IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF PENNSYLVANIA

CARNEGIE MELLON UNIVERSITY,	)	
	)	
Plaintiff,	)	
	)	
v.	)	Civil No. 09-290
	)	Judge Nora Barry Fischer
MARVELL TECHNOLOGY GROUP, LTD.,	)	
and MARVELL SEMICONDUCTOR, INC.,	)	
	)	
Defendants.	)	

MEMORANDUM OPINION

I. Introduction

Carnegie Mellon University ("CMU" or "Plaintiff") brought this patent infringement lawsuit against Marvell Technology Group, Ltd. and Marvell Semiconductor, Inc. (collectively, "Marvell" or "Defendants"). Currently pending before the Court is Marvell's "Motion for Partial Summary Judgment of Invalidity of U.S. Patent Nos. 6,201,839 and 6,438,180." (Docket No. 218). The Court has considered Marvell's motion and accompanying documents, (Docket Nos. 218-222), CMU's brief in opposition and accompanying documents, (Docket Nos. 232-234), Marvell's reply and documents, (Docket Nos. 249-251), CMU's sur-reply, (Docket Nos. 264-65), oral argument presented during two separate hearings, (Docket Nos. 274 and 292), Marvell's supplemental memorandum, (Docket No. 287), and CMU's supplemental memorandum. (Docket No. 291). The motion is fully ripe. Although it was a "close call," for reasons stated more fully herein, Marvell's motion [218] is DENIED.

II. Background

a. Factual Background

On March 21, 1995, Seagate filed a patent application on Glen Worstell's invention. (Docket No. 219 at 3). This application matured into U.S. Patent No. 6,282,251 (the "'251 Patent" or "Seagate Patent"), entitled "Modified Viterbi Detector Which Accounts for Correlated Noise."[1] (*Id.*). *See also* '251 Patent. It issued on August 28, 2001. *Id.* This patent "relates to disc drives. More particularly, [the invention] relates to a data detector in a disc drive wherein the data detector accounts for correlated noise." *Id.* at col. 1 lns. 4-7.

Doctors Aleksandar Kavcic and Jose M. F. Moura submitted a "Disclosure of Invention" to the CMU Technology Transfer Office on March 10, 1997. (Docket No. 220-4). The invention was entitled "Correlation-Sensitive Adaptive Sequence-Detector." (*Id.*). The Disclosure listed the date of conception as "05-96." (*Id.* at ¶ 6).

In April 1997, CMU shared the invention disclosure with engineers from Seagate, among other firms. (*See* Docket No. 220-7 at KLG 1416-1418). The disclosure found its way to Glen Worstell, the named inventor on the Seagate patent. In an email, Worstell stated that he had "reviewed the DSSC 'Correlation Sensitive Adaptive Sequence Detector' patent proposal." (*Id.* at KLG 1418). Worstell expressly stated that "[a] couple of years ago, I did some work on a Viterbi detector modification to account for noise correlation. This invention is related, but goes

[1] Although the Court did not expressly interpret "Viterbi algorithm," it did interpret "Viterbi-like." (Docket No. 176 at 2). Given this construction, "Viterbi algorithm" is implicitly construed as "an iterative algorithm that uses a trellis to determine the best sequence of hidden states (in this case, written symbols) based on observed events (in this case, observed readings that represent the written symbols), where the determined sequence is indicated by the best path through the trellis and is determined using branch metric values calculated for branches of the trellis." (*See id.* at 2).

beyond my work and is probably more interesting." (*Id.*). This email was dated April 4, 1997. (*See id.* at KLG 00001418).

On May 9, 1997, CMU filed a provisional patent application on the Kavcic invention. *See* U.S. Patent App. No. 60/046,006. This provisional application made no reference to the Seagate patent. *See id.* CMU filed a formal utility patent application on April 3, 1998 that claimed priority to the provisional application. *See* U.S. Patent App. No. 09/055,033. Both U.S. Patent Nos. 6,201,839 (the "'839 Patent") and 6,438,180 (the "'180 Patent") claim priority to the May 9, 1997 provisional application: the '839 Patent issued from the 09/055,033 application and the '180 Patent was a continuation-in-part ("CIP") of the '839 Patent. *See* '839 Patent; '180 Patent.

Thereafter, the '839 Patent, entitled "Method and Apparatus for Correlation-Sensitive Adaptive Sequence Detection," was issued by the United States Patent and Trademark Office ("PTO") on March 13, 2001. *See* '839 Patent. The listed inventors are Aleksandar Kavcic and Jose M. F. Moura. *Id.* CMU owns this patent by assignment. *Id.*

The '180 Patent, which is a CIP of the '839 Patent, is entitled "Soft and Hard Sequence Detection in ISI Memory Channels." It was issued by the PTO on August 20, 2002. *See* '180 Patent. The inventors of this patent are also Kavcic and Moura, and CMU likewise owns this patent by assignment. *Id.* Both the '839 and '180 Patents claim a priority date of May 9, 1997. *See* '839 Patent col. 1, lns. 7-9; '180 Patent col. 1 lns. 6-9.

b. Procedural Background

CMU filed this case on March 6, 2009, alleging the infringement of the '839 Patent at Count I and the '180 Patent at Count II. (Docket No. 1). Marvell's Amended Answer was filed on April 29, 2010. (Docket No. 116). The technology at issue in this case is generally related to methods and devices for reading information off of high density magnetic recording devices, and

more specifically, high density magnetic recording sequence detectors. *See* '839 Patent col.1 ln. 20-23.

CMU alleges that Marvell is liable for infringement of both patents, either literally or under the doctrine of equivalents. (*See* Docket No. 1 at ¶¶ 15, 22). CMU claims that a number of Marvell's product lines infringe the '839 Patent. (*Id.* at ¶ 15). CMU also argues that Marvell infringes the '180 Patent by way of these same product lines. (*Id.* at ¶ 22).

