UNITED STATES DISTRICT COURT

CENTRAL DISTRICT OF CALIFORNIA

ALFRED E. MANN FOUNDATION FOR SCIENTIFIC RESEARCH, et al., Plaintiffs, v. COCHLEAR CORPORATION, et al., Defendants.	Case No. CV 07-8108 FMO (SHx) **FINDINGS OF FACT AND CONCLUSIONS OF LAW**

INTRODUCTION

Plaintiff Alfred E. Mann Foundation for Scientific Research ("AMF" or "plaintiff") brings this action, alleging that defendants Cochlear Corporation and Cochlear Ltd. (collectively, "Cochlear" or "defendants") infringed two patents directed to cochlear implant technology. (See First Amended Complaint for Patent Infringement ("FAC") at ¶¶ 17 & 21-23; Reply and Counterclaims-in-Reply to Cochlear Americas and Cochlear Limited's Counterclaims ("Pl.'s Supp. Claims") at 13-14) (Document Nos. 164 & 171). AMF alleges that Cochlear infringed U.S. Patent No. 5,938,691, entitled "Multichannel Implantable Cochlear Stimulator" ("the '691 patent"), and U.S. Patent No. 5,609,616, entitled "Physician's Testing System and Method for Testing Implantable Cochlear Stimulator" ("the '616 patent") (collectively, "the patents-in-suit"). (See FAC at ¶¶ 21-23; Pl.'s Supp. Claims at 13-14).

The '691 patent is generally directed to a cochlea stimulation system comprising of: (1) an

audio signal receiving device, i.e., a microphone; (2) a wearable processor ("WP") that receives and processes audio signals; and (3) an implanted cochlea stimulator ("ICS") that receives data representing the audio signals and stimulates electrodes. (See '691 patent at Abstract, col. 3:9-39 & 34:51-35:6). By stimulating the electrodes located within the cochlea, the implant can also stimulate locations of the auditory nerve, so that the hearing impaired person's brain can perceive sound. (See id. at col. 1:24-27; Reporter's Transcript ("RT"), Jan. 14, 2014, vol. 2, at 79:13-15 & 85:18-25). The '616 patent is generally directed to a system and a method for testing such a system. (See '616 patent at Abstract, col. 34:23-61 & 35:43-36:7).

The court, with the consent of the parties, appointed a Special Master for claim construction. (See Order re: Joint Status Report Regarding Appointment of Special Master at 1) (Document No. 179). The Special Master conducted a claim construction hearing, and issued a Report and Recommendation. (See Special Master's Report and Recommendation on Claim Construction ("R&R") at 5) (Document No. 200). After considering the parties' objections to the R&R, the court issued its Claim Construction Order on June 18, 2012.[1] (See Order re: Parties' Objections to the Special Master's Report on Claim Construction ("Claim Construction Order")) (Document No. 212). Advanced Bionics, LLC ("Advanced Bionics"), the exclusive licensee of the asserted patents, (see Pl.'s Supp. Claims at 13), was joined as an involuntary plaintiff on January 13, 2014. (See Final Pretrial Conference Order ("PTO") at 1) (Document No. 399).

The court conducted a jury trial, in which the jury found that Cochlear infringed claims 1 and 10 of the '616 patent, and claims 6 and 7 of the '691 patent. (See Verdict Form at 1-4 & 5-8) (Document No. 460). The jury also found willful infringement of both asserted patents. (See id. at 4 & 8). In addition, the jury found that the asserted claims are not invalid based on Cochlear's obviousness and anticipation defenses. (See id. at 4-5 & 8-9). The jury awarded $131,216,325 damages, based on royalty rate of 7.5 percent. (See id. at 10). Finally, the jury provided an advisory verdict in favor of AMF on inequitable conduct. (See id. at 9-10).

[1] The case was transferred to the undersigned judge on January 18, 2013. (See Order of the Chief Judge, dated Jan. 18, 2013) (Document No. 232).

In addition, the court conducted a bench trial regarding the following: (1) equitable estoppel, (2) laches, (3) inequitable conduct, (4) prosecution history estoppel, and (5) indefiniteness.[2] (See PTO at 28; RT, Jan. 22, 2014, vol. 2).

The court, having heard live testimony and duly considered the evidence presented during both trials, the credibility of the witnesses, the parties' briefing, and the contentions and arguments of counsel, hereby makes the following findings of fact and conclusions of law in accordance with Rule 52(a) of the Federal Rules of Civil Procedure.

FINDINGS OF FACT

I. BACKGROUND.

1. Alfred E. Mann Foundation for Scientific Research is a nonprofit medical research foundation incorporated under California law. AMF's principal place of business is in Los Angeles County. (See PTO, App. A, at No. 1). AMF conducts medical research, and it has developed advanced medical devices for commercialization. (See RT, Jan. 14, 2014, vol. 2, at 51:15-19 & 52:14-53:18; Declaration of Dr. Joseph Schulman, Ph.D., Re Issues Tried to the Court ("Schulman Decl.") (Document No. 406) at ¶¶ 4-6). For instance, from about 2001 to 2004, AMF devoted substantial resources to its Battery Bion project, a wireless, implantable microstimulator intended for use in stroke patients. (See Schulman Decl. at ¶¶ 11-15). From 2004 to 2008, AMF conducted a human clinical trial with the University of Southampton, in order to reanimate paralyzed arms of post-stroke patients. (See Declaration of David Lee Hankin Submitted in Support of Plaintiff Re Issues Tried to the Court ("Hankin Decl.") at ¶ 13) (Document No. 403). In 2006-2009, AMF also worked on a trial involving the reanimation of paralyzed legs of post-spinal cord injury patients. (See id. at ¶ 21).

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[2] The parties also addressed enhanced damages. (See Plaintiff Alfred E. Mann Foundation's Memorandum of Points and Authorities re Bench Trial ("AMF's Bench Tr. Br.") at 18-25; Defendants Cochlear Ltd. and Cochlear Americas' Memorandum of Points and Authorities re: Bench Trial ("Cochlear's Bench Tr. Br.") at 18-25) (Document Nos. 480 & 482). In the contemporaneously issued Order re: Post-trial Motions, the court granted Cochlear's motion for judgment as a matter of law as to the willfulness finding. Accordingly, it is not necessary to address AMF's request for enhanced damages.

2. Defendant Cochlear Ltd. is a for-profit Australian company headquartered in Sydney, Australia. Defendant Cochlear Corporation is a for-profit corporation incorporated under Delaware law with its principal place of business in Colorado. (See PTO, App. A, at Nos. 2 & 3).

3. U.S. Patent No. 5,609,616, entitled, "Physician's Testing System and Method for Testing Implantable Cochlear Stimulator," was issued on March 11, 1997. U.S. Patent Application No. 447,157 was filed on May 25, 1995, and issued as the '616 patent. The U.S. Patent and Trademark Office ("USPTO") issued the '616 patent as a continuation of Ser. No. 23,584, filed on February 26, 1993; which is a continuation of Ser. No. 752,069, filed on August 29, 1991; which is a continuation-in-part of Ser. No. 411,563, filed on September 22, 1989. The '616 patent lists Joseph H. Schulman, John C. Gord, Primoz Strojnik, and David I. Whitmoyer as inventors, and AMF as the original assignee. (See PTO, App. A, at No. 9; '616 patent). The '616 patent expired on March 11, 2014. (See PTO, App. A, at 46).

4. U.S. Patent No. 5,938,691, entitled, "Multichannel Implantable Cochlear Stimulator," issued on August 17, 1999. U.S. Patent Application No. 09/103,264 was filed on June 23, 1998, and issued as the '691 patent. The USPTO issued the '691 patent as a division of Application No. 08/450,041, filed on May 25, 1995; which is a continuation of Application No. 08/322,065, filed on October 12, 1994; which is a continuation-in-part of Application No. 08/23,584, filed on February 26, 1993; which is a continuation of Application Ser. No. 07/752,069, filed on August 29, 1991; which is a continuation-in-part of Application Ser. No. 07/411,563, filed on September 22, 1989. The '691 patent lists Joseph H. Schulman, John C. Gord, Primoz Strojnik, David I. Whitmoyer, and James H. Wolfe as inventors, and AMF as the original assignee. (See PTO, App. A, at No. 11; '691 patent). The '691 patent expired on September 22, 2009. (See PTO, App. A, at 46).

5. AMF remains the assignee and lawful owner of the '616 patent and the '691 patent. (See PTO, App. A, at 46).

II. PATENT PROSECUTION – PRIOR ART.

6. Bryant R. Gold ("Gold") was one of the attorneys who prosecuted the applications that resulted in the issuance of the '616 patent. (See PTO, App. A, at No. 14).

