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6 **IN THE UNITED STATES DISTRICT COURT**  
7 **FOR THE DISTRICT OF ARIZONA**  
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9 Continental Circuits LLC,  
10 Plaintiff,  
11 v.  
12 Intel Corporation, et al.,  
13 Defendants.

No. CV16-2026 PHX DGC

**ORDER**

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16 Plaintiff Continental Circuits LLC asserts claims for patent infringement against  
17 Defendants Ividen U.S.A. Corp., Ividen Co. Ltd., and Intel Corp. The Court held a  
18 *Markman* hearing on August 4, 2017. This order will set forth the Court's ruling on the  
19 issues addressed during the hearing and in the parties' briefs.

20 **I. Background.**

21 Defendant Ividen produces layered electronic devices at its facilities overseas. *See*  
22 Doc. 133, ¶¶ 51, 110.<sup>1</sup> These layered devices are used in computer electronics, including  
23 computer processors manufactured by Defendant Intel. *See id.*, ¶¶ 49-51.

24 The devices are made of alternating layers of conductive and non-conductive  
25 materials. *See id.*, ¶ 29. When adhesion between the layers is poor, the layers can  
26 separate, creating problems for or failure of the electronic product in which they are

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28 <sup>1</sup> Page citations are to numbers placed at the top of each page by the Court's  
CM/ECF system rather than the document's original page numbers.

1 incorporated. *See id.* In the 1990s, four employees of Continental Circuits, Inc., a now-  
2 defunct circuit-board manufacturer, invented a “novel surface roughening technique”  
3 using etching to create a “non-uniformly roughened surface” that allows for stronger  
4 adhesion between layers. *Id.*, ¶¶ 28-29, 120. The four co-inventors applied to patent the  
5 surface-roughening technology in 1997, and two patents were issued in 2000 and 2004.  
6 *Id.*, ¶¶ 12-13. Those patents are not at issue in this case. A continuation application was  
7 filed by early 2005, and eventually resulted in the issuance of the four patents that are at  
8 issue here: U.S. Patent Nos. 7,501,582 (2009), 8,278,560 (2012), 8,581,105 (2013), and  
9 9,374,912 (2016) (collectively, the “patents-in-suit”). *See id.*, ¶¶ 14-17, 35-36. Copies of  
10 these patents can be found at Doc. 188-3, Exs. 1-4.

11 Plaintiff Continental Circuits LLC is a non-operating entity that was formed in  
12 2016 and owns the patents-in-suit. Doc. 49, at 11 n.8; Doc. 133, ¶ 19. The day after the  
13 last of the patents-in-suit was issued, Plaintiff filed this action. *See* Doc. 1. Plaintiff  
14 alleges that Defendants have infringed the patents-in-suit.

15 The parties have filed a joint claim construction statement that identifies the patent  
16 terms to be addressed in this order. Doc. 177. The statement identifies three categories  
17 of claims to be construed, each of which includes a number of closely related claims  
18 found in the patents. *Id.* It also identifies four terms that Defendants claim are indefinite  
19 and therefore invalid. *Id.* The parties have filed briefs on claim construction. Docs.  
20 188, 189, 199, 200. At the Court’s request, the parties filed additional memoranda  
21 regarding the ramifications of their claim construction positions. Docs. 225, 230.<sup>2</sup>

## 22 **II. Legal Standard.**

23 A patent includes two basic components: (1) a written description of the invention,  
24 referred to as the “specification” of the patent, and (2) the patent claims. The claims  
25 define the scope of the invention covered by the patent. *Phillips v. AWH Corp.*, 415 F.3d  
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28 <sup>2</sup> Some of the parties’ filings are redacted to remove trade secrets. Unredacted  
versions have been filed under seal at Docs. 234-238.

1 1303, 1312 (Fed. Cir. 2005) (en banc). Claim construction is a matter of law to be  
2 decided by the Court. *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 372 (1996).

3 Words of a claim are generally given the ordinary and customary meaning the  
4 words would have for a person of ordinary skill in the art at the time of the invention.  
5 *Phillips*, 415 F.3d at 1313. “[T]he person of ordinary skill in the art is deemed to read the  
6 claim term not only in the context of the particular claim in which the disputed term  
7 appears, but in the context of the entire patent, including the specification.” *Id.* The  
8 specification is also highly relevant. The Federal Circuit has characterized it as “the  
9 single best guide to the meaning of a disputed term.” *Id.* at 1315 (quotation marks and  
10 citation omitted). A court may also consider the patent’s prosecution history. *Id.*  
11 at 1317. “Like the specification, the prosecution history provides evidence of how the  
12 PTO and the inventor understood the patent.” *Id.* The claims, specification, and  
13 prosecution history are commonly referred to as “intrinsic evidence.”

14 Extrinsic evidence may also be used in claim construction. Extrinsic evidence  
15 consists of all evidence external to the patent and prosecution history, including expert  
16 and inventor testimony, dictionaries, learned treatises, and other patents. *Id.* Extrinsic  
17 evidence is viewed as less reliable than the patent and its prosecution history in  
18 determining how to read claim terms. *Id.* at 1318.

### 19 **III. Category 1 Terms.**

20 Category 1 in the parties’ joint claim construction statement concerns a number of  
21 claims in the patents-in-suit that address the etching of the dielectric or epoxy layer of an  
22 electronic circuit board or comparable device. Doc. 177 at 4-9. Some of the claims  
23 simply refer to “etching the epoxy,” while others refer to “etching the dielectric  
24 material,” “removal of a portion of the dielectric material,” “removal of some of the  
25 dielectric material,” “a surface of a layer of a dielectric material,” “a surface of a  
26 dielectric material,” and “a dielectric material comprising a surface.” *Id.* Plaintiff  
27 contends that these phrases require no construction. Defendants contend that each phrase  
28

1 should be construed to include a requirement that the etching, removal, or modification of  
2 the dielectric material be “produced by a repeated desmear process.” *Id.*

3 As Plaintiff correctly notes, Defendants do not contend that the actual words of the  
4 claims provide this additional meaning. Rather, Defendants seek to add a limitation to  
5 the claims – namely, that the etching or alteration of the dielectric material occur through  
6 a repeated desmear process. Because the plain and ordinary meaning of the phrases at  
7 issue does not include Defendants’ proposed limitation, Defendants carry a heavy burden.  
8 The Federal Circuit has explained that there are only two exceptions to the rule that  
9 claims are given their plain and ordinary meaning: “1) when a patentee sets out a  
10 definition and acts as his own lexicographer, or 2) when the patentee disavows the full  
11 scope of a claim term either in the specification or during prosecution.” *Thorner v. Sony*  
12 *Computer Entm’t Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012). The standard  
13 Defendants must meet for either of these exceptions is “exacting.” *Id.* at 1366.

14 “To act as its own lexicographer, a patentee must ‘clearly set forth a definition of  
15 the disputed claim term’ other than its plain and ordinary meaning.” *Id.* at 1365 (quoting  
16 *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002)). “It is not  
17 enough for a patentee to simply disclose a single embodiment or use a word in the same  
18 manner in all embodiments, the patentee must ‘clearly express an intent’ to redefine the  
19 term.” *Id.* (quoting *Helmsderfer v. Bobrick Washroom Equip., Inc.*, 527 F.3d 1379, 1381  
20 (Fed. Cir. 2008)).

