio waves and converting them into the original intelligence ... or desired information ...." Pltf.'s Ex. 9 at 1661. Silva explained that under claim 1 of the '582 patent, the detector is separate from the heterodyne receiver circuit and is instead part of the receiver circuit. Tr. at 120. Both he and Large stated that although a detector is usually considered part of a receiver, claim 1 treats the detector as being separate from the heterodyne receiver circuit. Silva concluded that given these ordinary meanings, a person of ordinary skill in the art would define a "heterodyne receiver circuit" to be a heterodyne circuit that operates inside a receiver. Id. at 119.

In the process of offering definitions that people of ordinary skill in the art would give the terms, Silva narrowed the possible components of a heterodyne receiver circuit to include amplification at the radiofrequency ("RF") stage, one or more mixers, one or more local oscillators, one or more intermediate frequency ("IF") stages and no detectors. Id. at 128. He testified that such a definition was consistent with the dictionary definition of "heterodyne reception" and with the prior art according to the Armstrong patent. Tr. at 123; Pltf.'s Ex. 30. Moreover, Trilithic offered into evidence another patent that also used the term "heterodyne receiver circuit," and Silva testified that the introduced patent used the term in the same manner

as did the '582 patent. Tr. at 128. Silva identified two heterodyne receiver circuits in Figure 3 of the '582 patent, stating that although the boundaries of the two circuits are not clear, neither includes the third mixer located at 70 on Figure 3. Id. at 161-62; '582 patent, Fig. 3. Silva explained that this interpretation was in accordance with the language of claim 1 that states "a combined signal level meter and leakage detector for cable television system comprising ... a heterodyne receiver circuit connected to said CATV cable signal level input and said CATV leakage signal antenna, said heterodyne receiver circuit having greater sensitivity for CATV leakage measurement than for CATV cable signal level measurement." Tr. at 162; '582 patent, col. 10, ln. 61-col. 11, ln. 4. According to Silva, there are "fuzzy borderlines ... between the input of the common heterodyne receiver and the output of the heterodyne receiver circuit associated with the antenna input and that associated with the signal level input." Tr. at 162.

Although Silva stated, and Large agreed, that the addition of the word "circuit" to "heterodyne receiver" is relatively unimportant to the term's meaning, Silva stressed that the addition of the word "common" in front of "heterodyne receiver" in claim 26 gives that term a very specific meaning. Id. at 160, 191, 207. The term "common" means that there is more than one input and either signal from the inputs can use the same circuit or components. Id. at 127. Silva defined the "common heterodyne receiver" as including an amplifier, mixer, local oscillator and IF output. Id. at 144. He emphasized that the signal path and the leakage path come together at node 64 of Figure 3 and then share a common path. Id. at 113-14. Trilithic notes that Wavetek's definition of common heterodyne receiver is wrong because it includes significant portions of circuitry that are not common to the signal and leakage paths. It points to the "Summary of the Invention" to support its conclusion, as the summary states that the preferred embodiment maximizes the common circuit portions for both modes of operation. '582 patent, col. 2, ln. 17-21. As to the reference of a "receiver" in claim 35, Silva testified that the term refers "to this instrument, this whole instrument here, or the receivers in the instrument, the one on the right, the right-hand position having more sensitivity than the one on the left-hand portion of the diagram." Id. at 148. In a later exhibit offered to the Court, Trilithic suggested that the term encompassed the same components as did the heterodyne receiver circuit, with the addition of the detector. Pltf.'s Post-Hearing Reply to Claim Construction, Att. 3.

Wavetek argues that Trilithic's approach of piecemeal definitions is inappropriate and inaccurate. Large suggested that the terms at issue are not unambiguous and that the "cobbling" together of ordinary definitions, even if the two parties agree as to the definitions of certain individual words, is not proper within the context of the patent. Id. at 189, 191-92 For example, Large highlighted that the ordinary understanding of the term "receiver" implies a detector will be included. Id. at 191-92, 200-01. Yet, claim 1 of the patent specifies that a detector is separate from the heterodyne receiver circuit. Id. at 191-92. Large suggested that because the term "heterodyne receiver circuit" would not be understood by a person skilled in the art to be a mere compilation of the definitions of each term, the person of ordinary skill would look to the patent description to determine the meaning of "heterodyne receiver circuit," "common heterodyne receiver" and "receiver." Id. at 193.