7. While prosecuting the application that was eventually issued as the '616 patent, Gold filed an Information Disclosure Statement on August 31, 1995 ("the 1995 IDS"). The 1995 IDS disclosed 63 references, including: (1) United States Patent No. 4,947,844 to McDermott ("the McDermott patent" or "'844 patent"); and (2) United States Patent No. 4,612,934 to Borkan ("the Borkan patent" or "'934 patent"). (See PTO, App. A, at Nos. 14-16).

8. On May 6, 1996, patent examiner William E. Kamm initialed the column, "Examiner Initial," on the 1995 IDS, indicating that he had considered the McDermott patent and the Borkan patent. (See PTO, App. A, at No. 18).

9. The McDermott and Borkan patents appear on the face of the '616 patent. (See PTO, App. A, at Nos. 19-21). U.S. Patent No. 4,232,679 to Schulman ("the Schulman patent" or "'679 patent") also appears on the face of the '616 patent. (See '616 patent).

10. During the prosecution of the '616 patent, the named inventors and their attorneys of record did not submit to the PTO an article by McDermott entitled, "An Advanced Multiple Channel Cochlear Implant," IEEE Transactions on Biomedical Engineering, pp. 789-97, Vol. 36:7 (July 1989) ("the 1989 McDermott article"). (See PTO, App. A, at 46).

11. The 1989 McDermott article was known to Gold when he submitted it to the PTO during the prosecution of Ser. No. 08/322,066. (See PTO, App. A, at 46).

12. The '844 patent to McDermott and the 1989 McDermott article were both by the same inventor, Hugh McDermott. (Trial Exhibits ("Exhs.") 1039 & 1150).

13. The '844 patent issued from an application filed in the United States prior to the priority date claimed in the '616 patent. (See PTO, App. A, at 45).

III. PATENT PROSECUTION – AMENDMENTS TO CLAIM 10 OF THE '616 PATENT.

14. The method claim that issued as claim 10 of the '616 patent first appeared in U.S. Patent Application No. 447,157 (the "'157 Application"). The '157 Application was filed on May 25, 1995. Joseph H. Schulman, John C. Gord, Primoz Strojnik, and David I. Whitmoyer were listed as the applicants (collectively, "Applicants"). The method claim that later issued as claim 10 of the '616 patent was originally filed as claim 12. (See Exh. 1303 at COC-1985 & 2053).

15. In its original form, claim 12 recited as follows:

12. A method of testing an implantable tissue stimulating system comprising:

transmitting data-containing signals to an implanted stimulator from an external transmitter;

selectively controlling the data-containing signals as they are thus transmitted;

receiving the data-containing signals within the implanted stimulator;

processing the data-containing signals within the implanted stimulator to generate stimulation signals;

applying the stimulation signals to a plurality of tissue stimulating electrodes;

selectively monitoring at least one of the electrodes to measure voltages/currents associated with the stimulation signals applied thereto;

generating stimulator status indicating signals representative of the measurements made within the implanted stimulator;

transmitting the stimulator status indicating signals to the external transmitter; and

receiving and processing the status indicating signals in the external transmitter to produce processed status indicating signals.

(Exh. 1303 at COC-2053).

16. The claim limitation, "displaying the processed status-indicating signals . . .," in the issued claim 10 did not appear in then-claim 12 as originally proposed. (See, generally, Exh. 1303 at COC-2053).

17. In the November 17, 1995 Office Action ("November 1995 Office Action"), Examiner Kamm rejected claim 12 as "indefinite in the use of the alternative phrase 'voltages/current.'" (Exh. 1303 at COC-2113 & 2116). Examiner Kamm also stated that "[t]he claim is further indefinite and incomplete in the absence of a step utilizing the processing status indicating signal." (Id. at COC-2116).

18. In the November 1995 Office Action, Examiner Kamm also rejected claim 12 "under 35 U.S.C. § 103 as being unpatentable over Van Arragon et al in view of Hafelfinger et al." (Exh.

1303 at COC-2117-18). Examiner Kamm explained that "Van Arragon et al discloses the claimed combination of an implantable stimulator with an external programmer-tester communicating in both directions via transmitters and receivers. While Van Arragon et al does not show the specific parameters of measuring at least one of voltage or current on at least one electrode, such monitoring circuitry further including impedance calculation circuits, are well-known in the implantable stimulator art as shown, for example, by Hafelfinger et al. It would have been obvious to one of ordinary skill in the art at the time of the invention to choose the parameters to be measured as an indication of the status of the stimulator and it would be a mere matter of choice to employ electrode current/voltage as such a parameter especially in view of the teaching of Hafelfinger et al." (Exh. 1303 at COC-2117-18). "Van Arragon et al." refers to U.S. Patent No. 4,513,743; and "Hafelfinger et al." refers to U.S. Patent No. 5,003,975. (See id. at COC-2120 & 2166-92).

19. On March 18, 1996, the Applicants filed Amendment A, amending claim 12. (Exh. 1303 at COC-2202 & 2205-06).

20. The amended claim 12 states as follows:

> ~~12~~ 10. A method of testing an implantable tissue stimulating system comprising:
>
> transmitting data-containing signals to an implanted stimulator from an external transmitter;
>
> selectively controlling the data-containing signals as they are thus transmitted;
>
> receiving the data-containing signals within the implanted stimulator, the implanted stimulator having a multiplicity of tissue-stimulating electrodes;
>
> processing the data-containing signals within the implanted stimulator to generate stimulation signals;
>
> applying the stimulation signals to at least one pair of the multiplicity of [~~a plurality of~~] tissue stimulating electrodes;
>
> selectively monitoring the at least one pair of the multiplicity of electrodes to

measure a voltage associated therewith at the same time [~~voltages/currents associated with~~] the stimulation signals are applied thereto;

generating stimulator status-indicating signals representative of the measurements made within the implanted stimulator;

transmitting the stimulator status-indicating signals to an external receiver coupled to the external transmitter; [~~and~~]

receiving and processing the status-indicating signals [~~in the external transmitter~~] to produce processed status-indicating signals which convey information regarding the status of the implanted stimulator, including the measurements made within the implanted stimulator; and

displaying the processed status-indicating signals, whereby the status of the implanted stimulator, including the results of the measurements made within the implanted stimulator, may be made known.

(Exh. 1303 at COC-2205-06) (underlining and strikeouts in original).

21. In the Remarks to Amendment A, the Applicants stated that, "[b]y way of the present amendment, Applicants have made a diligent effort to address each and every one of the definiteness concerns raised by the Examiner. Further, the newly-submitted claims have been carefully drafted in an attempt to ensure that they are definite and fully comply with the requirements of 35 U.S.C. § 112, second paragraph. Hence, it is believed that this rejection should be overcome." (Exh. 1303 at COC-2212).

22. The Applicants also stated that "[b]y way of the present amendment, Claims 1 and 12 (the independent claims) have been amended to distinguish the claimed invention over van Arragon et al. and Hafelfinger et al. More particularly, both van Arragon et al. and Hafelfigner et al (and, indeed, all of the other prior art cited by the Examiner) relate to implantable pacemakers, not cochlear stimulators. While there are some similarities between an implantable pacemaker and an implantable cochlear stimulator . . . there are many more dissimilarities." (Exh. 1303 at COC-2212).

23. The Applicants further distinguished claim 12 from the prior art by arguing that "the

claimed method is restricted to a method of testing an implantable tissue stimulating system that requires, inter alia, monitoring at least one pair of the multiplicity of electrodes at the same time the stimulation signals are applied thereto. Such simultaneous application of the stimulating signal to the electrode at the same time the electrode is monitored is not done in the pacemaker art." (Exh. 1303 at COC-2213-14) (emphasis in original).

24. The Applicants referred to the invention's "display[]" of parameters "in real time," in order to distinguish the cited pacemaker prior art, which "deals with downloading histogram data that has been accumulated in the implant device (the pacemaker) over a period of time." (Exh. 1303 at COC-2214-15) (emphasis in original). By contrast, the Applicants stated that their invention provides real time feedback, and "[t]he sensed parameter is sent back to the physician's tester as part of a feedback signal were [sic] it is displayed or otherwise processed." (Id. at COC-2214).

IV. CLAIM CONSTRUCTION.

25. The court construed the "means for generating data indicative of the audio signal" element of claim 6 of the '691 patent to be a means-plus-function element within the scope of 35 U.S.C. § 112, sixth paragraph.[3] The recited function is "generating data indicative of the audio signal," and the corresponding structure is "a microprocessor." (See R&R at 25-26 & 28; Claim Construction Order at 25; RT, Jan. 22, 2014, vol. 2, at 29:11-14).