21 A disavowal also must be “clear and unmistakable.” *Id.* at 1367. “‘Where the  
22 specification makes clear that the invention does not include a particular feature, that  
23 feature is deemed to be outside the reach of the claims of the patent, even though the  
24 language of the claims, read without reference to the specification, might be considered  
25 broad enough to encompass the feature in question.’” *Id.* at 1366 (quoting *SciMed Life*  
26 *Sys., Inc. v. Advanced Cardiovascular Sys., Inc.*, 242 F.3d 1337, 1341 (Fed. Cir. 2001)).  
27 “‘The patentee may demonstrate intent to deviate from the ordinary and accustomed  
28 meaning of a claim term by including in the specification expressions of manifest

1 exclusion or restriction, representing a clear disavowal of claim scope.” *Id.* (quoting  
2 *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002)).

3 After careful review of the patents-in-suit, the Court concludes that Defendants  
4 have met the exacting standard required to adopt their proposed limitation.

5 **A. The Patents’ Disavowal of Prior Art.**

6 The Federal Circuit has found disavowal when a patent “repeatedly disparaged an  
7 embodiment as ‘antiquated,’ having ‘inherent inadequacies,’ and then detailed the  
8 ‘deficiencies [that] make it difficult’ to use.” *See GE Lighting Solutions, LLC v.*  
9 *AgiLight, Inc.*, 750 F.3d 1304, 1309 (Fed. Cir. 2014) (quoting *Chi. Bd. Options Exch.,*  
10 *Inc. v. Int’l Sec. Exch., LLC*, 677 F.3d 1361, 1372 (Fed. Cir. 2012)). For example, in  
11 *Inpro II Licensing, S.A.R.L. v. T-Mobile USA, Inc.*, 450 F.3d 1350, 1354-55 (Fed. Cir.  
12 2006), the Federal Circuit affirmed the construction of “host interface” as a “direct  
13 parallel bus interface.” The court noted that the only embodiment disclosed was a direct  
14 parallel bus interface and that “the specification emphasizes the importance of a parallel  
15 connection in solving the problems of the previously used serial connection.” *Id.* This  
16 discussion demonstrated “what the inventor has described as the invention.” *Id.* at 1355;  
17 *see also OpenWave Sys., Inc. v. Apple Inc.*, 808 F.3d 509, 513-17 (Fed. Cir. 2015)  
18 (narrowly construing claim term “mobile device” to exclude communication devices  
19 containing a “computer module” based on limiting statements in specification that  
20 disparaged prior art communication devices containing such “computer modules”); *Fed.*  
21 *Retractable Techs., Inc. v. Becton, Dickinson & Co.*, 653 F.3d 1296, 1305 (Fed. Cir.  
22 2011) (limiting scope of syringe “body” to a one-piece body based in part on distinction  
23 of prior art syringes composed of multiple pieces); *SciMed*, 242 F.3d at 1341 (finding  
24 disavowal based on disparagement of a particular embodiment and statements that the  
25 “present invention” does not include the embodiment).

26 The specification, which is common to all the patents-in-suit, provides this  
27 introduction: “The present invention is directed to methods for making or manufacturing  
28 an electrical device, and the process, composition, and product thereof. More

1 particularly, the present invention involves such multi-layer electrical devices as circuit  
2 boards constructed by joining a dielectric material to a subsequently applied conductive  
3 material.” ’582 Patent at 1:13-18.<sup>3</sup> The purpose of the invention is to improve on multi-  
4 layer electrical devices that “suffer from delamination, blistering, and other reliability  
5 problems. This is particularly true when the laminates are subject to thermal stress.” *Id.*  
6 at 1:30-32.

7 The specification explains that the patented invention produces a stronger bond  
8 between the dielectric layer and the conductive layer by forming teeth in each layer that  
9 interlock with each other. “The surface structure is comprised of teeth that are preferably  
10 angled or hooked like fangs or canine teeth to enable one layer to mechanically grip a  
11 second layer.” *Id.* at 1:54-57.

12 The specification then proceeds to explain the process by which these teeth are  
13 formed in the manufacturing of a multi-layer electrical device. Step 6 is the relevant step  
14 for purposes of Category 1 claims. Step 6 “involves the etching [of] cavities, veins,  
15 openings, or gaps in the applied dielectric material, or more particularly an outermost  
16 surface thereof, to accommodate the teeth.” *Id.* at 5:37-40. The process by which layers  
17 of dielectric material are prepared for bonding to a conductive layer is known as a  
18 “desmear” process. The ’582 Patent repeatedly distinguishes the process covered by the  
19 patent from the prior art and its use of a “single desmear process.” Five portions of the  
20 specification are particularly relevant.

21 First, the specification explains that “[o]ne technique for forming the teeth is  
22 somewhat similar to what has been known as the swell and etch or desmear process,  
23 except that ***contrary to all known teachings in the prior art, in effect, a ‘double desmear***  
24 ***process’ is utilized.***” *Id.* at 5:41-44.<sup>4</sup> The description then becomes even more specific:  
25 “That is, not merely increasing the times and temperatures and other parameters for the

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27 <sup>3</sup> The parties’ Category 1 arguments all focus on the ’582 Patent. The Court will  
28 focus on that patent as well. The Court’s citations to portions of a patent throughout this  
order will include a column number and line numbers, separated by a colon.

<sup>4</sup> All bolded and italicized emphases in this order have been added by the Court.

1 desmear process, *but instead completing the process a first time, and then completing*  
2 *the process a second time.*” *Id.* at 5:44-48.<sup>5</sup>

3 Second, the patent explains that “the desmear process *as disclosed herein* is  
4 contrary to the manufacturer’s specification, *i.e., a ‘double desmear process,’ rather*  
5 *than the single desmear process of the known prior art.*” *Id.* at 5:60-63. This statement  
6 not only equates the prior art with a “single desmear process,” but specifically states that  
7 “the desmear process as disclosed herein” is “contrary” to that prior art.

8 Third, the specification explains:

9 the peel strength produced in accordance with *the present invention* is  
10 greater than the [peel] strength produced by *the desmear process of the*  
11 *prior art, i.e., a single pass desmear process.* For example, if a *prior art*  
12 *desmear process* is used to produce a 6 lb/in average peel strength, *the*  
13 *present invention* may produce an average peel strength on the order of 10  
14 lb/in or more.

14 *Id.* at 7:3-9. This statement again equates the prior art with “a single pass desmear  
15 process,” and states that “the present invention” produces a greater strength than that  
16 prior art.

17 Fourth, the patent recommends the use of Probelec XB 7081 for creation of the  
18 dielectric layer. The specification contains this explanation:

19 Although Probelec XB 7081 apparently was intended for use in the  
20 common desmear (swell and etch) process as used in conventional plated  
21 through hole plating lines, Probelec XB 7081 *can alternatively be used in*  
22 *carrying out the present invention.* For example, *the present invention*  
23 *differs from the common desmear process in that sub-steps in the*  
24 *desmear process are repeated as a way of forming the teeth.*

24 *Id.* at 8:45-52. This language explains that although Probelec XB 7081 was intended for  
25 the prior art process of single desmear, it “can alternatively be used in carrying out the  
26 present invention.” In other words, the prior art single desmear process is not “the

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28 <sup>5</sup> Plaintiff emphasizes that this description applies to “[o]ne technique for forming  
the teeth,” arguing that this is only an illustration. The Court will address this argument  
below.