On January 6, 2010, the parties filed a "Joint Agreed and Disputed Claim Terms Chart" pursuant to Local Patent Rule 4.2. (Docket No. 74). CMU and Marvell filed their opening claim construction briefs on January 27, 2010 and February 17, 2010, respectively. (Docket Nos. 78 and 81). After further briefing, (Docket Nos. 89-91, 93-95) and a technology tutorial held on April 7, 2010, (Docket No. 103), the Court conducted a *Markman* hearing. (Docket Nos. 105-106). After the *Markman* hearing, the parties filed a "Revised Joint Agreed and Disputed Claim Terms Chart." (Docket No. 120). Following supplemental post-*Markman* hearing briefing, (Docket Nos. 128-130, 135, 138-139), the Court issued its claim construction opinion. *Carnegie Mellon University v. Marvell Technology Group, Ltd.*, Civ. No. 09-290, 2010 WL 3937157 (W.D. Pa. Oct. 1, 2010). The Court's findings and rulings in that opinion are incorporated herein.

On December 22, 2010, Marvell filed the instant motion and attached documents under seal. (Docket Nos. 218-22). Thereafter, CMU filed its brief in opposition and accompanying documents. (Docket Nos. 232-34). Marvell's reply, (Docket Nos. 249-51), and CMU's sur-reply, (Docket Nos. 264-65), were filed and the Court heard oral argument on March 31, 2011 and May 17, 2011.[2] (Docket Nos. 274, 292). The parties filed supplemental briefing on the matters

[2] Experts for both sides, as well as the Court's Technical Advisor, were present at both arguments. (*See* Docket Nos. 274, 292).

addressed during these hearings. (Docket Nos. 277-78, 287-88, 291, 295, 298). The motion is now ripe and ready for disposition, after careful consideration by the Court.

c. The Parties' Arguments

The instant motion does not reach all of the asserted claims. Instead, Marvell only moves for partial summary judgment with respect to claims 1-5 of the '839 Patent and claims 1-2 of the '180 Patent. (Docket No. 219). Marvell refers to these claims as the "Group I" claims. The Court's analysis will therefore be limited to only these claims, as Marvell expressly states that it is not presently arguing that the remaining claims[3] are invalid. (*See* Docket No. 219 at n.2).

Marvell argues that the Group I claims are all unambiguously anticipated by the Seagate patent. (*See* Docket No. 219 at 5). Therefore, Marvell claims that the Group I claims are invalid under 35 U.S.C. § 102(e). (*See generally* Docket No. 219).

CMU responds that there are unresolved questions of fact that foreclose summary judgment. (*See*, *e.g.*, Docket No. 232 at 3). CMU disputes Marvell's assertions with respect to several elements of the Group I claims. (*See id.* at 1-2). Moreover, CMU asserts that there is a distinction between the Group I claims of the '839 Patent and the '180 Patent. (*Id.* at 2, 16). It distinguishes these claims by arguing that claim 1 of the '180 Patent is limited to steps taken "in a detector." (*Id.* at 2, 16). According to CMU, because Marvell has failed to show that the Seagate patent anticipates any Group I claim elements, summary judgment should be denied. (Docket No. 232 at 3) (stating that Marvell "cannot carry its burden of showing…that the [Seagate] patent anticipates the Group I claims.").

III. Legal Standard

[3] The "Group II" claims are claims 11, 16, 19 and 23 of the '839 Patent and claim 6 of the '180 Patent. (Docket No. 219 at n.2).

a. Summary Judgment

"The Court shall grant summary judgment if the movant shows that there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law." FED.R.CIV.P. 56(a). Pursuant to Rule 56, a Court must enter summary judgment against a party "who fails to make a showing sufficient to establish the existence of an element essential to that party's case, and on which that party will bear the burden of proof at trial." *Celotex Corp. v. Catrett*, 477 U.S. 317, 322 (1986). "Only disputes over facts that might affect the outcome of the suit under the governing law will properly preclude the entry of summary judgment." *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248 (1986).

Summary judgment may be granted when no "reasonable jury could return a verdict for the nonmoving party." *Id.* Therefore, in performing its analysis, a court should "view the evidence in a light most favorable to the opposing party and resolve doubts in its favor." *Ethicon Endo-Surgery, Inc. v. U.S. Surgical Corp.*, 149 F.3d 1309, 1315 (Fed. Cir. 1998).

b. Anticipation and Invalidity

An issued patent enjoys a presumption of validity. *See* 35 U.S.C. § 282; *SRAM Corp. v. AD-II Engineering, Inc.*, 465 F.3d 1351, 1357 (Fed. Cir. 2006). Due to this presumption, invalidity must be proved by clear and convincing evidence. *Microsoft Corp. v. i4i Ltd. Partnership*, 131 S.Ct. 2238, 2242 (2011). "The burden of establishing invalidity of a patent or any claim thereof shall rest on the party asserting such invalidity." 35 U.S.C. 282 (2006). Even in instances where the allegedly anticipatory reference was not before the PTO, the clear and convincing standard remains. *i4i*, 131 S.Ct. at 2244; *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 1050 (Fed. Cir. 1988). However, evidence not considered by the PTO may "carry more weight" in an infringement action than evidence previously considered by the PTO. *i4i*,

131 S.Ct. at 2251; *see also Am. Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1359 (Fed. Cir. 1984) (Rich, J.). Given that "[c]redibility determinations, the weighing of evidence, and the drawing of legitimate inferences from the facts are jury functions, not those of a judge," *Reeves v. Sanderson Plumbing Products, Inc.*, 530 U.S. 133, 150 (2000) (quoting *Liberty Lobby*, 477 U.S. at 255), it seems to this Court that it should not, at the summary judgment stage, consider the possible additional weight carried by a piece of prior art not considered by the PTO.[4]