26. The court construed the "external processor means coupled to the transmitting means of the external headpiece/transmitter for receiving and processing the status-indicating signals to derive information therefrom regarding the operation of the implanted stimulator and its plurality of tissue stimulating electrodes" element of claim 1 of the '616 patent to be a means-plus-function element. The recited function is "receiving and processing the status-indicating signals to derive information therefrom regarding the operation of the implanted stimulator and its plurality of tissue-stimulating electrodes," and the corresponding structure is an "antenna, receiver, and microprocessor." (See R&R at 3-4; Claim Construction Order at 25; RT, Jan. 22, 2014, vol. 2, at

[3] Currently 35 U.S.C. § 112(f).

28:3-13).

27. Each of the above limitations requires the disclosure of an algorithm. (See Order Re: Cross-Motions for Summary Judgment, filed on January 3, 2014 ("Court's Order of January 3, 2014"), at 28-32 & 34-35) (Document No. 352).

V. AMF'S KNOWLEDGE AND COMMUNICATIONS RE: COCHLEAR'S POTENTIAL INFRINGEMENT.

28. Dr. Joseph Schulman, Ph.D. ("Schulman") was the head of AMF's day-to-day operations from AMF's inception in 1985 to 2007. (See Schulman Decl. at ¶¶ 2-5). In 1994, Schulman attended a conference regarding cochlear implants in Melbourne, Australia, where Hugh McDermott presented an article regarding the Cochlear Nucleus system. (See id. at ¶¶ 23-24). At the conference, Schulman learned that Cochlear's Nucleus implant reported impedance measurements. (See RT, Jan. 17, 2014, vol. 1, at 123:4-124:9; Exh. 1075). Schulman did not learn that Cochlear's system necessarily used back telemetry, or the technical details regarding Cochlear's system. (See Schulman Decl. at ¶ 25; RT, Jan. 17, 2014, vol. 1, at 124:18-22).

29. In 1998, Schulman learned that the Cochlear Nucleus 24, one of the accused products in this case, had a cochlear implant and a speech processor that included some telemetry features. (Schulman Decl. at ¶ 26). However, Schulman did not learn the details of Cochlear's implementation of back telemetry at the time. (See id.).

30. Cochlear's implants and processors were not available to the general public for testing. The publicly available material that Schulman reviewed, including marketing materials and conference presentations, did not reveal the detailed technical workings of Cochlear's devices sufficient to allow Schulman to reach a conclusion regarding potential infringement of the patents-in-suit. (See Schulman Decl. at ¶ 27).

31. In 2003, Schulman attended a meeting at the House Ear Institute, where he obtained literature on the fitting system for the Nucleus 24. This literature showed details of the Nucleus 24 product and how its telemetry features were used and programmed. (See Schulman Decl. at ¶ 28).

32. Schulman, as President of AMF, sent a letter, dated July 21, 2003, to Jack O'Mahony

("O'Mahony"), who was then the CEO and President of Cochlear Pty Ltd. In the letter, Schulman states "that we have received information that your Nucleus cochlear implants utilize features that may infringe our U.S. Patent 5,609,616." (Schulman Decl. at ¶ 29; Exh. 1071). The letter further states that, "[a]lthough the patent is licensed to the Advanced Bionics Corporation, our licensee has decided, in accordance with the terms of our agreement, to defer enforcement of that patent to the AEMF. In doing so, Advanced Bionics has asked that we first explore a license agreement with Cochlear Pty Ltd. rather than undertake legal action to prevent you from using such important and patented technology in fitting patients. We are receptive to any reasonable resolution of the matter." (Exh. 1071). The July 21, 2003, letter does not mention the '691 patent. (See, generally, id.; Schulman Decl. at ¶ 29).

33. On October 7, 2003, Schulman received a response letter, dated October 1, 2003, from O'Mahony. (See Exh. 1072; Schulman Decl. at ¶ 30). The letter states, "With reference to your letter of July 21, 2003 and your U.S. Patent No. 5,609,616, the Nucleus cochlear implants do not infringe the patent." (Exh. 1072). The letter further states that "[t]he claims require separate transmitter and receiver coils. The Nucleus cochlear implant uses common circuitry with a single coil to exchange signals with an external speech processor in a manner very similar to the prior art references cited in the patent, and therefore it does not infringe." (Id.). The letter also states that "[a]nother feature of the claimed system is that the physician's tester can be connected directly to the external headpiece/transmitter. The Nucleus cochlear implant does not have a physician's tester that can be connected directly to an external coil of a headpiece/transmitter." (Id.). O'Mahony's response letter does not mention the '691 patent. (See id.). Schulman was not contacted further regarding this letter by O'Mahony or other Cochlear representatives. (See Schulman Decl. at ¶ 30).

34. In 2006, AMF conducted additional due diligence on Cochlear's implant systems. While AMF had difficulty finding materials regarding the circuitry of Cochlear's systems, it reviewed the materials it was able to locate. AMF's due diligence included reviewing Cochlear product manuals and speaking with medical doctors familiar with Cochlear's systems. (See Hankin Decl. at ¶ 24). AMF then retained the law firm of Irell & Manella LLP regarding this dispute. (See id.

at ¶ 25).

35. On August 28, 2006, AMF's outside counsel, Morgan Chu of Irell & Manella LLP ("Chu"), sent a letter to Dr. Chris Roberts, Cochlear Pty Ltd.'s CEO and President. (See Hankin Decl. at ¶ 25[4]; Exh. 634). Following up on the 2003 correspondence, the letter states that "the claims of the '616 patent do not require 'separate transmitter and receiver coils' or a 'physician's tester . . . connected directly to an external coil of a headpiece/transmitter.'" (Exh. 634). Thus, AMF asserted that Cochlear's arguments "do not bear on Cochlear's infringement of the '616 patent." (Id.). The letter further states that AMF "would like to discuss Cochlear's licensing of the '616 patent in connection with Cochlear's cochlear implant products, such that the matter may be amicably resolved." (Id.; see Hankin Decl. at ¶ 25). The August 28, 2006, letter does not mention the '691 patent. (See, generally, Exh. 634).

36. Michael G. Verga ("Verga"), outside counsel for Cochlear Ltd., responded to Chu's letter on October 24, 2006. (See Hankin Decl. at ¶ 27[5]; Exh. 633). The October 24, 2006, letter states that "Cochlear was surprised to receive [AMF's] letter of August 28, 2006, since Cochlear and AEMF last communicated about this matter over three years ago. At that time Cochlear presented to AEMF several reasons that Cochlear's products did not infringe the claims of the '616 patent. Having not received a reply, Cochlear believed that this matter was resolved to [AMF's] satisfaction over three years ago." (Exh. 633). The October 24, 2006, letter, also does not refer to the '691 patent. (See, generally, id.).

37. On December 13, 2007, AMF filed this lawsuit against Cochlear. (See Complaint for Patent Infringement) (Document No. 1). In the original complaint, AMF asserted infringement only as to the '616 patent. (See id. at ¶¶ 20-22).

38. Any finding of fact that more correctly constitutes a conclusion of law should be treated as such.

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[4] The Hankin Declaration refers to an August 18, 2006, letter. (Hankin Decl. at ¶ 25). However, the referenced letter has an August 28, 2006, date. (See Exh. 634).

[5] The Hankin Declaration again refers to the incorrect date of the referenced letter. (See Hankin Decl. at ¶ 27).

CONCLUSIONS OF LAW

I. EQUITABLE ESTOPPEL.

39. A patentee may forfeit its right to any relief from an infringer where: "(1) the patentee, through misleading conduct (or silence), leads the alleged infringer to reasonably infer that the patentee does not intend to enforce its patent against the alleged infringer; (2) the alleged infringer relies on that conduct; and (3) the alleged infringer will be materially prejudiced if the patentee is allowed to proceed with its claim." Radio Sys. Corp. v. Lalor, 709 F.3d 1124, 1130 (Fed. Cir. 2013) (citing A.C. Aukerman Co. v. R.L. Chaides Constr. Co., 960 F.2d 1020, 1028 (Fed. Cir. 1992) (en banc)). The alleged infringer must prove each of these elements by a preponderance of the evidence. Aukerman, 960 F.2d at 1045-46. The "applicability of equitable estoppel is 'committed to the sound discretion of the trial judge.'" Radio Sys. Corp., 709 F.3d at 1130 (citing Aukerman, 960 F.2d at 1028).