1 present invention.” It also explains precisely how “the present invention” differs from  
2 the prior art: “sub-steps in the desmear process are repeated as a way of forming the  
3 teeth.”

4 Fifth, the specification contains this strong statement: “In *stark contrast* with the  
5 etch and swell process of the *known prior art*, however, a second pass through the  
6 process (sub-steps A through F) is used. The second pass seems to make use of non-  
7 homogeneities in bringing about a formation of the teeth.” *Id.* at 9:1-9. This language  
8 draws a “stark contrast” between the “known prior art” and the current invention’s  
9 “second pass through the process.”

10 In summary, these statements identify the “swell and etch” or “single desmear”  
11 process as the “prior art,” the “known prior art,” the “common desmear process,” and  
12 “the desmear process of the prior art,” and expressly distinguish that prior art from the  
13 patented invention. The specification states that the invention is “contrary to all known  
14 teachings in the prior art” (*id.* at 5:43-48), is “contrary” to “the single desmear process of  
15 the known prior art” (*id.* at 5:61-63), “differs from the common desmear process” (*id.* at  
16 8:50-52), and stands in “stark contrast” with the “known prior art” (*id.* at 9:1-3). These  
17 statements are clear and strong. They do not merely point out deficiencies in the prior  
18 art, they state with emphasis that this invention is different from the prior art. They make  
19 clear that the invention does not include the prior art’s single desmear process.

20 **B. “The Present Invention.”**

21 When an inventor describes “the present invention” as including particular  
22 elements, it can be viewed as a disavowal of a broader scope that might otherwise apply.  
23 *See Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1372 (Fed. Cir. 2014) (“[W]e  
24 have held that disclaimer applies when the patentee makes statements such as ‘the present  
25 invention requires . . .’ or ‘the present invention is . . .’ or ‘all embodiments of the present  
26 invention are . . .’”); *see also Pacing Technologies, LLC v. GarminIntern., Inc.*, 778 F.3d  
27 1021, 1025 (Fed. Cir. 2015).



1           In *Honeywell Int’l, Inc. v. ITT Indus., Inc.*, 452 F.3d 1312, 1318 (Fed. Cir. 2006),  
2 the court addressed a “fuel injection system component.” Although the ordinary meaning  
3 of a “fuel injection system component” is not limited to a fuel filter, the Federal Circuit  
4 found that the proper construction was narrower than the customary meaning and was  
5 limited to a filter. The court noted that the specification repeatedly described the fuel  
6 filter as “this invention” and “the present invention,” and held that “[t]he public is  
7 entitled to take the patentee at his word and the word was that the invention is a fuel  
8 filter.” *Id.*; see also *Edwards Lifesciences LLC v. Cook Inc.*, 582 F.3d 1322, 1327 (Fed.  
9 Cir. 2009) (limiting the claim term “graft” to mean “intraluminal graft” when “the  
10 specification frequently describes an ‘intraluminal graft’ as ‘the present invention’ or  
11 ‘this invention’”).

12           As shown in the quotations above, the specification states that “the peel strength  
13 produced in accordance with ***the present invention*** is greater than the [peel] strength  
14 produced by the desmear process of the prior art, i.e., a single desmear process.” ’582  
15 Patent at 7:3-6. This statement suggests “the present invention” produces results  
16 different from the single desmear process. The specification also states that “***the present***  
17 ***invention*** differs from the common desmear process in that sub-steps in the desmear  
18 process are repeated as a way of forming the teeth.” *Id.* at 8:50-52. This statement  
19 clearly asserts that “the present invention” – not just the embodiment discussed in the  
20 specification as an example – differs from the prior art because it involves a repeat of the  
21 desmear process. The specification further states that “***the desmear process as disclosed***  
22 ***herein*** is contrary to the manufacturer’s specifications, i.e., a ‘double desmear process,’  
23 rather than the single desmear process of the known prior art.” *Id.* at 5:59-63. Although  
24 this statement is addressing the specifications of the XB 7081, it also states that “the  
25 desmear process as disclosed” in the patent is a “double desmear process.” These  
26 statements unmistakably affirm that “the present invention” differs from the single  
27 desmear process of the prior art.

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1           **C.     Prosecution History and Other Portions of the Patents.**

2           As Defendants note, the examiner rejected all pending claims during prosecution  
3 of the '560 Patent. Doc. 188-3 at 155. In response, the applicants submitted a  
4 declaration from Professor C.P. Wong, Ph.D, which included this explanation:

5           As described in this paragraph, performing two separate swell and etch  
6 steps is a technique which forms the teeth. Although how this occurs  
7 within the dielectric material is not recited with in-depth detail, I  
8 understand the specification as informing that the teeth formation results  
9 from the release of some solid content in the first etching pass, forming  
10 irregular recesses and volume displacement. By forming the irregular  
11 releases in the first etching pass, an opening within the dielectric material  
12 would then be enlarged in the second etch pass, making the structure shown  
13 in Figure 1 and recited in the claims[.]

14           Doc. 188-3 at 109.

15           This statement clearly describes the patented method as involving two etching  
16 processes. Although Plaintiff correctly notes that Dr. Wong refers only to “a technique”  
17 as opposed to “the technique,” Dr. Wong explains that the patented teeth are created by  
18 the second etching pass. This part of the prosecution history corroborates the conclusions  
19 reached above, even if not sufficient on its own to find disavowal.

20           Other portions of the patents also support the conclusions reach above. For  
21 example, the '582 Patent includes claims which assert that the products produced by the  
22 patented process are superior to products created by “a single roughening process,” “a  
23 single pass roughening,” or “a single desmear process.” *See, e.g.,* '582 Patent at 10:25,  
24 10:33-34, 11:4, 11:11, 11:48, 11:55, 12:2, 12:15, 12:42-43, 12:59, 14:7, 17:34, 17:38-39,  
25 18:1, 18:6, 18:36-37, 18:41-42, 19:10-11, 19:14-15, 19:26. 19:40, 19:66-67, 20:15-16.  
26 These claims are not at issue in this case, but both sides agreed during the *Markman*  
27 hearing that the Court can consider them in this order. Their wording confirms that the  
28 present invention is different from a single desmear process.

          Defendants also point to extrinsic evidence that supports the Court’s conclusion.  
Documents produced by the inventors state that “a two pass desmear cycle doubles the

1 peel strength of a one pass desmear cycle, but varying the times in the cycle do not seem  
2 to have that great of an effect.” Doc. 235-2, Ex. 26. The primary inventor of the  
3 patented product, Brian McDermott, wrote in a 1998 letter that “we use a double pass  
4 desmear to achieve the tooth structure.” Doc. 235-3, Ex. 30. This extrinsic evidence,  
5 although not reliable enough to be dispositive, provides helpful corroboration of the  
6 Court’s conclusion. *Phillips*, 415 F.3d at 1319 (explaining that extrinsic evidence “may  
7 be useful to the court”).

8 **D. Plaintiff’s Arguments.**

9 Plaintiff relies on the principle of claim differentiation and argues that references  
10 to a repeat desmear process are found in several independent claims, but not in dependent  
11 claims. Doc. 189 at 16. Plaintiff notes that “the presence of a dependent claim that adds  
12 a particular limitation gives rise to a presumption that the limitation in question is not  
13 present in the independent claim.” *Phillips*, 415 F.3d at 1315.