The ultimate question of patent validity is one of law. *i4i*, 131 S.Ct. at 2242-43 (quoting *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17 (1966); *Great A. & P. Tea Co. v. Supermarket Equipment Corp.*, 340 U.S. 147, 155 (1950)). Anticipation, however, is a question of fact. *See*, *e.g.*, *Acromed Corp. v. Sofamor Danek Group, Inc.*, 253 F.3d 1371, 1378-79 (Fed. Cir. 2001); *Atlas Powder Co. v. Ireco, Inc.*, 190 F.3d 1342, 1346 (Fed. Cir. 1999). Still,

[4] The Court notes that, although the Supreme Court's *i4i* decision conclusively established that the clear and convincing standard is appropriate for proving invalidity, the Supreme Court stated that evidence not considered by the PTO "may 'carry more weight'" in meeting this burden. *i4i*, 131 S.Ct. at 2251 (citing *American Hoist*, 725 F.2d at 1360). However, without more explicit guidance than that this evidence "may" be more probative, this Court will follow the well-established rule that courts should not engage in the weighing of evidence at the summary judgment stage. *See Liberty Lobby*, 477 U.S. at 255 (1986 ("Credibility determinations, the weighing of evidence, and the drawing of legitimate inferences from the facts are jury functions, not those of a judge, whether [s]he is ruling on a motion for summary judgment or for a directed verdict."); *see also*, *e.g.*, *Metropolitan Life Ins. Co. v. Bancorp. Services, L.L.C.*, 527 F.3d 1330, 1339 (Fed. Cir. 2008) (resolving factual disputes in a patent case "is not appropriate on summary judgment."). Therefore, although a given reference "may 'carry more weight,'" this Court declines to resolve any disputed facts based on this additional weight. Adding in the dueling expert declarations that have framed this motion, the Court finds all the more reason to decline to engage in weighing the facts, especially at this stage of litigation. *See Fuji Machine Mfg. Co. Ltd. v. Hover-Davis, Inc.*, 60 F.Supp.2d 111, 120 (W.D.N.Y. 1999) (where experts disagree, their credibility is "a factor that may be taken into account in determining where the truth lies. Such credibility determinations, however, are properly left for the trier of fact based on the experts' live testimony at trial, and should not be made by the court on a motion for summary judgment.") (citing *Allied Colloids Inc. v. American Cyanamid Co.*, 64 F.3d 1570, 1575 (Fed. Cir. 1995)).

"[a]lthough anticipation is a question of fact, it still may be decided on summary judgment if the record reveals no genuine issue of material fact." *Telemac Cellular Corp. v. Topp Telecom, Inc.*, 247 F.3d 1316, 1327 (Fed. Cir. 2001).

A patent claim is "invalid for anticipation if a *single* prior art reference discloses *each and every limitation*" of the claim. *Schering Corp. v. Geneva Pharmaceuticals*, 339 F.3d 1373, 1377 (Fed. Cir. 2003) (emphasis added). *See also Zenith Elecs. Corp. v. PDI Commc'ns Sys., Inc.*, 522 F.3d 1348, 1363 (Fed. Cir. 2008) (invalidity by anticipation "requires a showing that each element of the claim at issue, properly construed, is found in a single prior art reference."). Each element and the "arrangement or combination" of those elements must be present in the prior art reference. *See Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008). However, the elements need not be expressly disclosed by the prior art; they need merely be inherent in the previous disclosure. *See Transclean Corp. v. Bridgewood Servs., Inc.*, 290 F.3d 1364, 1373 (Fed. Cir. 2002) ("[A]nticipation by inherent disclosure is appropriate only when the reference discloses prior art that must *necessarily* include the unstated limitation.") (emphasis in original). The key is that, within "the four corners of a single, prior art document … every element of the claimed invention [must be described], either expressly or inherently, such that a person of ordinary skill in the art could practice the invention without undue experimentation." *Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1282 (Fed. Cir. 2000).

Courts may rely on expert testimony at the summary judgment stage. *See Globetrotter Software, Inc. v. Elan Computer Group, Inc.*, 362 F.3d 1367, 1381 (Fed. Cir. 2004) (noting that, on remand, district court could reopen record for more specific expert testimony, and that it could entertain new summary judgment motions in light of that testimony); *cf. Arthur A. Collins, Inc. v. Northern Telecom Ltd.*, 216 F.3d 1042, 1047-48 (Fed. Cir. 2000) (noting standard for

affidavit of expert submitted in opposition to motion for summary judgment). Courts should, however, recognize that, "[i]n many patent cases expert testimony will not be necessary because the technology will be 'easily understandable without the need for expert explanatory testimony.'" *Centricut, LLC v. Esab Group, Inc.*, 390 F.3d 1361, 1369 (Fed. Cir. 2004). "Indeed, where a prior art reference plainly discloses a claim limitation, the court may recognize and apply that teaching on summary judgment." *Advanced Technology Materials, Inc. v. Praxair, Inc.*, 228 Fed. App'x 983, 985 (Fed. Cir. 2007) (citing *Union Carbide Corp. v. Am. Can Co.*, 724 F.3d 1567, 1571-72 (Fed. Cir. 1984)). Further, in cases where expert testimony is necessary, courts shall not rely on such testimony if it contradicts the plain meaning of the specification. *Mantech Environmental Corp. v. Hudson Environmental Services, Inc.*, 152 F.3d 1368, 1373 (Fed. Cir. 1998). In sum, while courts may rely on expert testimony, they should be wary of reliance upon such testimony at the summary judgment stage. Hence, this Court proceeds with caution, and only looks to expert testimony where the Court needs clarification of the technological matters at issue and such testimony informs the parties' arguments.[5]

c. Claim Dependency

Dependent claims are authorized by 35 U.S.C. § 112, ¶ 3, which states that "[a] claim may be written in independent or, if the nature of the case admits, in dependent or multiple dependent form." "[A] claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it