40. There is no evidence that AMF communicated with, or made any representation to Cochlear with respect to the '691 patent before filing suit. AMF's discussions with Cochlear in 2003 and 2006 refer only to the alleged infringement of the '616 patent. (See, e.g., Exhs. 1071, 1072, 633 & 634). "[S]ilence alone will not create an estoppel unless there was a clear duty to speak, . . . or somehow the patentee's continued silence reenforces the defendant's inference from the plaintiff's known acquiescence that the defendant will be unmolested." Aukerman, 960 F.2d at 1043-44. Cochlear has not proven by the preponderance of the evidence that AMF had a "clear duty to speak" concerning the '691 patent, or that it could reasonably infer that AMF would not file suit as to the '691 patent. In other words, there is no "misleading conduct (or silence)" to indicate that AMF did not intend to enforce the '691 patent. See Radio Sys. Corp., 709 F.3d at 1130. Thus, Cochlear's equitable estoppel argument fails as to the '691 patent.

41. With respect to the '616 patent, AMF's conduct, namely, its 2003 correspondence and silence from late 2003 through mid-2006, was not sufficiently misleading to lead Cochlear to "reasonably infer that the patentee does not intend to enforce its patent[.]" Radio Sys. Corp., 709 F.3d at 1130. "Misleading 'conduct' may include specific statements, action, inaction, or silence when there was an obligation to speak." Aspex Eyewear Inc. v. Clariti Eyewear, Inc., 605 F.3d

1305, 1310 (Fed. Cir. 2010) (citing Aukerman, 960 F.2d at 1028). Intentionally misleading silence may arise where a patentee "threatened immediate or vigorous enforcement of its patent rights but then did nothing for an unreasonably long time." Id. (internal citations omitted); see, e.g., id. at 1311 (demand letter stating patentholder's "strong intention to fully and vigorously enforce [its] rights"); Radio Sys. Corp., 709 F.3d at 1126 (demand letter alleging infringement and stating that accused infringer "must take a license or cease all manufacturing and destroy all sales inventory."). Here, while the almost three-year gap between the parties' October 2003 and August 2006 letters raise questions as to AMF's diligence, "equitable relief is not a matter of precise formula." Aspex Eyewear Inc., 605 F.3d at 1311. AMF's correspondence does not indicate that it would immediately or vigorously enforce its rights. Rather, the July 21, 2003, letter expressed AMF's interest in "first explor[ing] a license agreement . . . rather than undertak[ing] legal action." (Exh. 1071). AMF's 2003 letter also stated that AMF was "receptive to any reasonable resolution of the matter." (Id.). In the context of AMF's interactions with Cochlear, the court does not interpret AMF's discussions with Cochlear in 2003 as "threats of suit for infringement[.]" Aspex Eyewear Inc., 605 F.3d at 1311. In short, Cochlear has not proven the elements of equitable estoppel by a preponderance of the evidence.

II. LACHES.

42. A patentee's claim for pre-suit damages may be barred under the doctrine of laches where (1) "the plaintiff delayed filing suit for an unreasonable and inexcusable length of time from the time the plaintiff knew or reasonably should have known of its claim against the defendant," and (2) "the delay operated to the prejudice or injury of the defendant." Aukerman, 960 F.2d at 1028 & 1032. The alleged infringer must prove laches by a preponderance of the evidence. Id. at 1045. Historically, "[a] rebuttable presumption of laches [has arisen] when a patentee has delayed more than six years after actual or constructive knowledge of the defendant's alleged infringing activity." Vita-Mix Corp. v. Basic Holding, Inc., 581 F.3d 1317, 1333 (Fed. Cir. 2009)

(citing Aukerman, 960 F.2d at 1032).[6] Laches is an equitable defense, applied at the trial court's discretion in view of the circumstances. See Aukerman, 960 F.2d at 1036.

43. The record demonstrates that AMF had actual or constructive knowledge of Cochlear's purported infringement of the '616 patent and the '691 patent in 2003 when Schulman attended a meeting at the House Ear Institute, where he obtained literature regarding the fitting system for Cochlear's Nucleus 24 product. This literature included details of the Nucleus 24 product and how its telemetry features were used and programmed, (see Schulman Decl. at ¶ 28), and put AMF on inquiry notice regarding Cochlear's purported infringement. See Wanlass v. Gen. Elec. Co., 148 F.3d 1334, 1338 (Fed. Cir. 1998) ("sales, marketing, publication, or public use of a product similar to or embodying technology similar to the patented invention, or published descriptions of the defendant's potentially infringing activities, give rise to a duty to investigate whether there is infringement.").

44. The court is not persuaded that AMF knew or should have known of Cochlear's infringing activities due to Schulman's attendance at the Melbourne conference in 1994. (See, e.g., Schulman Decl. at ¶¶ 23-25). At the Melbourne conference, Schulman learned that Cochlear's Nucleus implant reported impedance measurements; however, he did not receive detailed technical information about the Nucleus implant. (See id.; Exh. 1075 at AMF8912). This is insufficient to establish that AMF had inquiry notice regarding Cochlear's purported infringement.

45. Likewise, the court is not persuaded by Cochlear's argument that AMF should have known of its claims by 1996, when AMF purportedly identified the Cochlear 24-N as having "back telemetry." (See RT, Jan. 22, 2014, vol. 2, at 93:5-13); Cf. Wanlass, 148 F.3d at 1339 (constructive knowledge based on defendant's "open and notorious sale of easily testable products," which gave the patentholder "the opportunity to discover the alleged infringement earlier"). The general disclosure of "back telemetry" was not enough to put AMF on inquiry notice

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[6] The Federal Circuit has granted a petition for rehearing en banc to consider Aukerman in light of Petrella v. Metro-Goldwyn-Mayer, Inc., 134 S.Ct. 1962 (2014). See SCA Hygiene Prods. Aktiebolag v. First Quality Baby Prods., LLC, 2014 WL 7460970, *1 (Fed. Cir. 2014). The court has analyzed both Aukerman and Petrella, and considers its ruling consistent with both decisions.

of its claims. For the same reasons, AMF did not have actual or constructive knowledge of Cochlear's infringement in 1998, when Schulman learned that Cochlear's Nucleus 24 implant had telemetry features. (See Schulman Decl. at ¶ 26). Under the circumstances, Cochlear has not presented sufficient evidence to establish that AMF had constructive knowledge of its claims in the 1994-1998 time frame.

46. AMF presented credible evidence that Cochlear's implants and processors were not available to AMF for testing, and the readily available materials were not detailed enough for AMF to reach a conclusion as to whether Cochlear's telemetry features were similar to those claimed in the patents-in-suit. (See Schulman Decl. at ¶ 27). The record does not indicate that AMF received detailed technical information, such that AMF should have known of its claims against Cochlear. Nor has Cochlear demonstrated that other public information was detailed enough to put AMF on inquiry notice of its claims. See Wanlass, 148 F.3d at 1338-39 (constructive knowledge may be warranted due to disclosures in "readily available information").

47. Based on the foregoing, the court finds that AMF knew or should have known of its claims in 2003, when it obtained detailed technical information regarding Cochlear's accused devices. (See Schulman Decl. at ¶ 28).

48. AMF filed suit in December 2007. Thus, AMF delayed approximately four years before filing suit, so the traditional presumption of laches does not apply. See Aukerman, 960 F.2d at 1028 & 1035.

49. AMF's four-year delay in bringing suit was not unreasonable under the circumstances. See Aukerman, 960 F.2d at 1032 ("The length of time which may be deemed unreasonable has no fixed boundaries but rather depends on the circumstances."). In the 2003-2007 time frame, AMF had limited resources, and it devoted substantial portions of its resources to its research and development activities, such as the Battery Bion project. (See Schulman Decl. at ¶ 15). During this time period, AMF also conducted a human clinical trial at the University of Southampton, in order to reanimate paralyzed arms of post-stroke patients. (See Hankin Decl. at ¶ 13). AMF also initiated a trial involving the reanimation of paralyzed legs of post-spinal cord injury patients. (See id. at ¶ 21). Given AMF's limited personnel, AMF's delay in filing suit was not unreasonable.

50. In addition, the court is not persuaded that Cochlear suffered economic prejudice due to AMF's delay. See Aukerman, 960 F.2d at 1033. First, while Cochlear argues that it would not have invested in the "new Nucleus Freedom implant with the exact same telemetry system" as the older accused products, (see Cochlear's Bench Tr. Br. at 4), Cochlear conceded that it did not change the development plans for its implants or processors based on the 2003 letter from AMF. (See PTO, App. A, at No. 188). For the same reason, the court is not persuaded by Cochlear's argument, (see Cochlear's Bench Tr. Br. at 4), that it "could have" designed around the '616 patent with an earlier lawsuit, as there was nothing preventing Cochlear from designing around the '616 patent on the basis of AMF's 2003 letter. In short, Cochlear has not shown economic prejudice due to the delay in filing suit.