14 The claim differentiation presumption can be overcome by clear indicia in the  
15 specification and prosecution history. As the Federal Circuit has explained, “claim  
16 differentiation is a rule of thumb that does not trump the clear import of the  
17 specification.” *Edwards*, 582 F.3d at 1332; *see also Seechange Int’l, Inc. v. C-COR, Inc.*,  
18 413 F.3d 1361, 1369 (Fed. Cir. 2005) (noting that claim differentiation is “not a hard and  
19 fast rule and will be overcome by a contrary construction dictated by the written  
20 description or prosecution history.”).

21 The Court finds, for reasons explained above, that the specification clearly  
22 distinguishes between the current invention and the prior art of a single desmear process.  
23 The clear and unequivocal rejection of that prior art overcomes any presumption raised  
24 by claim differentiation.

25 Plaintiff also notes that the specification begins its discussion of the double  
26 desmear process by describing it as “[o]ne technique for forming the teeth[.]” ’582  
27 Patent at 5:40-41. Although this is true, the patent then proceeds to explain at length the  
28 difference between the current invention and the prior art single desmear process. As

1 already noted, in two places the specification distinguishes this prior art from “the present  
2 invention.” Thus, although the specification does include a reference to “one technique,”  
3 the subsequent, detailed explanation makes clear that the patented invention is different  
4 from the single desmear process.

5 Similarly, the words “for example” in one portion of the specification do not  
6 suggest that the double desmear process is only an illustration of one embodiment of the  
7 patented invention. *Id.* at 8:49-50. Rather, the language is used to explain why XB 7081,  
8 which is normally made for a single desmear process, “can alternatively be used in  
9 carrying out the present invention.” *Id.* at 8:48-49. The specification states: “For  
10 example, the present invention differs from the common desmear process in that sub-  
11 steps in the desmear process are repeated as a way of forming the teeth.” *Id.* at 8:49-52.  
12 Thus, the example is not one means by which the invention may be embodied, but an  
13 explanation of why XB 7081 can be used with the patented product – by repeating the  
14 desmear process for which XB 7081 was designed.

15 Plaintiff notes that an early statement in the specification refers to methods of  
16 production other than repeated desmearing: “For example, a dielectric material can have  
17 a non-homogeneous composition or thickness to bring about an uneven chemical  
18 resistance, such that *slowed and/or repeated etching* will form teeth instead of the  
19 uniform etch.” *Id.* at 2:27-30. Plaintiff argues that this sentence identifies “slowed”  
20 etching as an additional method for making the patented invention, in contrast to repeated  
21 etching. The word “slowed” does appear once in the specification, but the Court cannot  
22 conclude that this single word justifies a finding that the patents include the single  
23 desmear process.

24 As explained above, the balance of the specification makes clear that the single  
25 desmear process of the prior art is not part of the invention. In fact, it is part of the  
26 problem the invention was designed to overcome. Defendants’ expert, Dr. Srinivasa  
27 Raghavan, also credibly explains in his declaration that a person of ordinary skill in the  
28 art would not read the word “slowed” in the context of the patents to mean that the

1 patents embrace single-pass desmearing. Doc. 199-3, ¶¶ 15-17. Finally, language in the  
2 specification and in the extrinsic evidence suggests that varying the times of a single  
3 desmear process does not produce the teeth that are key to the invention. *See* '582 Patent  
4 at 5:43-47; Doc. 235-2, Ex. 26. For these reasons, the Court cannot accept Plaintiff's  
5 argument that the single word "slowed" constitutes an alternative embodiment of the  
6 patented invention. *See Trustees of Columbia University in City of New York v. Symantec*  
7 *Corp.*, 811 F.3d 1359, 1366 (Fed. Cir. 2016) (explaining that "[t]his single sentence in the  
8 specification cannot overcome the overwhelming evidence in other parts of the  
9 specification").

10 Finally, the Court notes that the boilerplate disclaimer of lexicography and  
11 disavowal at the end of the specification does not alter its conclusion. '582 Patent at  
12 9:18-25. The Court finds the detailed and repeated explanation of the specification, not  
13 this disclaimer, to be controlling.

#### 14 **IV. Category 2 Terms.**

15 The parties' second category of disputed claims includes the following phrases  
16 from the '560, '105, and '912 Patents: "Epoxy dielectric material delivered with solid  
17 content," "epoxy dielectric material . . . the dielectric material delivered with solid  
18 content," "dielectric material delivered with solid content," "dielectric material that is  
19 delivered with solid content," and "dielectric material delivered with . . . solid content."  
20 Doc. 177 at 12-13. Defendants contend that each of these phrases should be construed to  
21 mean dielectric material "delivered with solid particles suspended in a liquid." *Id.*  
22 Plaintiff contends that no construction is necessary. Alternatively, Plaintiff contends that  
23 the phrases should be interpreted to include "dielectric material having solid particles  
24 suspended in the dielectric material." *Id.* The dispute is whether the patents require the  
25 use of liquid dielectric material in manufacturing the multi-layer electronic devices they  
26 cover. For several reasons, the Court concludes that Plaintiff is correct – the patents do  
27 not require use of a liquid dielectric material.

28

1           **A. Plain and Ordinary Meaning.**

2           As noted above, words of a claim are generally given the ordinary and customary  
3 meaning the words would have to a person of ordinary skill in the art at the time of the  
4 invention. *Phillips*, 415 F.3d at 1313. The Court concludes that the plain and ordinary  
5 meaning of the words in Category 2 does not require use of a liquid dielectric material.

6           The parties agree that dielectric material can be applied either in solid or liquid  
7 form. Neither side argues that the simple phrase “dielectric material” necessarily  
8 specifies one or the other. Given this fact, the Court concludes that the plain and ordinary  
9 meaning of “epoxy dielectric material delivered with solid content” or “dielectric  
10 material delivered with solid content” is delivery of a dielectric material the content of  
11 which is solid. Were it not for other portions of the patents, the Court would be inclined  
12 to conclude that the form of dielectric material specified in the claims is solid. This is  
13 precisely opposite the argument made by Defendants – that the *only form* of dielectric  
14 material permitted under the claims is liquid. The plain meaning does not support  
15 Defendants’ position.

16           **B. Specification.**

17           The specification provides clarification. Dielectric material is applied to the multi-  
18 layer electronic device in Step 3 of the process described in the patents. The specification  
19 gives this description of Step 3:

20                       Step 3 includes applying the dielectric material to the outermost  
21 surface of the conductive layer (and the base if appropriate for the circuitry  
22 or electrical device at issue) prepared in accordance with step 2. *The*  
23 *dielectric material can be applied by as [sic] a (dry film), a (liquid)*  
24 *curtain coating, a (liquid) roller coating, or an analogous application or*  
*bonding technique.*

25           ’582 Patent at 5:15-21.<sup>6</sup> This language explains that the patented invention can use either  
26 dry or liquid dielectric material. The explanation is unambiguous.

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27           <sup>6</sup> Some sentences in the specification include numbers that refer to specific  
28 components of the figures shown at the beginning of the specification. Quotations  
throughout this order omit those numbers.