[5] To this end, the Court notes that affidavits or declarations of several experts were submitted over the course of the Court's consideration of the pending motion. (*See* Docket Nos. 220-9; 234-9; 251-11; 265-3; 291-14). Marvell also filed a declaration of Glen Worstell, the inventor of the Seagate Patent. (Docket No. 251-12). The Court has also conferred with its technical advisor on several occasions. (*See* Docket Nos. 159; 257; 273; 282; 305). The Court has considered all of these in its analysis of the instant motion.

refers." 35 U.S.C. § 112, ¶ 4. Therefore, if a dependent claim depends upon an independent claim that is held valid, the dependent claim must also be valid as at least one of its elements necessarily is not anticipated by the prior art. *See Wahpeton Canvas Co., Inc. v. Frontier, Inc.*, 870 F.2d 1546, 1552 n.9 (Fed. Cir. 1989) (citing *Teledyne McCormick Selph v. U.S.*, 558 F.2d 1000, 1004 (Ct. Cl. 1977) ("It, of course, has long been established that a dependent claim… cannot be infringed unless the accused device is also covered by the independent claim…"). The opposite is not necessarily true: "dependent … claims shall be presumed valid even though dependent upon an invalid claim." *Apple Computer, Inc. v. Articulate Sys., Inc.*, 234 F.3d 14, 24 (Fed. Cir. 2000). Therefore, where a dependent claim is dependent upon an invalid claim, this Court must still independently analyze the dependent claim to determine whether it is anticipated by the prior art. *Clearwater Systems Corp. v. Evapco, Inc.*, 394 Fed.App'x 699, 706 (Fed. Cir. 2010).

IV. Discussion

In the present motion, Marvell challenges the validity of claims 1-5 of the '839 Patent. The Court notes that claims 2 and 3 are dependent upon claim 1, s*ee* '839 Patent, col. 14 lns. 3, 7, and claim 5 is dependent upon claim 4. *Id.* at col. 14 ln. 20. Marvell likewise challenges claims 1 and 2 of the '180 Patent, which also share an independent/dependent relationship. *See* '180 Patent, col. 15 ln. 49.

a. The Claim Preamble Limitations[6]

[6] Preambles are not always to be considered limiting. The question of whether the preamble of a claim is to be considered limiting is to be determined "on the facts of each case in light of the claim as a whole and the invention described in the patent." *Storage Tech. Corp. v. Cisco Sys., Inc.*, 329 F.3d 823, 831 (Fed. Cir. 2003). The preamble may be limiting where it recites a limitation or is "necessary to give life, meaning, and vitality" to the claim. *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 183 F.3d 1298, 1305 (Fed. Cir. 1999). "No litmus test defines when a preamble limits claim scope," but "[i]n general, a preamble limits the claimed invention if it

Marvell's first "element" in its argument challenging the Group I claims is the preamble of claims 1 and 4 of the '839 Patent and claim 1 of the '180 Patent. The preamble of both of the independent '839 Patent claims states that, what is claimed is "[a] method of determining branch metric values for branches of a trellis for a Viterbi-like detector…" '839 Patent at col. 13 lns. 61-62; col. 14 lns. 10-11. The preamble of claim 1 of the '180 Patent claims "[a] method of determining branch metric values in a detector…" '180 Patent at col. 15 lns. 39-40. Marvell argues that these preambles disclose identical "concepts." (Docket No. 219 at 10). Meanwhile, CMU draws a distinction between the preamble of the '839 claims and the preamble of claim 1 in the '180 Patent by noting that "[c]laim 1 of the '180 patent… states that the claimed method of 'determining branch metric values' is performed '***in a detector.***'" (Docket No. 232 at 16) (emphasis in original). For simplicity, the Court addresses each preamble separately.

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recites essential structure or steps, or if the preamble is used in the prosecution history to limit the scope of the claim." *In re Cruciferous Sprout Litig.*, 301 F.3d 1343, 1347 (Fed. Cir. 2002). The preamble is not regarded as limiting when the patent claim otherwise describes a complete invention, when the preamble is merely duplicative of limitations in the body, or when it operates only as an introduction to the general field of the invention. *See Am. Med. Sys., Inc. v. Biolitic, Inc.*, 618 F.3d 1354, 1358-59 (Fed. Cir. 2010) (preamble not limiting if the patent "describes a structurally complete invention in the claim body and uses the preamble only to state a purpose…"); *Symantec Corp. v. Computer Associates Intern., Inc.*, 522 F.3d 1279, 1288-89 (Fed. Cir. 2008) (preamble not limiting when merely duplicative of claim language); *Hearing Components, Inc. v. Shure, Inc.*, 600 F.3d 1357, 1366 (Fed. Cir. 2010) (preamble not limiting when it is "simply an introduction to the general field of the claim."). The parties here have made no argument as to the appropriateness of treating the preamble as limiting; indeed, the preamble was only referenced on a few occasions during claim construction, and in each instance was used to give context to language contained in the body of the claims. (*See* Docket No. 78 at 38; Docket No. 81 at 40; Docket No. 128 at 12).

The Court refrains from making a decision on this point, in the context of the present motion for partial summary judgment, given the lack of argument and because it appears to the Court that, based on the record before it, the analysis is a zero-sum outcome: if the preamble is not limiting, the existence of anticipatory prior art is irrelevant to the preamble element. If the preamble *is* limiting, the Court would still have to engage in the anticipation analysis. Because CMU failed to raise a challenge to Marvell's use of the preamble as a limitation, the Court will operate under the presumption that the preamble *is* limiting for purposes of ruling on this motion.

i. The '839 Patent Preamble

First, as to the '839 Patent preamble, the Court finds that "determining branch metric values for branches of a trellis in a Viterbi-like detector" is expressly disclosed by the Seagate Patent. The Seagate Viterbi detector operates by selecting the most likely path through a trellis diagram. *See* '251 Patent at col. 4, lns. 22-23. The patent also discloses the determination of a branch metric. *See id.* at col. 4 lns. 45-53.