51. Likewise, the court is not persuaded by Cochlear's assertions regarding evidentiary prejudice. (See Cochlear's Bench Tr. Br. at 4-5). While some trial witnesses had difficulty remembering some details, the court is not persuaded that such issues rendered Cochlear unable to "present a full and fair defense on the merits[.]" Aukerman, 960 F.2d at 1033. For instance, Cochlear did not present evidence that the "loss of records" or "death of a witness" undermined the trial. (See, generally, Cochlear's Bench Tr. Br. at 4-5). As for fading memories, AMF presented credible evidence that the witness testimony would not have been materially different if it had filed suit earlier. (See, e.g., Schulman Decl. at ¶¶ 33-36).

52. In short, Cochlear has not proven the laches defense by the preponderance of the evidence.

III. INEQUITABLE CONDUCT.

53. In order to prevail on an inequitable conduct defense, "the accused infringer must prove that the applicant misrepresented or omitted material information with the specific intent to deceive the PTO. The accused infringer must prove both elements – intent and materiality – by clear and convincing evidence." Therasense, Inc. v. Becton, Dickinson & Co., 649 F.3d 1276, 1287 (Fed. Cir. 2011) (en banc) (internal citations omitted). "[G]ross negligence or negligence under a 'should have known' standard does not satisfy this intent requirement." Id. at 1290. In a case that involves the nondisclosure of a prior art reference, "clear and convincing evidence must show that

the applicant made a deliberate decision to withhold a known material reference." Id. (internal quotation marks and emphasis omitted)." Accordingly, "the accused infringer must prove by clear and convincing evidence that the applicant knew of the reference, knew that it was material, and made a deliberate decision to withhold it." Id. While the trial court "may infer intent from indirect and circumstantial evidence[,]" the intent to deceive must be "the single most reasonable inference able to be drawn from the evidence." Id. (internal quotation marks omitted). The evidence "must be sufficient to require a finding of deceitful intent" under the circumstances. Id. (internal quotation marks omitted). Intent to deceive may not be found where "there are multiple reasonable inferences that may be drawn[.]" Id. at 1290-91.

54. Cochlear asserts that AMF engaged in inequitable conduct as to the '616 patent, due to the failure of Bryant Gold, one of AMF's patent prosecutors, to disclose the 1989 McDermott article. (See Cochlear's Bench Tr. Br. at 14-16).

55. The jury provided an advisory verdict that Cochlear did not prove inequitable conduct by clear and convincing evidence. (See Verdict Form at 9-10).

56. Based on the record, the court is not persuaded that it should disturb the jury's advisory verdict. As for materiality, AMF presented evidence that the 1989 McDermott article was cumulative of the cited prior art. See Therasense, 649 F.3d at 1291 (but-for materiality standard for materiality). It is undisputed that the Applicants disclosed the McDermott '844 patent during prosecution. (See PTO, App. A, at Nos. 14-15, 18-19). Gold testified that cited prior art, such as the McDermott '844 patent, the Borkan '934 patent, and the Schulman '679 patent, "disclose[d] everything and more than is disclosed in the McDermott article." (RT, Jan. 21, 2014, vol. 1, at 80:15-86:18 & 88:9-12). Based on the jury's advisory verdict, the jury apparently found Gold's testimony credible. The court agrees with the jury's credibility finding. Based on the current record, it is reasonable to conclude that the 1989 McDermott article was cumulative. See Therasense, Inc., 649 F.3d at 1290-91. Thus, Cochlear has not proven materiality by clear and convincing evidence.

57. As for intent to deceive, AMF presented evidence that Gold did not have the requisite intent, for instance, because he did not consider the McDermott material. (See, e.g., RT, Jan. 21,

2014, vol. 1, at 80:12-83:16 & 86:11-18); see Therasense, Inc., 649 F.3d at 1290 ("the accused infringer must prove by clear and convincing evidence that the applicant . . . knew that [the reference] was material"). Based on the evidence regarding the cited prior art, it is reasonable to conclude that Gold considered the 1989 McDermott article cumulative during prosecution. Under the circumstances, intent to deceive is not the most reasonable inference drawn from the evidentiary record. See id.

58. Cochlear has not proven inequitable conduct by clear and convincing evidence, so the '616 patent is not unenforceable due to inequitable conduct.

IV. PROSECUTION HISTORY ESTOPPEL.[7]

59. "Prosecution history estoppel prevents a patentee from recapturing under the doctrine of equivalents subject matter surrendered during prosecution to obtain a patent." Cross Med. Prods. v. Medtronic Sofamor Danek, Inc., 480 F.3d 1335, 1341 (Fed. Cir. 2007); see Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd., 535 U.S. 722, 738, 122 S.Ct. 1831, 1841 (2002). "There are two distinct theories that fall under the penumbra of prosecution history estoppel – amendment-based estoppel and argument-based estoppel. . . . In general, prosecution history estoppel, under either theory, requires that patent claims be interpreted in light of the proceedings before the PTO." Deering Precision Instr., L.L.C. v. Vector Distrib. Sys., Inc., 347 F.3d 1314, 1324-25 (Fed. Cir. 2003), cert. denied, 540 U.S. 1184 (2004).

60. For amendment-based estoppel, where the applicant "narrowed the claim in response to a rejection, courts may presume the amended text was composed with awareness of this rule and that the territory surrendered is not an equivalent of the territory claimed." Deering Precision

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[7] AMF notes that Cochlear abandoned its prior prosecution history estoppel argument as to the "means for transmitting" limitation in the '691 patent, which purportedly barred the use of the doctrine of equivalents to cover a single-antenna implant. (See AMF's Bench Tr. Br. at 17-18). Cochlear did not present this argument during the bench trial. (See, generally, Cochlear's Bench Tr. Br. at 16-18; RT, Jan. 22, 2014, vol. 2; Defendants' Cochlear Ltd. and Cochlear Americas' Proposed Findings of Fact and Conclusions of Law; Defendants Cochlear Ltd. and Cochlear Americas' Opening Statement) (no reference to "means for transmitting" limitation or antenna-based theory for prosecution history estoppel). Accordingly, it is unnecessary to address this limitation.

Instr., L.L.C., 347 F.3d at 1325 (internal quotation marks omitted). In order to rebut the presumption, "the patentee must show that at the time of the amendment one skilled in the art could not reasonably be expected to have drafted a claim that would have literally encompassed the alleged equivalent." Id. (internal quotation marks omitted). The patentee may do so by showing that (1) "the equivalent may have been unforeseeable at the time of the amendment;" (2) "the rationale underlying the amendment may bear no more than a tangential relation to the equivalent in question;" or (3) "there may be some other reason suggesting that the patentee could not reasonably be expected to have described the insubstantial substitute in question." Id. As for argument-based estoppel, the "prosecution history must evince a clear and unmistakable surrender of subject matter." Id. at 1326 (internal quotation marks omitted).

61. Cochlear argues that AMF narrowed claim 10 of the '616 patent by: (1) adding the "displaying" limitation to overcome the prior art; and (2) modifying the "selectively monitoring" limitation. (See Cochlear's Bench Tr. Br. at 16-18). Cochlear also notes that in the response to the Amendment, the Examiner withdrew the rejection, stating that claim 10 is "allowable over the prior art of record since the prior art does not show or suggest the measuring of the electrode voltage for external display." (Id. at 17) (emphasis from brief omitted).

62. AMF argues that it has rebutted the Festo presumption, because the focus of the amendment was on "the displaying capability of the invention, not on any particular type of information that must be displayed." (AMF's Bench Tr. Br. at 16). In addition, AMF contends that "the Patent Examiner focused on the fact that this invention, as opposed to the [prior art] pacemaker, allowed for a display of the data measurements that are taken in real time." (Id. at 17 (quoting the Claim Construction Order)) (emphasis omitted). As for the "selectively monitoring" limitation, AMF asserts that the modification is tangential to the equivalent at issue in the "displaying" limitation. (See AMF's Bench Tr. Br. at 17). Finally, AMF argues that the statements of the Examiner alone cannot give rise to prosecution history estoppel. (Id.).