1 The specification goes on to provide a preferred embodiment for the invention. It  
2 includes this explanation:

3 Turning now particularly to the process for forming the teeth and the  
4 cavities for the teeth, the present invention *can be carried out* by a new use  
5 of a CIBA-GEIGY product known as Probelec XB 7081 as a  
6 photoimagable dielectric material. Generally, and in accordance with its  
7 specifications sheet, Probelec XB 7081 is a single component, 100% epoxy  
8 photodielectric material especially developed for . . . multi-layer boards.

8 *Id.* at 6:41-48.

9 As is clear from this language, the use of XB 7081 is a preferred embodiment, an  
10 illustration. The specification says only that the patent “can be carried out” by using this  
11 product, which is a liquid, not that it must be carried out in this manner. Later portions of  
12 the specification continue discussion of this preferred embodiment. When the  
13 specification describes the method for applying the dielectric material, it again uses  
14 XB 7081 as an illustration. *Id.* at 7:15-37.

15 “[I]t is improper to read limitations from a preferred embodiment described in the  
16 specification – even if it is the only embodiment – into the claims absent a clear  
17 indication in the intrinsic record that the patentee intended the claims to be so limited.”  
18 *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 913 (Fed. Cir. 2004). Unlike the  
19 Category 1 phrases discussed above, where the specification clearly distinguishes the  
20 invention from the prior art single desmear process, the specification and other intrinsic  
21 evidence contain no clear indication that the dielectric material to be used in the patented  
22 process must be liquid. Nor does the specification describe “the present invention” as not  
23 including solid forms of dielectric material. For a court to find that a specification has  
24 disclaimed a particular possible interpretation of the claims, “there must be a clear and  
25 unmistakable disclaimer.” *Thorner*, 669 F.3d at 1366-67; *see also Pacing Techs.*, 778  
26 F.3d at 1024. The patents’ preferred embodiment of XB 7081 does not constitute a clear  
27 and unmistakable disclaimer of a solid dielectric material.

1           **C.     Prosecution History.**

2           Defendants look to the prosecution history to support their argument that the  
3 dielectric material must be applied in liquid form. Doc. 188 at 14-15. But the legal  
4 standard for finding a prosecution history disclaimer requires “a clear and unmistakable  
5 disavowal of scope during prosecution.” *Purdue Pharma L.P. v. Endo Pharm. Inc.*, 438  
6 F.3d 1123, 1136 (Fed. Cir. 2006). Ambiguous statements in the prosecution history will  
7 not support a finding of disclaimer. *SanDisk Corp. v. Memorex Prods., Inc.*, 415 F.3d  
8 1278, 1287 (Fed. Cir. 2005) (“There is no ‘clear and unmistakable’ disclaimer if a  
9 prosecution argument is subject to more than one reasonable interpretation, one of which  
10 is consistent with a proffered meaning of the disputed term.”); *see also LG Elecs., Inc. v.*  
11 *Bizcom Elecs., Inc.*, 453 F.3d 1364, 1373-74 (Fed. Cir. 2006) (finding that prosecution  
12 history statements were not sufficiently clear to justify limiting claims), *reversed on other*  
13 *grounds by Quanta v. LG Elecs.*, 128 S. Ct. 2109 (2008).

14           Defendants note that the examiner for the ’560 Patent rejected a number of claims  
15 because “[i]t is not clear as to what is meant by a dielectric material being delivered with  
16 solid content and it is also unclear as to how epoxy uses non-homogeneity with the solid  
17 content.” Doc. 183 at 158. The applicants responded with a document submitted on  
18 June 25, 2012. Doc. 188-3 at 96-109. The document attached a declaration by Dr.  
19 Wong. *Id.* at 107-109. The relevant portions of the document provide this explanation:

20           Dr. Wong testifies that, from the identified passages of the specification of  
21 the subject application, one of ordinary skill would understand that the  
22 specification disclosed the use of a generally liquid epoxy non-  
23 homogeneous dielectric, specifically as noted by the Examiner in the  
24 Action Sentence bridging [pages] 3 and 4. As noted by Dr. Wong, by  
describing the epoxy as having a solid content of 58%, one skilled in the art  
would understand that Probelec XB 7081 includes solid particles suspended  
in a generally liquid epoxy.

25           \* \* \*

26           As discussed above, the specification describes the use of a “dielectric  
27 material” with “non-homogeneous composition . . . to bring out uneven  
chemical resistance, such that slowed and/or repeated etching will form  
teeth instead of a uniform etch.” The operation of this aspect of the process  
28 of the present application is explained in the Declaration, Paragraph 7. In  
addition, the Specification describes the use of an epoxy, e.g., Probelec



1 XB 7081, having “a solid content of 58%.” By describing the epoxy as  
2 having a solid content of 58%, one skilled in the art would understand that  
3 Probelec XB 7081 includes solid particles in a percentage of 58%  
4 suspended in a generally liquid epoxy and that utilization of an epoxy  
5 “delivered with solid content” similar to Probelec as the applied dielectric  
6 material.

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12 *Id.* at 103-104. Defendants also emphasize this paragraph from Dr. Wong’s attached  
13 declaration:

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I have been asked to comment on the question of disclosure in the original  
specification for the claim language requiring an epoxy dielectric material  
delivered with solid content . . . . A particular example of this epoxy  
having solid content is disclosed as Probelec XB 7081 as described in  
paragraphs (0051-0065). Paragraphs (0051 to 0060) describe the various  
properties of this epoxy material. In paragraph (0056), McDermott  
discloses a “solid content of 58%.” By describing this epoxy as having a  
solid content of 58%, I understand that Probelec XB 7081 includes solid  
particles suspended in a generally liquid epoxy.

*Id.* at 108.

Defendants contend that this language amounts to a disclaimer of solid dielectric  
material for the patented process. The Court does not agree.

Portions of the quoted language simply describe XB 7081, the product used in the  
specification’s preferred embodiment. These portions state that XB 7081 includes solid  
particles suspended in a generally liquid epoxy. Such a description of a product used in a  
preferred embodiment does not constitute a disclaimer of all other possible forms of  
dielectric material.

Other portions of the quoted language refer to epoxy “having a solid content of  
58%,” and state that one skilled in the art would understand this to mean a liquid  
containing solid particles. But the reference to 58% does not appear in any of the  
Category 2 claims to be construed – they all refer to dielectric material “delivered with  
solid content.” The fact that dielectric material “having a solid content of 58%” suggests  
a liquid with 58% solid particles, as the statements from the prosecution history say, does  
not mean that the phrase “delivered with solid content,” standing alone, also means a  
liquid. At most, the statements are ambiguous.

1           The prosecution history does not clearly and unmistakably disavow use of solid  
2 dielectric materials. *Purdue*, 438 F.3d at 1136. As a result, the Court cannot rely on the  
3 prosecution history as a basis for concluding that solid dielectric materials are excluded  
4 from the patent. To the contrary, the specification expressly states that a dry film  
5 dielectric material may be used.

6 **V.    Category 3.**

7           The parties' third category of claim terms are "means-plus-function limitations."  
8 Doc. 177 at 2-3. The relevant statute provides that "[a]n element in a claim for a  
9 combination may be expressed as a means or a step for performing a specified function  
10 without the recital of structure, material, or acts in support thereof, and such claim *shall*  
11 *be construed to cover the corresponding structure, material, or acts described in the*  
12 *specification and equivalents thereof.*" 35 U.S.C. § 112(f). When this statute applies to  
13 a claim, the claim is construed by identifying the "function" associated with the plain  
14 language, and then identifying the corresponding "structure" in the specification that is  
15 associated with that function.