Hence, the Court finds that the Viterbi-like portion of the '839 preamble element is disclosed by the Seagate Patent. The Court construed "Viterbi-like" to mean "an algorithm that is or is similar to an iterative algorithm that uses a trellis to determine the best sequence of hidden states (in this case, written symbols) based on observed events (in this case, observed readings that represent the written symbols), where the determined sequence is indicated by the best path through the trellis and is determined using branch metric values calculated for branches of the trellis." (Docket No. 176 at 2). The Seagate Patent describes an iterative algorithm: the detector "uses a branch metric in a Viterbi detector which is based on a current signal sample, as well as one or more previous signal samples." *Id.* at col. 2 lns. 3-5. It also describes a method of determining the best path through a trellis. *Id.* at col. 4 lns. 22-24 ("Viterbi detector 24 operates by selecting the most likely path through the trellis diagram 25 given some received sequence."). The Seagate Patent, therefore, discloses the entirety of the '839 preamble limitation.

ii. The '180 Patent Preamble

Again, CMU claims that the preamble of claim 1 of the '180 Patent is different from that of the '839 preamble because the '180 preamble requires that the determination occur "in a detector." (Docket No. 232 at 2, 16). Marvell counters with the observation that the claim does not require the *selecting* step to occur *in* a detector. (Docket No. 249 at 14). Rather, said

preamble merely states that the method is for "determining branch metric values in a detector." '180 Patent at col. 15, lns. 39-40.

The Court finds that Marvell's position is correct, but for slightly different reasons. First, the Court turns to the doctrine of claim differentiation, which states that "the presence of a dependent claim that adds a particular limitation raises a presumption that the limitation in question is not found in the independent claim." *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 910 (Fed. Cir. 2004). "That presumption is especially strong when the limitation in dispute is the only meaningful difference between an independent and dependent claim…" *SunRace Roots Enterprise Co., Ltd. v. SRAM Corp.*, 336 F.3d 1298, 1303 (Fed. Cir. 2003).

Here, claim 5 of the '180 Patent is dependent upon claim 1. Claim 5 specifically limits "the detector" of claim 1 to the "group consisting of a Viterbi detector, a soft output Viterbi detector, a Generalized Viterbi detector, and a BCJR detector." '180 Patent at col. 15 lns. 56-59. There is, therefore, an "especially strong" presumption that the "detector" of claim 1 is broader than "Viterbi detectors."

Secondly, the parties have agreed that "Viterbi-like detector" and "Viterbi-like detector circuit" are synonymous – both mean "a *detector* that uses a Viterbi-like algorithm." (Docket No. 120-1 at 4) (emphasis added). If "detector" and "detector circuit" are synonymous here, they must be synonymous elsewhere. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (en banc) ("Because claim terms are normally used consistently throughout the patent, the usage of a term in one claim can often illuminate the meaning of the same term in other claims."). The "detector" of claim 1 is therefore synonymous with "detector circuit[s]," such as detector circuits 26 and 28 of Figures 1 and 2. *See* '180 Patent at col. 3 lns. 30-32.

Read this way, the Seagate Patent discloses determination of a branch metric *in a detector*. Specifically, the Seagate Patent teaches a data detector and recovery circuit similar to the CMU detector circuit. *See id.* at Fig. 1, col. 3 lns. 44-45. Branch metrics are determined *in* the data detector and recovery circuit, *see id.* at col. 4 lns. 22-53, which anticipates the preamble limitation even if determination occurs outside the Viterbi itself. The preamble limitation of the '180 Patent is, therefore, disclosed in the Seagate Patent. However, the Court's analysis does not end here. The Court now addresses the parties' arguments as to the remainder of the claims.

b. Claims 1-5 of the '839 Patent

i. Claim 1

Claim 1 of the '839 Patent claims:

> A method of determining branch metric values for branches of a trellis for a Viterbi-like detector, comprising:
>
> selecting a branch metric function for each of the branches at a certain time index; and
>
> applying each of said selected functions to a plurality of signal samples to determine the metric value corresponding to the branch for which the applied branch metric function was selected, wherein each sample corresponds to a different sampling time instant.

'839 Patent, col. 13 ln. 61 – col. 14 ln. 2.

1. "Selecting"

First, the Court turns to the arguments centered on the "selecting" step of the method of claim 1. In this regard, the parties' arguments largely revolved around equation 20 of the Seagate Patent, '251 Patent at col. 9 ln. 50, and equation 13 of the '839 and '180 Patents. '839 Patent, col. 7 ln. 3; '180 Patent col. 7 ln. 35. The parties have agreed that "selecting" means "to choose one from a set of more than one." (Docket No. 120-1 at 3). They have also agreed that "branch metric function" means "a mathematical function for determining a 'branch metric value' for a 'branch,'" (*Id.* at 2), and "certain time index" means "a certain point in time." (*Id.*).

With these definitions in mind, the Court finds that the "selecting" element is not disclosed in the Seagate patent. The purpose of the detector is to "select[] the most likely path" through a trellis diagram representing a signal. '251 Patent at col. 4 lns. 22-24. As disclosed in the Seagate patent, this selection occurs at every state, *see id.* at col. 4 lns. 22-26, and there are at least two possible branches entering and leaving each state. *Id.* at col. 5 lns. 38-39. In order to determine the most likely path through the trellis, the Viterbi "eliminates all but the most likely" branches entering and leaving a given state. *Id.* at col. 5 lns. 46-55. However, the Court finds that this selection process simply results in the selection of a branch metric *value*,[7] not a branch metric *function*.[8]

Marvell's initial argument was that selection of the "filter tap weights" of the Seagate Patent is essentially analogous to selection of a branch metric function.[9] (*See* Docket No. 219 at 13). The gist of this argument was that selection of different tap weights essentially produced a new branch metric function. (*See id.*) ("The Seagate patent makes this selection using values of 'filter tap weights' ("W_i") to determine which branch metric function to select from the set at each relevant point in time: 'The correlation of the noise is thus determinable based on the filter tap weights.'") (citations omitted). The flaw in this argument is that the selection does not occur for "a certain time index." *See*, *e.g.*, '839 Patent, col. 13 lns. 63-64 (requiring the step of "selecting a branch metric function for each of the branches *at a certain time index*."). Because the tap weights are fixed at the design stage, it appears to this Court that there is no selection of a

[7] The parties agree that "branch metric value," "branch metric" and "metric value" all mean the same thing: "the numerical value of a 'branch.'" (Docket No. 120-1 at 2).