According to Large, a careful reading of the claims and the specification leads to the conclusion that the three terms at issue here are used almost interchangeably, as they in essence refer to the same basic structure with only some minor alterations in the claims. Id. at 275. Large viewed the language of claim 1 and claim 26 as parallel. Id. at 200-01. Thus, he determined that a person of ordinary skill in the art would conclude that the use of the term "common heterodyne receiver" is synonymous with the term "heterodyne receiver circuit" as used in claim 1. Id. Furthermore, Large proposed that the term "receiver" in claim 35 refers to essentially the same structure as is described in claims 1 and 26. Id. at 201. Wavetek's proposed definition of all three terms, "heterodyne receiver circuit," "common heterodyne receiver" and "receiver" is

a device that has two separate RF front ends, respectively comprising a signal level meter ("SLM") input and a leakage input. The RF front end to which the SLM input is connected is a dual-conversion front end, having two IF [ ] stages, each of which includes a local oscillator and a mixer. The RF front end to which the leakage input is connected is a single-conversion front end, having only one IF stage which includes a local oscillator and a mixer. The output of the two RF front ends are input to a third, common IF stage which includes a local oscillator and a mixer.

See Def.'s Ex. 13.

In support of its definition, Wavetek cites to the prosecution history and a notice of allowance issued to the patentee which stated that the prior art of record failed to teach the "claimed invention of a combined signal level meter and leakage detector comprising, first RF input, second RF input, a wideband dual-conversion receiver end connected to said first RF input." Def.'s Ex. 2 (Notice of Allowability 10/29/96). Given this allowance, Wavetek suggests that the examiner's understanding of the device comports with Wavetek's proposed definition of the three terms. Trilithic points to an amendment after the allowance notice in which Trilithic stated that

the reasons for the allowances as stated by the Examiner do not necessarily apply to all the claims. For example, among other reasons for allowance of this application, the prior art fails to teach or suggest a combined CATV signal level meter and leakage detector, as claimed in claim 3, including a heterodyne receiver circuit connected to a CATV cable signal level input and a CATV leakage signal antenna and having greater sensitivity for CATV leakage measurement than for CATV cable signal, a processing and control circuit, and a display means for selectively displaying signal level information and leakage information corresponding to signals supplied to the CATV cable signal level input circuit and the CATV leakage signal input circuit, respectively.

Id. (December 13, 1996, Amendment After Allowance at 4-5). In response to that proposed amendment, the Patent and Trademark Office sent confirmation that the amendment filed December 13, 1996, had been considered, entered and entered as directed to matters of form not affecting the scope of the invention. Id. (Amendment 2213, Paper Number 7).

[24] Furthermore, Trilithic contends that Wavetek's definition violates the doctrine of claim differentiation and limits the claims to the preferred embodiment. According to Trilithic, claims such as dependent claims 15 and 16 would be rendered superfluous by accepting Wavetek's definition because those two claims specifically address the dual conversion and single conversion front end requirements, which are not addressed in claim 1. The doctrine of claim differentiation presumes that there is a difference in the scopes of the patent's claims. Tandon Corp. v. United States Int'l Trade Comm'n, 831 F.2d 1017, 1023 (Fed.Cir.1987). Such a presumption, however, " 'is a guide, not a rigid rule.' " ATD Corp. v. Lydall, Inc., 159 F.3d 534, 541 (Fed.Cir.1998) (citing Autogiro Co. of America v. United States, 181 Ct.Cl. 55, 384 F.2d 391 (Fed.Cir.1967)). According to the Federal Circuit, "the doctrine cannot alter a definition that is otherwise clear from the claim language, description, and prosecution history." O.I. Corp. v. Tekmar Co., Inc., 115 F.3d 1576, 1582 (Fed.Cir.1997). The doctrine cannot broaden claims beyond their correct scope as that scope has been determined in light of the specification, prosecution history, and other relevant extrinsic evidence. Multiform Desiccants, Inc. v. Medzam, Ltd., 133 F.3d 1473, 1480 (Fed.Cir.1998).