16           The parties have identified three claim terms requiring construction, and agree that  
17 each of these terms constitutes a means-plus-function limitation. The parties also agree  
18 on the function for each term. The Court's task, therefore, is to find the corresponding  
19 "structure" in the specification for each function.

20           The first limitation, found in the '582 Patent, is "means for joining the conductive  
21 layer to the dielectric material." Doc. 177 at 15. The parties agree that this claim has the  
22 following function: "joining the conductive layer to the dielectric material." *Id.*

23           The second claim also comes from the '582 Patent and reads: "means for  
24 mechanically gripping a conductive layer to the surface of the dielectric material so that  
25 the conductive layer is burrowed in and under the top surface of the dielectric material."  
26 *Id.* The parties agree on the following function for this claim: "mechanically gripping a  
27 conductive layer to the surface of the dielectric material so that the conductive layer is  
28 burrowed in and under the top surface of the dielectric material." *Id.*

1           The third term comes from the '105 Patent and reads: “means for interlocking a  
2 conductor part of the circuitry configured for filling cavities with an epoxy dielectric  
3 material disposed in combination with the circuitry and coupled with the conductor part.”  
4 *Id.* at 116. The parties agree on this function: “interlocking a conductor part of the  
5 circuitry configured for filling cavities with an epoxy dielectric material disposed in  
6 combination with the circuitry and coupled with the conductor part.” *Id.*

7           The parties disagree on the structure that should correspond to each claim. With  
8 respect to the first claim, Plaintiff asserts that the structure should be Figure 1 of the '582  
9 Patent, together with the following statement from the specification: “It could also be  
10 said that the layers joined in a saw-toothed manner, i.e., teeth made of both materials in  
11 an interlocking bite.” Defendants, on the other hand, contend that the structure should  
12 include seven paragraphs from the '582 Patent specification – paragraphs that discuss the  
13 connection between the dielectric material and the conductive layer in considerable  
14 detail. These paragraphs include a discussion of teeth, a saw-toothed description of the  
15 teeth, a triangular shape description of the teeth, canine or fang-shaped teeth, and  
16 preferable sizes and frequencies for the teeth. '582 Patent at 3:18 to 4:11.

17           With respect to the second claim term, Plaintiff contends that the corresponding  
18 structure consists of Figure 1 and the following statement:

19           However, the preferred embodiment utilizes a surface of obtuse, canine, or  
20 fang-shaped teeth to help the conductive coating hook under the exterior  
21 surface of the applied dielectric material to mechanically grip the applied  
22 dielectric material. The obtuse, canine, or fang-shaped teeth are in contrast  
23 to the shallower, more rounded surface typically produced by known  
24 roughening techniques. Note in FIG. 2 that roughening techniques can  
produce some occasional gouging but nothing on the order of the present  
invention.

25 '582 Patent at 3:42-51. Defendants propose the same seven-paragraph structure that they  
26 advocate with respect to the first claim.

27           For the third claim, which is found in the '105 Patent, Plaintiff proposes that the  
28 structure include Figure 1 and the following language from the specification:

1 The invention can be carried by forming cavities in the applied dielectric  
2 material for receiving the teeth, and then forming the teeth from the  
3 conductive coating and metal layer formed thereon. Generally, the teeth  
4 can be of any triangular shape (e.g., equilateral, isosceles, scalene, right,  
5 obtuse, or any combination thereof). Preferably, though, the teeth are  
6 obtuse so as to hook or angle under the exterior surface of the applied  
7 dielectric material.

8 '105 Patent at 3:40-47. Defendants propose the same seven-paragraph structure that they  
9 propose for the other claims. *Id.* at 3:26-4:29.

10 The Federal Circuit has instructed “that corresponding structure must include all  
11 structure that actually performs the recited function.” *Cardiac Pacemakers, Inc. v. St.*  
12 *Jude Medical, Inc.*, 296 F.3d 1106, 1119 (Fed. Cir. 2002); *see also Callicrate v.*  
13 *Wadsworth Mfg., Inc.*, 427 F.3d 1361, 1369 (Fed. Cir. 2005) (holding that it was error for  
14 the district court to limit the corresponding structure to the preferred embodiment and not  
15 include “all structure in the specification corresponding to the claimed function”). In  
16 light of this guidance, the Court concludes that Plaintiff’s proposed structures are too  
17 narrow. Although they include some discussion of the means by which the conductive  
18 and dielectric layers adhere to each other, those discussions do not include “all structure”  
19 described in the specification “that actually performs the recited function.” *Cardiac*  
20 *Pacemakers*, 296 F.3d at 1119. The Court also disagrees with Plaintiff’s suggestion that  
21 the words “joining,” “mechanically gripping,” and “interlocking” have different  
22 meanings. These terms are not defined in the patents. Each is used to describe the means  
23 by which the layers adhere to each other. And, as Defendants note, these terms are used  
24 interchangeably in some parts of the specification. *See, e.g.*, '582 Patent at 1:50-57, 3:21-  
25 23.

26 The seven paragraphs identified by Defendants describe the structure by which the  
27 dielectric material adheres to the conductive layer in more detail, but even they leave out  
28 some structure, and the Court has difficulty understanding how these technical and  
lengthy paragraphs could be used by a jury to determine whether the accused products  
infringe. Indeed, both sides acknowledged during the *Markman* hearing that it would be

1 best to prepare for the jury a short and clear description of the structure that corresponds  
2 to the functions identified above.

3 The disagreement between the parties seems to be over which portions of the  
4 structure discussed in the specification must be present for a product to infringe. Plaintiff  
5 contends that the presence in the accused product of any part of the structure will be  
6 sufficient. Defendants argue that at least four different components of the structure must  
7 be present before infringement is found. Defendants identify these components by  
8 looking to parts of the specification that are not included in their seven paragraphs of  
9 proposed structure.

10 The Court concludes that the parties' *Markman* briefs do not provide a sufficient  
11 discussion of the law or the specification for the Court to resolve this disagreement. As a  
12 result, the Court will require the parties to do the following:

- 13 1. Develop an agreed-upon description of each element of structure found in  
14 the specification that relates to the adhering function of these claims. This  
15 can include separate paragraphs for each element (tooth shape, frequency,  
16 size, etc.) or a narrative description of the entire structure. It should be in  
17 language suitable for a jury instruction.
- 18 2. Brief two questions: (1) As a legal matter, how many elements of a  
19 structure must be present in an accused product for a finding of  
20 infringement? (2) How does that law apply to these patents – what  
21 elements of structure disclosed in the specification must be present for an  
22 accused product to infringe in this case?
- 23 3. The parties shall confer and, within 10 days of this order, propose a  
24 schedule for completing these tasks, including page limitations.