63. Based on a review of the prosecution history and the parties' briefing, the court is persuaded by AMF's arguments. As for the "displaying" limitation, the Applicants' addition of the "displaying" limitation to claim 10 was directed towards overcoming the pacemaker prior art that

lacked a display. "'[T]he inquiry into whether a patentee can rebut the Festo presumption under the 'tangential' criterion focuses on the patentee's objectively apparent reason for the narrowing amendment.'" Regents of the Univ. of Cal. v. Dakocytomation Cal., Inc., 517 F.3d 1364, 1378 (Fed. Cir. 2008) (quoting Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd., 344 F.3d 1359, 1367 (Fed. Cir. 2003)). An amendment may be "tangential," where the focus of the amendment was not the equivalent at issue. See, e.g., Regents of the Univ. of Cal., 517 F.3d at 1378 ("The prosecution history therefore reveals that in narrowing the claim to overcome the prior art rejections, the focus of the patentees' arguments centered on the method of blocking – not on the particular type of nucleic acid that could be used for blocking."); Funai Elec. Co., Ltd. v. Daewoo Elecs. Corp., 616 F.3d 1357, 1369-70 (Fed. Cir. 2010) ("It is apparent that the nature of the insulating material was not a factor in the allowance . . . . This limitation is in the category that the Court called 'merely tangential' to the prosecution, as discussed in Festo. Thus the district court correctly held that the cancellation of claims 1 and 2 did not surrender access to equivalency with respect to the insulating material. The district court appropriately tried the question of equivalency to the jury."). Here, the prior art rejection and the amendment to add the "displaying" limitation was focused on the displaying capability of its invention, not on the particular type of information that must be displayed. Thus, the "objectively apparent reason" for the amendment was to overcome the pacemaker prior art, which did not include the real-time display of data. See Regents of the Univ. of Cal., 517 F.3d at 1378 ("prosecution history estoppel will not bar the doctrine of equivalents when 'the reason for the narrowing amendment was peripheral, or not directly relevant, to the alleged equivalent'").

64. As for the "selectively monitoring" amendment, the Examiner rejected claim 10 (then claim 12), on the basis of § 112, explaining, for instance, that it is "indefinite in the use of the alternative phrase voltages/current." (See Exh. 1303 at COC-2116). The Examiner reiterated that voltage measurements require a reference. (See id.). In the Amendment, the Applicants replaced "voltages/currents" with "a voltage . . . ." (See Exh. 1303 at COC-2205). While it is possible that the amendment to the "selectively monitoring" limitation may foreclose a doctrine of equivalents argument regarding the "voltage" in that step, the court is not persuaded by Cochlear's argument

that AMF should be broadly "estopped from asserting infringement of claim 10 under the doctrine of equivalents." (See Cochlear's Bench Tr. Br. at 17). Here, the equivalent at issue is in the "displaying" step of claim 10. (See id. at 18). However, claim 10 recites several intermediate steps between the "selectively monitoring" and "displaying" steps, which even involve processing the data. (See '616 patent at col. 35:56-36:8). In particular, after the electrodes have been "selectively monitored" to "measure a voltage," the (1) "status-indicating signals representative of the measurements" are generated, (2) these signals are transmitted, and (3) the "status-indicating signals" are processed "to produce processed status-indicating signals," which are then (4) displayed in the "displaying" step. Under the circumstances, the amendment of the "selectively monitoring" limitation is "tangential" to the equivalent in the "displaying" step. See Regents of the Univ. of Cal., 517 F.3d at 1376. The court's review of the prosecution history does not indicate the surrender of the doctrine of equivalents in the "displaying" step. See Intervet Inc. v. Merial Ltd., 617 F.3d 1282, 1291 (Fed. Cir. 2010) ("There is no reason why a narrowing amendment should be deemed to relinquish equivalents . . . beyond a fair interpretation of what was surrendered.") (internal quotation marks omitted).

65. Finally, Cochlear asserts that AMF is estopped from asserting infringement of claim 10 under the doctrine of equivalents based on the Examiner's statement that "the prior art does not show or suggest the measuring of the electrode voltage for external display." (Cochlear's Bench Tr. Br. at 17) (citing Exh. 1303 at COC-2221). Cochlear's assertions are unpersuasive. The Examiner's Notice of Allowance cannot, by itself, give rise to disavowal of claim scope. See Salazar v. Procter & Gamble Co., 414 F.3d 1342, 1347 (Fed. Cir. 2005) ("The parties . . . contest whether the applicant's silence to the examiner's remarks in the Examiner's Statements of Reasons for Allowance amounts to a clear disavowal of claim scope . . . . [S]uch statements do not amount to a clear disavowal of claim scope[.]"). Moreover, the court interprets Examiner Kamm's emphasis to be on the "external display," and does not interpret the Examiner's comment as requiring the display of a voltage value. Indeed, during claim construction, the court rejected a similar argument by Cochlear that claim 10 "must be construed to require that the display be in voltage form." (Claim Construction Order at 2). The court explained that "the Patent Examiner

did not emphasize the measuring and displaying of the electrode voltage in voltage form. Rather, the Patent Examiner focused on the fact that this invention, as opposed to a pacemaker, allowed for a display of the data measurements that are taken in real time." (See id. at 3) (emphasis in original).

66. In short, the court finds that AMF rebutted the Festo presumption, and that AMF is not foreclosed from arguing that the "displaying" step in claim 10 is met under the doctrine of equivalents.

V. INDEFINITENESS.[8]

67. A patent is presumed to be valid. 35 U.S.C. § 282. A party challenging the validity of a patent must prove invalidity by clear and convincing evidence. Intel Corp. v. VIA Techs., 319 F.3d 1357, 1366 (Fed. Cir. 2003) ("Any fact critical to a holding on indefiniteness, moreover, must be proven by the challenger by clear and convincing evidence.").

68. Whether a claim is indefinite or definite is a question of law. See DDR Holdings, LLC v. Hotels.com, L.P., 773 F.3d 1245, 1260 (Fed. Cir. 2014). The indefiniteness or definiteness analysis requires a determination of whether one skilled in the art would understand the bounds of the claim when read in light of the specification. See Personalized Media Commc'ns, LLC v. Int'l Trade Comm'n, 161 F.3d 696, 705 (Fed. Cir. 1998) ("Determining whether a claim is definite requires an analysis of whether one skilled in the art would understand the bounds of the claim when read in light of the specification. . . . If the claims read in light of the specification reasonably

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[8] In the bench trial, Cochlear also argued indefiniteness as to the "means in the WP for receiving and processing the ICS-status-indicating signals" limitation in claims 6 and 7 of the '691 patent. (See, e.g., Direct Testimony of Robert J. Stevenson, Ph.D. Re Indefiniteness ("Stevenson Decl.") at ¶¶ 15-18) (Document No. 410). However, Cochlear did not identify the indefiniteness issue for this limitation in its Memorandum of Contentions of Fact and Law. (See, generally, Def.'s Memorandum of Contentions of Fact and Law at 50-54) (Document No. 310). Nor did Cochlear identify this limitation in its claim construction briefing or its motion for summary judgment. (See Integrated, Joint Brief on Claim Construction at 7) (Document No. 59) (Joint Brief re: Summary Judgment Motions at 27-30 (Document No. 246). Finally, the parties did not identify the claim limitations at issue for indefiniteness in the pretrial order. (See, generally, PTO). Under the circumstances, the court finds that Cochlear waived the indefiniteness argument as for the "means in the WP for receiving and processing the ICS-status-indicating signals" limitation in claims 6 and 7. AMF's objection to Cochlear's inclusion of this limitation in its indefiniteness case, (see AMF's Bench Tr. Br. at 13-14), is sustained.

apprise those skilled in the art of the scope of the invention, § 112 demands no more.") (internal quotation marks omitted); see also Nautilus, Inc. v. Biosig Instruments, Inc., 134 S.Ct. 2120, 2129 (2014) ("[W]e read §112, ¶ 2 to require that a patent's claims, viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty."); Source Search Tech. LLC v. LendingTree, LLC, 588 F.3d 1063, 1077 (Fed. Cir. 2009) ("[T]his court measures indefiniteness according to an objective measure that recognizes artisans of ordinary skill are not mindless 'automatons.'").

69. "While it is undisputed that the question of whether a claim is indefinite is based on how the claim limitation would be understood by one of skill in the art, the testimony of one of ordinary skill in the art cannot supplant the total absence of structure from the specification." Noah Sys., Inc. v. Intuit Inc., 675 F.3d 1302, 1312 (Fed. Cir. 2012) (internal quotation marks omitted); see also Intel, 319 F.3d at 1366 (holding that the internal circuitry of an electronic device need not be disclosed in the specification if one of ordinary skill in the art would understand how to build and modify the device); Finisar Corp. v. DirecTV Group, Inc., 523 F.3d 1323, 1341 (Fed. Cir.), cert. denied, 555 U.S. 1070 (2008) ("This court does not impose a lofty standard in its indefiniteness cases."); Telcordia Techs., Inc. v. Cisco Sys., 612 F.3d 1365, 1377 (Fed. Cir. 2010) (where defendant bears the burden of proving that an ordinary artisan would not understand the disclosure, finding that the trial record did not show that an ordinary artisan would not understand the link between the controller and the monitoring function).