[8] The Court discusses "function" below. *See infra*.

[9] Marvell distanced itself from this argument over the course of the Court's consideration of the pending motion. (*See* Docket No. 249 at 3).

branch metric function at a certain time index. (*See* Docket No. 301 at 67). Essentially all that the Seagate Patent teaches is selection – prior to operation – of a single branch metric function. Indeed, CMU asserted this point at argument. (*See id.* at 66-67). Even Marvell acknowledged such, but in a roundabout way. (*See* Docket No. 249 at 3) ("[W]hether tap weights are fixed, programmed at the factory, or adaptively varied during operation does not create a genuine issue as to whether [the Seagate] patent describes the claimed 'selecting' step.").

Marvell also made an argument that the output or target value creates five different equations. (*See* Docket No. 249 at 5). This means, according to Marvell, that there are five separate "functions" among which selection can occur in the Seagate Patent. (*Id.*). CMU responds that these target values do nothing more than vary input values ("arguments") into the same function. (*See* Docket No. 264 at 5-6). The Court finds CMU's argument persuasive.

Marvell did not advance a construction of the word "function," other than to say that it should be given its ordinary meaning. (Docket No. 301 at 25). On the other hand, according to CMU, a "function" is "a mathematical relation that uniquely associates members of a first set with members of a second set." (Docket No. 264 at 5). This is essentially the ordinary meaning of the word "function." *See* Merriam-Webster's Collegiate Dictionary, 507 (11th ed. 2007) (defining "function" as "a mathematical correspondence that assigns exactly one element of one set to each element of the same or another set"). Under this ordinary meaning, which the Court adopts for purposes of this motion since the parties seem to be in agreement, simply adding another variable into a function – here the target value – does not operate to convert that single function into multiple functions.[10] Therefore, variation of the target value does not render Equation 20 of the Seagate Patent a "set" of functions.

[10] The Court notes that this reasoning would seem to render the CMU claims invalid under 35

Perhaps the best argument put forth by Marvell is that the Examiner found that the "selecting a branch metric function" limitation was taught by Fitzpatrick. (*See* Docket No. 251-6) (PTO Office Action stating that Fitzpatrick discloses a method for determining branch metric values). Again, though, the Court must emphasize that this motion is brought under 35 U.S.C. § 102, not 35 U.S.C. § 103. The question, then, is whether the *Seagate* Patent discloses all the elements of the claim, not whether Seagate and another patent disclose all the elements. *See Advanced Display Sys.*, 212 F.3d at 1282 (stating that "invalidity by anticipation requires that the four corners of a *single*, prior art document describe *every* element of the claimed invention, either expressly or inherently, such that a person of ordinary skill in the art could practice the invention without undue experimentation.") (emphasis added).

Admittedly, "[m]aterial not explicitly contained in the single, prior art document may still be considered for purposes of anticipation if that material is incorporated by reference…" *Id.* However, to incorporate material by reference, the host document must identify "with detailed particularity what specific material it incorporates and clearly indicate where that material is found in the various documents." *Id.* A "mere reference to another application, or patent, or publication is not an *incorporation* of anything therein…" *Callaway Golf Co. v. Acushnet Co.*, 576 F.3d 1331, 1346 (Fed. Cir. 2009) (citing *In re De Seversky*, 474 F.2d 671, 674 (C.C.P.A. 1973)). It is therefore possible that, if Fitzpatrick has been incorporated by reference, it could be used to satisfy the final claim limitation.

Based on the evidence before it, however, this Court cannot make such a finding: the exhibits provided to the Court show only that the Examiner stated that Fitzpatrick anticipated the

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U.S.C. § 112 ¶ 1. It appears that this definition would result in Equation 13 of the '839 patent also being considered a *single* function, such that the patent does not teach a set of functions from which one function may be selected. However, as this argument would arise under § 112, and the instant motion is brought under § 102, the Court will not decide the point at this juncture.

selecting element of the '839 Patent application. (*See* Docket 251-6). They also show that the applicants only amended the applying step, not the selecting step. (*See* Docket 251-10). The Court cannot, on the basis of this evidence, find that Fitzpatrick was incorporated by reference. Therefore, because this motion was brought under 35 U.S.C. § 102, instead of §103, the Court cannot conclude that the '839 Patent was *anticipated* by the Seagate Patent.

2. "Applying"

Although it appears that much of the "applying" step is described in the Seagate Patent, the entire claim element is not. For example, a "signal sample" is "a value of a signal at a certain point in time." (Docket No. 120-1 at 3). The signal sample of the applying step is just the signal value that exists at the "certain time index" of the selecting element. (*See id.* at 2) (defining "certain time index" as "a certain point in time.").

However, the applying step requires that "each of said *selected functions*" be applied to a plurality of signal samples. '839 Patent at col. 13 ln. 65 - col. 14 ln. 2. Because the Court has found that the Seagate Patent does not teach selection of a function, application of the *selected functions* cannot be anticipated by the Seagate Patent.