## 25 **VI. Indefiniteness.**

26 The relevant statute provides that “[t]he specification shall conclude with one or  
27 more claims *particularly pointing out and distinctly claiming* the subject matter which  
28 the applicant regards as his invention.” 35 U.S.C. § 112(b). This requirement ensures

1 that a patentee adequately notifies the public of the scope of his or her invention. “A  
2 patent is invalid for indefiniteness if its claims, read in light of the specification  
3 delineating the patent, and the prosecution history, fail to inform, with reasonable  
4 certainty, those skilled in the art about the scope of the invention.” *Nautilus v. Biosig*  
5 *Instruments, Inc.*, 134 S.Ct. 2120, 2123 (2014). At the same time, however, “absolute  
6 precision is unattainable.” *Id.* Courts therefore “must take into account the inherent  
7 limitations of language” and allow a “modicum of uncertainty” so as to provide  
8 appropriate incentives for innovation. *Id.* at 2128. Because an indefinite claim is an  
9 invalid claim, an accused infringer must prove indefiniteness clearly and convincingly.  
10 *Bancorp Servs., LLC v. Hartford Life Ins. Co.*, 359 F.3d 1367, 1371 (Fed. Cir. 2004).

11 **A. “A Sample of the Circuitry.”**

12 Claims in the ’582 Patent require that “a sample of the circuitry” have a frequency  
13 of teeth sufficient to provide at least 5,000 teeth per linear inch. ’582 Patent, Claims 94,  
14 95, 122. Defendant contends that the phrase “a sample of the circuitry” is indefinite  
15 because it does not provide enough precision for a person skilled in the art to determine  
16 the scope of the invention with reasonable certainty. *See Nautilus*, 134 S.Ct. at 2129.  
17 The Court does not agree.

18 The specification begins by identifying the location of the teeth that are critical to  
19 the patent. Figure 1 is a magnified photograph of the interface between a conductive  
20 layer and a dielectric layer in a device made according to the patent, and clearly  
21 illustrates the teeth of the two layers that interlock with each other. Figure 2 is a  
22 magnified photograph of the same interface in a device made by the prior art. The  
23 boundary between the two layers is much smoother and lacks the cavities and teeth  
24 illustrated in Figure 1. The specification then provides this explanation:

25 FIG. 1 is an illustration of a conductive coating and metal layer on the  
26 applied dielectric material with a desirable tooth structure. In contrast, FIG.  
27 2 is an illustration of a prior art conductive coating and metal layer on the  
28 applied dielectric material with the surface produced by roughening  
processes. . . . Compare FIG. 1 and FIG. 2, and note particularly the size,  
shape, frequency, and depth of the teeth in FIG. 1 with the surface produced  
by roughening in FIG. 2.

1 '582 Patent at 3:8-17.

2 The specification proceeds to explain the nature of the teeth called for by the  
3 patents:

4 As to frequency, the teeth should be quite frequent in number; at  
5 least about 5,000 teeth per linear inch, and preferably about 10,000 per  
6 linear inch; and even better is at least about 15,000 teeth per linear inch.

7 As to surface area, there should be at least about 25,000 teeth per  
8 square inch, better still is essentially at least about 100,000 per square inch,  
9 and preferably at least about 200,000 per square inch, or even greater.

10 *Id.* at 3:62 to 4:2

11 Having described this tooth frequency, the specification explains:

12 It should be recognized that the teeth generally are not formed to a  
13 precise dimension. As shown in FIG. 1, some of the teeth are somewhat  
14 differently sized, angled, and proportioned. Thus, ***a representative sample***  
15 of the electrical device should have teeth in about these ranges.

16 Having at least about 20% of the teeth in one or more of these  
17 ranges, and preferably about 50% is a preferred balance of mechanical grip  
18 without a weakening [of] the integrity of the layer, particularly in  
19 combination.

20 *Id.* at 4:3-11.

21 Several points are apparent from this quoted language. First, the teeth are located  
22 at the interface between the dielectric material and the conductive layer. Second, the  
23 frequency of the teeth should be at least 5,000 per linear inch and 25,000 per square inch.  
24 Although Defendants protest that they don't know where these teeth are located, Figure 1  
25 and this language makes clear that they are located in the interface between the two  
26 layers. Third, the specification states that "a representative sample of the electrical  
27 device should have teeth in about these ranges." *Id.* at 4:6-7.

28 In light of this specification, claims in the '582 Patent are not indefinite. Claim 94  
states that the patented device includes "a conductive layer of material built up on a  
surface on a layer of dielectric materials, the layers joined in a saw-tooth manner made of  
both materials in an interlocking bite." *Id.* at 18:14-17. The claim then states: "[T]he  
conductive layer is a portion of circuitry of an electrical device, the conductive layer is  
comprised of teeth such that a sample of the circuitry has a frequency of the teeth

1 sufficient to provide at least 5,000 of the teeth per linear inch.” *Id.* at 18:18-22.  
2 According to this language, the conductive layer is a portion of the circuitry, and a  
3 sample of the circuitry – the conductive layer – should show a frequency of teeth  
4 sufficient to provide at least 5,000 teeth per linear inch. In light of the specification’s  
5 suggestion that the samples should be “representative,” and its unambiguous explanation  
6 that the location of the teeth and the area to be sampled is the interface between the  
7 dielectric and conductive layers, the Court concludes that a person reasonably skilled in  
8 the art could determine how to obtain such a sample.

9 Defendants argue that the size and location of the sample are not specified in the  
10 claim. True, but the size clearly must be large enough to show “a frequency of the teeth  
11 sufficient to provide at least 5,000 of the teeth per linear inch,” and, according to the  
12 specification, should be a “representative sample.” The parties may disagree on how big  
13 that sample ought to be, but the Court cannot conclude that such disagreement makes this  
14 claim indefinite. Persons of ordinary skill in the art would understand a sample size large  
15 enough to be representative of the interface as a whole.

16 The Court disagrees with Defendants’ argument that the location of the sample is  
17 unknown, or that the sample might even be taken from locations in the electronic device  
18 other than the interface between the dielectric material and the conductive layer. Reading  
19 the specification leaves no doubt as to the meaning of the claim: the interface is the  
20 location of the teeth to be sampled, and the teeth in the interface must be shown by  
21 sampling to have a frequency of at least 5,000 per linear inch.

22 **B. “Upgrade Slope.”**

23 Claims in the ’582 Patent call for the formation of cavities in the dielectric  
24 material “wherein at least one of the cavities includes an upgrade slope with respect to  
25 the dielectric material, and one of the teeth engages a portion of the dielectric material at  
26 the slope.” ’582 Patent at 17:58-61. Defendants claim that the phrase “upgrade slope” is  
27 indefinite because a person of ordinary skill could not distinguish when a slope is  
28 “upgrade” as opposed to “downgrade,” or where the slope is located. Plaintiff responds



1 that the slope, according to the language of each claim at issue, calls for “an upgrade  
2 slope *with respect to the surface of the dielectric material.*” See, e.g., ’582 Patent,  
3 Claims 89, 94. Plaintiff argues that this language shows that “upgrade slope” describes  
4 the orientation of cavity walls in relation to the surface of the dielectric material.  
5 Doc. 200 at 15.

6 The specification includes this explanation:

7 A further way of articulating the “teeth” concept is to view each  
8 tooth as being substantially triangular in shape, with the base of the triangle  
9 being a plain of the dielectric material before it is etched, or more precisely  
10 by the exterior surface thereof. The invention can be carried out by  
11 forming cavities in the applied dielectric material for receiving the teeth,  
12 and then forming the teeth from the conductive coating and then a layer  
13 formed thereon. Generally, the teeth can be of any triangular shape, e.g.,  
14 equilateral, isosceles, scalene, right, obtuse, or any combination thereof”.  
15 Preferably, though, the teeth are obtuse so as to hook or angle under the  
16 exterior surface of the applied dielectric material.