1. Heterodyne Receiver Circuit

In claim 1, the language of the claim itself requires that the "heterodyne receiver circuit" be connected to the CATV cable signal level input and the CATV leakage signal antenna. '528 patent, col. 10, ln. 65-67. Therefore, Silva's suggestion that a person of ordinary skill in the art could read that to mean there are two separate heterodyne receiver circuits, one attached to the signal input and one attached to the leakage antenna, seems to be in direct conflict with the language of the claim itself.

[25] The language of claim 1 requires that there be a "detector having an input connected to said heterodyne receiver circuit." *Id*. col. 11., ln. 3-4. Both parties agree that the audio detector is not part of the heterodyne receiver circuit. Tr. at 120, 200-01; Pltf.'s Post-Hearing Reply to Claim Construction, Att. 3. In fact, when the Court examines how both parties interpret claim 1 in accordance with the specification, it appears that the parties agree as to what elements are included in the "heterodyne receiver circuit." In its reply brief, Trilithic suggested that the term "heterodyne receiver circuit" in claim 1 refers to only one circuit which includes nodes 32, 38, 40, 42, 44, 46, 50, 52, 54, 58, 60, 62, 64, 66, 68, 70, and 72 in Figure 3. *See* Pltf.'s Post-Hearing Reply Br. Ex. 3. The Court acknowledges that although the claims must be read in light of the specification and the preferred embodiment found therein, limitations from the specification cannot be imported into the claims. Accordingly, the Court is not limiting the definition of "heterodyne receiver circuit" to the embodiment depicted in Figure 3. However, for convenience sake, the Court will refer to Figure 3 of the patent which provides illustrations of the preferred embodiment.

In accordance with the claims and specifications, the audio detector must have an input connected to "said heterodyne receiver circuit." '582 patent, col. 11, ln. 3-4. That input must come from the "heterodyne receiver circuit" after the signal has passed through the common circuitry that can be shared by either the cable signal or the leakage signal. Thus, in order for the combined signal level meter and leakage detector to work according to claim 1 of the patent, whether it is phrased in such terms or not, that signal must go through the common circuitry before getting to the audio detector. Therefore, the heterodyne receiver circuit referenced in claim 1 must include the circuitry that connects to both the cable signal level input and the leakage antennas, as well as the common circuitry that then leads into the said detector. *See* Fig. 3. Before providing input for the detector, the common circuity must receive and mix a signal from either the cable signal input or the leakage input. *See* id.

Furthermore, the wording of claim 1 explains that the said "heterodyne receiver circuit" must have greater sensitivity for CATV leakage measurement than for CATV cable signal level measurement. '582 patent, col. 11, ln. 1-2. This tells a person of ordinary skill in the art that the circuitry that is attached to both of these inputs may require different uses of components such as oscillators, mixers and amplifiers for each respective side. The specification provides a suggestion for how this can be done. *See* '582 patent, Fig. 3.

[26] Although the parties agree on which components are included in the term, Trilithic advocates for a very broad definition while Wavetek suggests that a much narrower definition be given that specifically includes the components required for the circuitry depicted in Figure 3. The Court cannot give the claim a broader scope than is required by the claim language and the specification, yet it also cannot import limitations from the specifications into the claim language. A person of ordinary skill in the art would understand "heterodyne receiver circuit" as it is used in claim 1 to mean that such a circuit must be connected to both the cable signal level and the leakage antenna inputs, and the circuit must have greater sensitivity for the leakage antenna input. Accordingly, a person of ordinary skill in the art would know that a certain combination of oscillator and mixers must be used in order to make one side of the circuit more sensitive. Implicit in this understanding is knowledge concerning the use of dual conversion or single conversion front ends and IF stages. A person of ordinary skill in the art would also know what combination of oscillators,

mixers and circuitry are required to get either of those two signals from the input of the cable signal or leakage to the point of becoming input for the detector. Because the claim specifically provides that the input from the heterodyne receiver circuit is separate from the detector, the person of ordinary skill in the art will know that the detector is not part of the receiver. Although the construction is not limited to the embodiment found in the specification, such information will assist the person of ordinary skill in the art to determine what type of circuitry may be used. If both parties agree as to what nodes in the specification are included in the "heterodyne receiver circuit," given the language of the claim and the explanation in the specification, a person of ordinary skill in the art will be able to determine the same.