For these reasons, the Court finds that Claim 1 is not anticipated by the Seagate Patent. Because the Court has found that this independent claim is valid, the claims depending from it must also be held valid. *Wahpeton Canvas Co.*, 870 F.2d at 1552 n.9. Still, the Court will address the dependent claims, as follows.

ii. Claim 2

Claim 2 of the '839 Patent claims:

> The method of claim 1 further comprising the step of receiving said signal samples, said signal samples having signal-dependent noise, correlated noise, or both signal-dependent and correlated noise associated therewith.

'839 Patent, col. 14 lns. 3-6.

The method of claim 2 incorporates all of the steps of claim 1, which, as discussed above, are not anticipated by the Seagate Patent. Claim 2 includes the additional limitation that the signal samples of claim 1 include "signal-dependent noise, correlated noise, or both…" *Id.* With respect to claim 2, then, the question would be whether the Seagate Patent discloses receiving signal samples associated with these specific noise types.

The parties disputed the construction of most of the claim terms relevant to claim 2. (*See* Docket No. 120-1 at 5-6, 12). They did, however, agree that "noise" means "an unwanted disturbance in a signal." (Docket No. 120-1 at 3). The remaining relevant terms were construed by the Court. Specifically, the Court reached the following constructions for the relevant claim terms:

> "Correlation" means "the degree to which two or more items (here, noise in signal samples) show a tendency to vary together."
>
> "Correlated" means two items that have a tendency to vary together.
>
> "Correlated noise" means "noise with 'correlation' among 'signal samples,' such as that caused by coloring by front-end equalizers, media noise, media nonlinearities, and magnetoresistive (MR) head nonlinearities."
>
> "Signal-dependent noise" means "media noise in the readback signal whose noise structure is attributable to a specific sequence of symbols (e.g., written symbols)."

(Docket No. 176 at 1-2).

To this Court, it is clear that the Seagate Patent discloses a detector that receives correlated noise samples. Not only is the Seagate Patent entitled "[m]odified viterbi detector which accounts for correlated noise," but it repeatedly refers to correlated noise. For example, the Seagate Patent explains that, in the prior art, "noise at the input to the detector is further colored by the filter or equalizer which is required to simplify the target response. The filter or equalizer *correlates* … noise in the system…" '251 Patent at col. 1 lns. 53-56. The Seagate

Patent, thus, uses the term "correlated noise" in accord with the Court's construction of the term, which expressly includes coloring by filters and equalizers. (*See* Docket No. 176 at 1-2). Further, said patent specification states that "the Viterbi detector according to the present invention accounts for *correlated noise* in the system." '251 Patent at col. 2 lns. 5-7 (emphasis added). The Seagate Patent, therefore, discloses a signal that has "correlated noise … associated therewith." *See* '839 Patent, col. 14 ln. 6.

The Seagate Patent also accounts for signal-dependent noise. The Court construed the term "signal-dependent noise" to mean "media noise … whose noise structure is attributable to a specific sequence of symbols." (Docket No. 176 at 2). Transition noise is a type of media noise which is attributable to the sequence of symbols recorded on the recording media. (*See* Docket No. 220-9 ¶ 39). Transition noise is, therefore, a form of signal-dependent noise.

The Seagate Patent describes several times how the invention accounts for transition noise. As Marvell points out:

> The modified metric used in accordance with the present invention can be further modified to take into account transition noise as well. If it is assumed that the standard deviation of the noise component of each sample is greater where there is a transition in the signal written to the disc than where there is no transition, then each branch metric can be modified by multiplying the metrics which correspond to transitions by a fraction which depends on the transition noise standard deviation.

'251 Patent at col. 10 lns. 48-56. In this manner, the Seagate Patent describes a species of the genus, signal-dependent noise, and it is "firmly establishe[d] that a later genus claim limitation is anticipated by, and therefore not patentably distinct from, an earlier species claim." *Eli Lilly & Co. v. Barr Labs., Inc.*, 251 F.3d 955, 971 (Fed. Cir. 2001); *cf. Medichem, S.A. v. Rolabo, S.L.*, 353 F.3d 928, 934-35 (Fed. Cir. 2003) (stating that "'[i]t is … an elementary principle of patent law that when, as by a recitation of ranges or otherwise, a claim covers several compositions, the

claim is "anticipated" if one of them is in the prior art.'") (quoting *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 782 (Fed. Cir. 1985)).

Either disclosure is enough to anticipate the additional element in claim 2 of the '839 Patent. The Federal Circuit has noted that "[t]hat which infringes if later anticipates if earlier." *Brown v. 3m*, 265 F.3d 1349, 1352 (Fed. Cir. 2001) (citing *Polaroid Corp. v. Eastman Kodak Co.*, 789 F.2d 1556, 1573 (Fed. Cir. 1986)). The Federal Circuit has also held that, "[b]y claiming [an] invention in the alternative, [a patentee] has presented a claim for which infringement would lie" under any single alternative. *Brown*, 265 F.3d at 1352. Put more directly, "[w]hen a claim covers several structures or compositions, either generically or *as alternatives*, the claim is deemed anticipated if *any* of the structures or compositions within the scope of the claim is known in the prior art." *Brown*, 265 F.3d at 1351 (citing *Titanium Metals*, 778 F.2d at 782) (emphasis added).

Here, because a signal sample with correlated noise *or* signal-dependent noise could infringe, it must also anticipate. However, because the limitations incorporated from claim 1 are not anticipated, the Court finds that claim 2 is not anticipated.

iii. Claim 3

Claim 3 of the '839 Patent claims:

> The method of claim 1 wherein said branch metric functions for each of the branches are selected from a set of signal-dependent branch metric functions.

'839 Patent, col. 14 lns. 7-9.