70. "In a means-plus-function claim in which the disclosed structure is a computer, or microprocessor, programmed to carry out an algorithm, the disclosed structure is not the general purpose computer, but rather the special purpose computer programmed to perform the disclosed algorithm." WMS Gaming, Inc. v. Int'l Game Tech., 184 F.3d 1339, 1349 (Fed. Cir. 1999). Accordingly, a means-plus-function limitation can be indefinite, due to the failure to adequately disclose an algorithm corresponding to the microprocessor's function. See Noah Sys., 675 F.3d at 1312 ("In cases such as this one, involving a special purpose computer-implemented means-plus-function limitation, this court has consistently required that the structure disclosed in the specification be more than simply a general purpose computer or microprocessor. We require

that the specification disclose an algorithm for performing the claimed function.") (internal quotation marks, footnote, and citation omitted); see also Net MoneyIN, Inc. v. VeriSign, Inc., 545 F.3d 1359, 1367 (Fed. Cir. 2008) ("To avoid purely functional claiming in cases involving computer-implemented inventions, we have consistently required that the structure disclosed in the specification be more than simply a general purpose computer or microprocessor.") (internal quotation marks omitted).

71. "For a claim to be definite, a recited algorithm, or other type of structure for a section 112(f) claim limitation, need not be so particularized as to eliminate the need for any implementation choices by a skilled artisan; but it must be sufficiently defined to render the bounds of the claim – declared by section 112(f) to cover the particular structure and its equivalents – understandable by the implementer." Ibormeith IP, LLC v. Mercedes-Benz USA, LLC, 732 F.3d 1376, 1379 (Fed. Cir. 2013). "The usage 'algorithm' in computer systems has broad meaning, for it encompasses in essence a series of instructions for the computer to follow, whether in mathematical formula, or a word description of the procedure to be implemented by a suitably programmed computer." Typhoon Touch Techs., Inc. v. Dell, Inc., 659 F.3d 1376, 1384 (Fed. Cir. 2011) (internal quotation marks and citation omitted); see Finisar, 523 F.3d at 1340 ("This court permits a patentee to express that algorithm in any understandable terms including as a mathematical formula, in prose, . . . or as a flow chart, or in any other manner that provides sufficient structure.") (internal citation omitted).

A. Claim 1 of the '616 Patent.

72. Claim 1 of the '616 patent discloses a "physician's tester," comprising, among other things, an "external processor means coupled to the transmitting means of the external headpiece/transmitter for receiving and processing the status-indicating signals to derive information therefrom regarding the operation of the implanted stimulator and its plurality of tissue stimulating electrodes." The parties agree that the "external processor means" limitation is a means-plus-function limitation. (See Joint Brief re: Summary Judgment Motions at 9 & 29). For purposes of this inquiry, the relevant part of the function is "processing the status-indicating signals to derive information therefrom regarding the operation of the implanted stimulator and its plurality

of tissue stimulating electrodes." The parties agree that the corresponding structure is an antenna, receiver, and microprocessor. (See R&R at 3-4).

73. The court previously found that the disclosed microprocessor is programmed, and therefore, an adequate disclosure of an algorithm is required. (See Court's Order January 3, 2014, at 35).

74. Cochlear argues that claim 1 of the '616 patent is indefinite, because it fails to disclose an algorithm for "processing the status-indicating signals to derive information therefrom regarding the operation of the implanted stimulator and its plurality of tissue stimulating electrodes." (See Stevenson Decl. at ¶ 19).

75. The "external processor means . . . for . . . processing the status-indicating signals" claim limitation relates to the "physician's tester," which is described in columns 32-33 of the '616 patent. Cochlear's expert posits that "[t]here is very little disclosure to inform [his] inquiry regarding processing status-indicating signals" in that section. (See Stevenson Decl. at ¶ 21). Having reviewed the specification, the court agrees. The physician's "tester monitors the performance parameters of the ICS 12 by detecting the back telemetry signal of the ICS in an interrogation protocol[9] for the microprocessor." ('616 patent at col. 32:60-62). After the tester stores the back telemetry signal in its memory, the tester's control panel, "which contains electronic circuitry," "conver[ts] the back telemetry signal into directly readable information[,] which is read out on the LCD display 304." (Id. at col. 32:63-33:2). In addition, the control panel's knobs can be adjusted to change the values that are measured and displayed. The knobs "control potentiometers, the position of which are read by the microprocessor 30 to control the commands . . . and hence the parameters measured and displayed by the ICS and Physician's Tester combination." (Id. at col. 33:14-18). In short, while the "physician's tester" section generally explains that the tester converts the back telemetry signal into readable information and that the microprocessor helps control the commands, it does not disclose how the microprocessor

[9] "Interrogation protocol" is not defined or discussed in the '616 patent. (See, generally, '616 patent).

"processes" the signal from the implant "to derive information therefrom regarding the operation" of the implant and the electrodes. (See id. at col. 34:46-52).

76. The tester described in Figure 7 is based on the components in the wearable processor. (See '616 patent at col. 32:55-59; Figs. 1 & 7). Thus, the court reviews the corresponding discussion of the microprocessor. (See id. at col. 5). The ICS's "processor 46 selectively monitors the voltage applied . . . and generates a status indicating signal relative to such voltage which is transmitted by the telemetry transmitter 42 and received by the telemetry receiver 36 [in the wearable processor]. As previously stated, such information is utilized in the microprocessor 30 and gate array 32 of the WP 16 to control the power level[.]" (Id. at col. 5:38-47). Similarly, "power level indicating signals" are received by the transmitter (Block 36) in the WP "and processed in the microprocessor 30 and gate array 32 to generate signals controlling the power level." (Id. at col. 5:8-13). Like columns 32-34, this discussion does not provide significant guidance regarding how the microprocessor "processes" the signal from the implant "to derive information therefrom regarding the operation" of the implant and the electrodes. (See id. at col. 34:46-52). The court has reviewed the rest of the specification, and it has not located an express disclosure of an algorithm for the "processing the status-indicating signals" function.

77. AMF argues that the '616 patent discloses an algorithm for the "processing the status-indicating signals . . ." limitation.[10] Specifically, AMF's expert, Dr. Darrin Young, Ph.D. ("Young"), asserts that the '616 patent discloses an algorithm for the microprocessor that "includes the steps of (1) accepting from the receiver signals representative of measured voltage," and "(2) applying Ohm's law to convert the measured voltage or voltage and current into an impedance value." (Declaration of Dr. Darrin J. Young in Opposition to Cochlear Defendants' Indefiniteness Claim ("Young Decl.") at ¶ 30) (Document No. 406). He further explains that Figure 6 and the tables identify "impedance" as a value that has been derived. (See id. at ¶ 29; '616 patent at Fig. 6, col. 33:23-54). He then states that a person of ordinary skill in the art would understand from the

[10] AMF has not identified another algorithm in its briefing or supporting declaration. (See, generally, AMF's Bench Tr. Br. at 10-12; Young Decl.).

specification that the tester instructs the microprocessor to calculate impedance, and that one of ordinary skill would know that "[t]he algorithm for calculating impedance is Ohm's law[.]" (See Young Decl. at ¶¶ 31 & 34).

78. AMF's argument is based on the premise that the patentee necessarily disclosed Ohm's law by identifying impedance and voltage. The court is not persuaded by AMF's argument. First, the '616 patent does not identify Ohm's law in the disclosure. (See, generally, '616 patent). Second, AMF's theory that a person of ordinary skill in the art would know how to calculate impedance by using Ohm's law does not mean that the patentee adequately disclosed an algorithm. See Blackboard, Inc. v. Desire2Learn, Inc., 574 F.3d 1371, 1385 (Fed. Cir. 2009) ("The question before us is whether the specification contains a sufficiently precise description of the 'corresponding structure' to satisfy section 112, paragraph 6, not whether a person of skill in the art could devise some means to carry out the recited function."). Third, AMF practically concedes that there are multiple ways to calculate impedance. (See Young Decl. at ¶ 41) (discounting relevance of alternate equation to calculate impedance); See also Noah Sys. Inc., 675 F.3d at 1317 ("We explained that the disclosure must identify the method for performing the function, whether or not a skilled artisan might otherwise be able to glean such a method from other sources or from his own understanding. . . . That various methods might exist to perform a function is 'precisely why' the disclosure of specific programming is required.") (citations and emphasis omitted).