2. "Common Heterodyne Receiver"

[27] Claim 26 of the '582 patent is a method claim. It specifically calls for "a method of measuring signal level and leakage in a cable television system comprising the steps ... supplying said CATV cable signal and said CATV leakage signal to a common heterodyne receiver; ... demodulating the output signal of said heterodyne receiver." '582 patent, col. 12, ln. 66-col. 13, ln. 4. Wavetek suggests that the same circuity in Figure 3 that comprises the heterodyne receiver circuit of claim 1 comprises the common heterodyne receiver circuitry of claim 26. Trilithic maintains that the term should be given the ordinary meaning of "common heterodyne receiver" proposed by Trilithic to be a circuit in which two signals are connected to an input terminal of a single heterodyne receiver.

There is a difference between the language of claim 1 and claim 26. In claim 1, the heterodyne receiver circuit is "connected to" the signal input and the leakage antenna. "Connected to" means "joined or fastened." *Webster's II New Riverside University Dictionary* 299 (1984). Claim 26 addresses a step of "supplying" the two different signals to a common heterodyne receiver. "Supplying" means "making available for use." Id. at 1164. Large suggested that there is no difference between "connected to" and "supplying." However, a difference does exist between those two words and the two claims. The first two steps listed in Claim 26 are "obtaining a CATV cable signal from a CATV cable" and "obtaining a CATV leakage signal radiated from the CATV cable using an antenna." '582 patent, col. 12, ln. 63-65. These steps cover the method for connecting the circuitry to the cable signal and the leakage signal. Some circuitry must be connected to those inputs in order to obtain the signals and make the signals useful. The next step talks of supplying the signals, in the required manner, to the common heterodyne receiver. This wording indicates that those signals undergo some process in between being obtained from the their sources and being delivered to the common heterodyne receiver. This process is described in many of the other claims of the patent. The circuitry that is used to get the two signals to the common heterodyne receiver is therefore not included as part of the common heterodyne receiver.

Moreover, claim 26 does not include the requirement that the common heterodyne receiver have greater sensitivity for one signal verses the other signal. Therefore, claim 26 does not require that the elements considered to be the common heterodyne receiver actually be the circuitry that is connected to the two different inputs-the cable signal input and the leakage antenna. Instead, claim 26 addresses the common circuity that either of those two signals can utilize. The elements of the common heterodyne receiver do not have to be as all-encompassing as the elements included in the heterodyne receiver circuit as it is defined in claim 1 because the elements of the common heterodyne receiver do not have to be connected to the cable signal input and the leakage antenna, nor do they have to provide components that account for greater sensitivity to one side.

The language of the claim allows the person of ordinary skill in the art to know that somehow, as explained

in other claims, each of the signals needs to get through the other circuitry that is connected to the common heterodyne receiver. The ordinary meaning of "common" is "shared." Therefore, in the context of this claim, the common heterodyne receiver includes the part of the circuitry where there is a single input into a heterodyne receiver that is shared by the signals coming from either the cable signal input or the leakage antenna. In its next step, the claim further defines what is included in the common heterodyne receiver by requiring that the common heterodyne receiver produce some sort of output signal that is then demodulated. '582 patent, col. 13, ln. 3-4. Accordingly, a person of ordinary skill in the art would understand that the common heterodyne receiver begins with a single input to the heterodyning circuitry, providing a point where the cable signal input and the leakage input come together to share circuitry. The common heterodyne receiver includes whatever components are necessary to complete the heterodyning process, and whatever components are necessary to produce an output that can then be demodulated. A person of ordinary skill in the art should know what components those processes encompass. Although the claim is not limited by this reading of the specification, the specification assists a person of ordinary skill in the art to determine what is included in the term "common heterodyne receiver" as it applies in claim 26. In the context of Figure 3, and according to Silva's testimony, at the very least, the common heterodyne receiver includes an amplifier, a mixer,a local oscillator and an IF input. Tr. at 144; see '582 patent, Fig. 3.