The method of claim 3 incorporates all of the steps of claim 1, which, as discussed above, are not anticipated by the Seagate Patent. Additionally, claim 3 further narrows the "branch metric function" limitation of claim 1 to cover only "signal dependent branch metric functions." *See id.*

Under the Court's Claim Construction Order, "signal-dependent branch metric function" means "a 'branch metric function' that accounts for the signal-dependent structure of the media noise." (Docket No. 120-1 at 2). Because the Court has found that selection of a branch metric function from a set of branch metric functions does not occur, it follows that selection of a signal-dependent branch metric function does not occur. This claim is likewise not anticipated under the same reasoning the Court applied in its analysis of the "selecting" step of claim 1.

iv. Claim 4

Claim 4 of the '839 Patent claims:

> A method of determining branch metric values for branches of a trellis for a Viterbi-like detector, comprising:
>
> selecting a branch metric function for each of the branches at a certain time index from a set of signal-dependent branch metric functions; and
>
> applying each of said selected functions to a plurality of signal samples to determine the metric value corresponding to the branch for which the applied branch metric function was selected, wherein each sample corresponds to a different sampling time instant.

'839 Patent, col. 14 lns. 10-19.

Claim 4 covers subject matter that is similar to the subject matter of claims 1 and 3. The "applying" step is identical to the same step in claim 1. The "selecting" step is the same as claim 1, save that it has incorporated the narrower limitation of claim 3 into the independent claim language. The Court has already described how each of the relevant limitations is not described in the Seagate Patent. For the same reasons as set out above, the Court finds that claim 4 is not anticipated by the Seagate Patent.

v. Claim 5

Claim 5 of the '839 Patent claims:

> The method of claim 4 further comprising the step of receiving said signal samples, said signal samples having signal-dependent noise, correlated noise, or both signal-dependent and correlated noise associated therewith.

'839 Patent, col. 14 lns. 20-23.

The method of claim 5 incorporates all of the steps of claim 4, which, as discussed above, are not anticipated by the Seagate Patent. It adds the same narrowing limitation to claim 4 that claim 2 added to claim 1. Given the Court's earlier analysis, the Court finds that this claim is not anticipated by the Seagate Patent, even though the Seagate Patent discloses the new element of claim 5.

c. Claims 1-2 of the '180 Patent

i. Claim 1

Claim 1 of the '180 Patent claims:

A method of determining branch metric values in a detector, comprising:

> receiving a plurality of time variant signal samples, the signal samples having one of signal dependent noise, correlated noise, and both signal dependent and correlated noise associated therewith;
> selecting a branch metric function at a certain time index; and
> applying the selected function to the signal samples to determine the metric values.

'180 Patent, col. 15 lns. 39-48.

With the exceptions of this claim's preamble "in a detector" limitation and the "receiving" limitation, this claim's limitations are virtually identical to those already addressed in the preamble of the '839 Patent claims. Because the Court has already found the preamble limitation to be anticipated for purposes of this motion, it turns now to the "receiving" limitation.

Although "receiving" has not been construed by the Court or the parties, the Court finds that this element is expressly disclosed in the Seagate Patent. For example, claim 1 of the Seagate Patent claims "[a] method of detecting an input signal *received over a plurality of time periods*…" '251 Patent at col. 12 lns. 58-59. "Generally speaking, [courts] indulge a 'heavy presumption' that a claim term carries its ordinary and customary meaning." *Sunrace Roots*

Enter. Co., LTD v. SRAM Corp., 336 F.3d 1298, 1302 (Fed. Cir. 2003)). A court should "look to the specification to determine 'whether the presumption of ordinary and customary meaning is rebutted.'" *E-Pass Technologies, Inc. v. 3Com Corp.*, 343 F.3d 1364, 1368 (Fed. Cir. 2003) (quoting *Texas Digital Systems, Inc. v. Telegenix, Inc.*, 308 F.3d 1193, 1204 (Fed. Cir. 2002)). Because nothing in either patent's specification sets out a special meaning, and both patents use different forms of the same word, the Court concludes that both patents use the root word "receive" in its ordinary manner, and that the "receiving" element is, therefore, taught by the Seagate Patent.

However, the Court once again focuses on the "selecting" step. For substantially the same reasons as addressed above, the Court finds that the "selecting" and "applying" steps are not anticipated by the Seagate Patent. Thus, the Court finds that this claim is not anticipated by the Seagate Patent.

ii. Claim 2

Claim 2 of the '180 Patent claims:

The method of claim 1, wherein the branch metric function is selected from a set of signal-dependent branch metric functions.

'180 Patent, col. 15 lns. 49-51.

This limitation is essentially the same as one of the limitations in claims 3 and 4 of the '839 Patent. For substantially the same reasons, the Court finds that this claim is also not anticipated by the Seagate patent.

d. The Worstell Email

Having found that the Group I claims are valid, the Court briefly turns to the Worstell email stating that the CMU invention "goes beyond" Worstell's work. (*See* Docket No. 220-7 at KLG 1418). CMU has described the Worstell email as "objective evidence" of the difference

between the CMU patents and the Seagate Patent. (*See* Docket No. 232 at 17). This email may play a role in an obviousness analysis under 35 U.S.C. § 103, wherein it is appropriate for courts to look to objective evidence. *See Graham*, 383 U.S. at 17-18. Under 35 U.S.C. § 102, however, the question is whether *every* claim element is disclosed within the "four corners" of a single prior art document. *Advanced Display Sys.,* 212 F.3d at 1282. It would, therefore, be inappropriate for this Court to consider such external evidence in a §102 analysis, especially when it has found that not all of the limitations of the relevant claims are contained within the four corners of the single prior art Seagate Patent.

V. Conclusion

For the foregoing reasons, the Court finds that claims 1-5 of the '839 Patent and claims 1-2 of the '180 Patent are not anticipated under 35 U.S.C. § 102(e). Defendant's Motion [218] is therefore DENIED. An appropriate Order Follows.

s/Nora Barry Fischer
Nora Barry Fischer
United States District Judge

cc/ecf: All counsel of record

Date: September 28, 2011