79. Based on the court's review of the specification and the evidence presented during the trials, the court finds that the '616 patent does not disclose an algorithm for "processing the status-indicating signals to derive information therefrom regarding the operation of the implanted stimulator and its plurality of tissue stimulating electrodes." Defendants have proven by clear and convincing evidence that the '616 patent fails to disclose the algorithm necessary to achieve the claimed function. See WMS Gaming, Inc., 184 F.3d at 1349; Aristocrat Techs. Austl. Pty Ltd. v. Int'l Game Tech., 521 F.3d 1328, 1333-38 (Fed. Cir.), cert. denied, 555 U.S. 1070 (2008). Thus, claim 1 of the '616 patent is invalid as indefinite.

B. Claims 6 and 7 of the '691 Patent.

80. Claims 6 and 7 of the '691 patent require a "means for generating data indicative of the audio signal."[11] This claim limitation has been determined to be a means-plus-function element. (See R&R at 28). The recited function is "generating data indicative of the audio signal," and the corresponding structure is "a microprocessor." (See R&R at 26 & 28; Claim Construction Order at 25).

81. The court previously found that the microprocessor structure corresponding to the "means for generating data indicative of the audio signal" requires the disclosure of a corresponding algorithm. (See Court's Order of January 3, 2014, at 32).

82. Cochlear argues that the '691 patent fails to disclose any algorithm for the microprocessor to perform the "generating data indicative of the audio signal" limitation in claims 6 and 7. (Cochlear's Bench Tr. Br. at 10-11). Cochlear's expert, Dr. Robert J. Stevenson, Ph.D., ("Stevenson") asserts that the specification's description only "provides that a digitized signal is applied to microprocessor 30[,]" and that the "output from the microprocessor is converted into a serial bit stream for transmission to the ICS[.]" (Stevenson Decl. at ¶ 12). Indeed, the specification explains that the audio signals are "processed by a multiplexer 26 and converted to a series of digital signals by an A to D converter 28 for application to a microprocessor 30." ('691 patent at col. 4:49-52). The specification further states that "[t]he output of the microprocessor 30 is coupled through the custom gate array 32 that converts data from the microprocessor into a serial bit stream going to a data transmitter 34." (Id. at col. 4:59-62). Thus, the specification describes the signal flow into the microprocessor (Block 30), as well as the signal flow out of the microprocessor. However, this section of the specification does not disclose how the microprocessor generates the "data indicative of the audio signal."

83. The specification also describes an embodiment where the "filter bank may . . . be implemented as a group of digital filters, for example in a digital signal processor integrated

[11] Claim 7 of the '691 patent depends on claim 6 and therefore incorporates the "means for generating data indicative of the audio signal" by reference.

circuit." ('691 patent at col. 4:52-55); (see id. at Fig. 1) (identifying multichannel filter bank as Block 24). In this embodiment, "the signal flow would be from the audio front end and AGC 22, through an anti-aliasing filter, to an analog to digital filter, then into a digital filter bank 24 and the general processing of microprocessor 30." (Id. at col. 4:52-58). While this portion of the specification discloses a variation in the signal flow, it is still silent regarding what happens within the microprocessor. Rather, the '691 patent discloses "general processing of microprocessor 30." (Id.). The court has reviewed the rest of the specification, and it has not located an express disclosure of an algorithm for the "means for generating data indicative of the audio signal" requirement.

84. In response, AMF asserts that claims 6 and 7 of the '691 patent are not indefinite, because the microprocessor "implement[s] a logarithmic conversion algorithm to generate data indicative of [an] audio signal."[12] (AMF's Bench Tr. Br. at 12). AMF's expert, Young, posits that "the steps (or algorithm) performed by the microprocessor in the '691 patent to be: (1) receiving digital data from the analog to digital converter and (2) using a logarithmic conversion function to format the received data to be encoded on an amplitude modulated signal." (Young Decl. at ¶ 15). AMF argues that "because the implant includes an 'exponential D to A converter'" to decompress data, the "microprocessor in the WP must employ a logarithmic conversion algorithm[.]" (AMF's Bench Tr. Br. at 12). The specification discloses the implanted cochlea system (i.e., implant), that uses "an exponential D to A converter 64." (see '691 patent at Fig. 2, col. 5:62 & col. 6:58). Young asserts that the "algorithm is implemented with a simple logarithmic lookup table[,]" and that he "know[s] of no other way to implement such a logarithmic algorithm in a DSP." (Young Decl. at ¶ 17).

85. Based on the intrinsic record and the evidence presented in trial, the court is not persuaded by AMF's theory. First, while it may be necessary for the wearable processor (WP) (Block 16 in Figure 1) in the '691 patent to perform a logarithmic conversion, because the

[12] AMF has not identified another algorithm in its briefing or supporting declaration. (See, generally, AMF's Bench Tr. Br. at 12-13; Young Decl.).

implantable cochlear system includes an exponential D/A converter, it has not been established that the logarithmic conversion must take place in the microprocessor (Block 30). AMF's expert admitted that the '691 patent does not state that the logarithmic conversion must take place in the microprocessor. (See RT, Jan. 22, 2014, vol. 2, at 99:2-4) (Q: "Does the patent say that that function, the logarithmic conversion, is done in the microprocessor?"; A: "The patent doesn't say that."). Moreover, Young admitted that the logarithmic function could be performed by the A to D converter. (See id. at 98:13-15) (Q: "So it can't be in the A to D converter?"; A: "You could implement a logarithmic function into the A to D converter"). Young later admitted that based on the disclosure of an exponential delay, the logarithmic function must generally take place in the wearable processor, not specifically in the microprocessor. (See id. at 100:20-24) (Q: "The patent doesn't say how to implement a logarithmic function in the microprocessor; does it?"; A: "The patent disclose an exponential delay. And when I read that, it suggests to me they got to be a logarithmic function in the external wearable processor."). Stevenson, Cochlear's expert, confirmed that the logarithmic conversion can take place using a logarithmic A to D converter. (See, e.g., id. at 78:5-15). Under the circumstances, the court is not persuaded by AMF's theory, which is based on the flawed assumption that the logarithmic conversion must be performed by the microprocessor.

86. AMF's algorithm theory is also unavailing, because the record demonstrates that there are multiple logarithmic algorithms. See Noah Sys. Inc., 675 F.3d at 1317 ("We explained that the disclosure must identify the method for performing the function, whether or not a skilled artisan might otherwise be able to glean such a method from other sources or from his own understanding. . . . That various methods might exist to perform a function is 'precisely why' the disclosure of specific programming is required.") (citations and emphasis omitted). AMF has not presented credible evidence that there is only a single algorithm available, i.e., "a simple logarithmic lookup table[.]" (See Young Decl. at ¶ 17). Young's declaration is equivocal on the topic. (See id.) ("I know of no other way to implement such a logarithmic algorithm in a DSP.") (emphasis added). Moreover, during the bench trial, Young admitted that there are additional possible algorithms, such as a power series algorithm and a binary logarithmic algorithm. (See

RT, Jan. 22, 2014, vol. 2, at 99:2-100:21). Thus, the disclosure in the '691 patent of the purported algorithm for the microprocessor is deficient.

87. Based on the foregoing, claims 6 and 7 of the '691 patent are invalid as indefinite because it has been proven by clear and convincing evidence that the specification of the '691 patent fails to disclose the requisite algorithm for the microprocessor to perform the "means for generating data indicative of the audio signal" function. See 35 U.S.C. § 112(f); WMS Gaming, Inc., 184 F.3d at 1349; Aristocrat Techs. Austl. Pty Ltd. , 521 F.3d at 1333-38.

88. Any conclusion of law that more correctly constitutes a finding of fact should be treated as such.

CONCLUSION

Based on the foregoing, IT IS ORDERED that:

1. Defendants have not met their burden to show that plaintiff should be equitably estopped from enforcing its claims.

2. Defendants have not met their burden to show that plaintiff should be barred from pre-suit damages under the doctrine of laches.

3. Defendants have not met their burden to show that plaintiff committed inequitable conduct before the PTO.

4. Plaintiff is not prevented from asserting an infringement theory under the doctrine of equivalents for the "displaying" limitation of claim 10 of the '616 patent.

5. Claim 1 of the '616 patent, and claims 6 and 7 of the '691 patent are invalid on indefiniteness grounds.

Dated this 31st day of March, 2015.

/s/
Fernando M. Olguin
United States District Judge