3. "*Receiver*"

[28] Claim 35 of the '582 patent refers to a "receiver" in terms of it being one of the elements that comprises the combined signal level meter and leakage detector which is coupled to the cable distribution system. '582 patent, col. 13, ln. 47-48. The claim requires that the receiver be connected to the CATV cable connector and the CATV leakage signal antenna and that the receiver have greater sensitivity for the CATV leakage measurement than for the CATV cable signal level measurement. Id. ln. 54-58. The *McGraw-Hill Dictionary* defines "receiver" as a unit that receives modulated material and converts the material into original intelligence or other useful information. Pltf.'s Ex. 9 at 1661. A receiver generally has a detector for detecting or demodulating the material. Tr. at 200-01; Pltf.'s Ex. 9 at 550. In the previous claims that involved the terms "heterodyne receiver circuit" and "common heterodyne receiver" the language of the claims made clear that the detector was not considered to be part of either of those terms, even though the word "receiver" was used in the phrase. Unlike claims 1 and 26, this claim does not specify that the detector is separate from the "receiver" term. Accordingly, the use of the term "receiver" in claim 35 encompasses all the circuitry that is attached to both the CATV signal level meter input and the CATV leakage antennas that is needed to move the signals from the inputs to and through the detector. The claim also specifies that the receiver must have greater sensitivity for the leakage side than the signal level side, and as previously discussed, a person of ordinary skill in the art will understand the circuitry and components that are needed to accomplish this. However, in addition to that circuitry and the circuitry that is required for taking those input signals and getting them to the detector, the detector itself is also included in this use of the term "receiver."

In claim 44, the patent again uses the term "receiver." However, this claim makes quite clear what is included in the receiver referenced in claim 44. The patent specifies that

a receiver separately connected to said CATV cable connector and one of said CATV leakage antennas, said receiver including a tuned preamplifier having an input connected to said one CATV leakage signal antenna; at least one dedicated mixer for CATV signal level measurement; at least one dedicated mixer for CATV leakage measurement; at least one common mixer for CATV signal level measurement and CATV leakage measurement; and an IF stage having a relatively wide bandwidth for CATV signal level

measurement and a relatively narrow bandwidth for a CATV leakage measurement

is required. '582 patent, col. 14, ln. 45-59.

B. Means for Display

[29] Both parties agree that the term "display means" as found in claims 1, 18, 35 and 44 is written in means-plus function format and that the '582 patent discloses a type of liquid crystal display ("LCD") display as the corresponding structure. *See* Fig. 3 nodes 12a, 12b, 94. Trilithic suggests that the Court should interpret display means as an LCD display and its equivalents. Wavetek argues that the specification, through its words and figures, more specifically discloses a dual-segmented LCD display and its equivalents.

As previously discussed, the "means" term in a means-plus function claim "is essentially a generic reference for the corresponding structure disclosed in the specification." Chiuminatta Concrete Concepts v. Cardinal Indus., 145 F.3d 1303, 1308 (Fed.Cir.1998). The wording of the '582 specification refers to "LCD displays" and an "LCD driver." '582 patent, col. 5, ln. 19-32. Figure 3 depicts drawings for an Level LCD display, a channel LCD display, and an LCD driver. Id. Fig. 3 nodes 12a, 12b, 94. Silva explained that the LCD display can be used for the signal meter or the leakage meter, but information for both instruments cannot be displayed at the same time. Tr. at 133. Throughout his testimony Silva referred to the display disclosed in Figure 3 as a seven segmented display. Id. at 134-35. Both Silva and Large agreed that Figure 3 depicts a dual seven-segmented LCD display and LCD driver. Tr. at 167, 208-210. Wavetek questions whether other LCD displays could be used in the device.

The specification discloses an LCD display as the corresponding structure to the display means. *See* '582 patent, col. 5, ln. 22-32. The specification provides that there are two LCD displays, "the left LCD having three and a half digits. a polarity sign (+/-). a decimal point and a low battery indicator, the right LCD display having four digits and one decimal point." Id. ln. 23-26. As Wavetek correctly noted, the Court does not need to determine the LCD display equivalents as part of the claim construction. A person of ordinary skill in the art will know what is involved in an LCD display and will know what type of LCD display will work or be most appropriate for this particular device. The technology behind the LCD display is not the new technology that is the basis of the patent. If only a dual segmented LCD will work in this instrument, a person of ordinary skill in the art will know that and act accordingly. The Court will not limit the construction of LCD to specifically a dual-segmented LCD display.

IV Conclusion

The purpose of the Markman hearing and this subsequent order is to construe the claims placed in issue and more specifically the terms highlighted by the parties. This being done, the parties may proceed accordingly with the underlying infringement suit.