17 The use of any shape of teeth increases the surface area where the  
18 conductive coating is on the applied dielectric material. However, the  
19 preferred embodiment uses a surface of obtuse, canine, or fang-shaped teeth  
20 to help the conductive coating and metal layer hook under the exterior  
21 surface of the applied dielectric material.

22 ’582 Patent at 3:28-46.

23 With this explanation from the specification, the Court concludes that a person of  
24 ordinary skill in the industry could understand with reasonable certainty the meaning of  
25 the claim at issue: A dielectric material comprising a surface with cavities “wherein at  
26 least one of the cavities includes an upgrade slope with respect to the surface of the  
27 dielectric material, and one of the teeth engages a portion of the dielectric material at the  
28 slope.” The cavities formed in the dielectric material must have sloped sides, relative to  
the flat surface of the dielectric material, and the teeth formed from the conductive layer  
must engage a portion of the dielectric material at the sloped side of the cavity.

As Plaintiff’s counsel conceded at the *Markman* hearing, this terminology does not  
specify any specific slope or angle, and, as a result, every cavity, no matter how small or  
shallow, would have sides that are sloped relative to the surface of the dielectric material  
and therefore satisfy this claim requirement. Indeed, even the undulating surface of the

1 prior art as illustrated in Plaintiff's opening brief (Doc. 189 at 9, lines 13-15) would  
2 appear to satisfy this description. As a result, the Court cannot see how this claim  
3 language distinguishes the patented invention from the prior art, but that is not a question  
4 of definiteness.

5 **C. "Peel Strength Greater Than."**

6 Defendants challenge the '582 Patent claims that call for "peel strength greater  
7 than a peel strength that would be produced by a single desmear process." Doc. 177  
8 at 18. Defendants agree that "peel strength" is a term of art that generally refers to the  
9 adhesive strength that exists between two layers. Doc. 188 at 25. Defendants argue,  
10 however, that this claim language specifies no method for measuring peel strength and no  
11 criteria for determining the peel strength of a product produced by a single desmear  
12 process, and therefore leaves a person of ordinary skill in the art with no basis to  
13 determine what measurement is intended.

14 Plaintiff asserts with some persuasive force that IPC-TM-650, method 2.4.8, is the  
15 standardized method for measuring peel strength by one skilled in the art. Doc. 200-3  
16 at ¶ 30. But Plaintiff also argues that any scientifically reasonable method for measuring  
17 peel strength could be used, the only requirement being that it show a peel strength in the  
18 product made under the patent that is greater than the peel strength of a product made by  
19 a single desmear process.

20 The Court agrees with Plaintiff. Defendants do not contend that the word  
21 "greater" is indefinite. And the fact that a particular method of measuring peel strength is  
22 not identified does not make the language indefinite. Those skilled in the art know the  
23 accepted means for measuring peel strength. Nor is the claim indefinite because the  
24 baseline peel strength of a product made with a single desmear process is not specified.  
25 No particular peel strength is required; it just must be lower, upon measurement, than the  
26 peel strength of the patented product measured by the same method. Persons skilled in  
27 the art know how to conduct such measurements and how to locate a product made by a  
28 single desmear process.

1           **D. “Substantially Greater.”**

2           Claims 14 and 19 of the ’560 Patent and several claims in the ’105 Patent call for  
3 cavities in the dielectric layer having “a first cross-sectional distance proximate the  
4 [initial] surface” and a “substantially greater cross-sectional distance distant from the  
5 [initial] surface.” Doc. 177 at 19. Defendants contend that the intrinsic record is devoid  
6 of any objective criteria for determining how much greater is “substantially greater”  
7 within the meaning of the claims, and that these limitations therefore are indefinite.  
8 Defendants note that the ’912 Patent does not include the word “substantially,” calling  
9 simply for a “greater cross-sectional distance.” As a result, Defendants argue,  
10 “substantially” must have some meaning beyond “greater,” a meaning not apparent from  
11 the intrinsic evidence.

12           Plaintiff notes that the Federal Circuit has “repeatedly confirmed that relative  
13 terms such as ‘substantially’ do not render patent claims so unclear as to prevent a person  
14 of skill in the art from ascertaining the scope of the claim.” *Deere & Co. v. Bush Hog,*  
15 *LLC*, 703 F.3d 1349, 1359 (Fed. Cir. 2012). Plaintiff agrees, however, on the relevant  
16 test: “Such a term is not indefinite if the intrinsic evidence provides ‘a general guideline  
17 and examples sufficient to enable a person of ordinary skill in the art to determine [the  
18 scope of the claims].’” *Enzo Biochem, Inc. v. Applera Corp.*, 599 F.3d 1325, 1335 (Fed.  
19 Cir. 2010) (citation omitted).

20           Plaintiff points to the following language from the specification as providing  
21 guidance on the meaning of “substantially”:

22           In comparison with the above-mentioned roughening techniques of the  
23 prior art, it is believed that a surface of the teeth is an improvement in that  
24 there is an increase in surface area. However, it is still better to use teeth  
25 that are fang-shaped to enable a mechanical grip that functions in a  
26 different manner than adherence by means of increased surface area. By  
27 using the fanged, angled, canine, or otherwise hooked teeth (in addition to  
28 increased surface area), there is a multidirectional, three dimensional  
interlacing and overlapping of layers.

1 '582 Patent at 1:58-66. Plaintiff also points to language in the specification stating that  
2 “the . . . metal layer is actually burrowed under the dielectric material and vice versa.”  
3 *Id.* at 1:66 to 2:3.

4 Plaintiff’s expert, Dr. Hoffman, provides this explanation of why this description  
5 is sufficient for one skilled in the art to understand the meaning of “substantially”:

6 In light of the specification and the art, a person of ordinary skill  
7 would understand that the cross-sectional distance of the interior of a cavity  
8 must exceed a cross-sectional distance nearer the opening of a cavity enough  
9 to create the “mechanical grip” described in the patents and allow the  
10 conductive material to burrow “in and under” the dielectric material. *See,*  
11 *e.g.,* '582 Patent at 1:58-2:3.

12 A person of ordinary skill in the art would recognize that if the  
13 cross-sectional distance of the interior of the cavity only exceeds the cross-  
14 sectional distance of the opening by a very slight amount, the mechanical  
15 grip disclosed in the patents would not be achieved.

16 A person of ordinary skill in the art would further understand that  
17 the specific difference between comparative cross-sectional distances may  
18 vary based on particular application and material properties. For example,  
19 a person having ordinary skill in the art would understand that materials  
20 having high tensile strength will more readily grip copper, meaning that the  
21 degree of undercutting and burrowing (that is to say the amount which the  
22 cross-sectional distance distant the surface is greater than the distance  
23 proximate the surface) can be lesser than a material with lower tensile  
24 strength.

25 Doc. 200-3 at ¶¶ 35-37.

26 As noted above, the Supreme Court recently held that “a patent’s claims, viewed  
27 in light of the specification and prosecution history, [must] inform those skilled in the art  
28 about the scope of the invention with *reasonable certainty*.” *Nautilus, Inc.*, 134 S. Ct. at  
2129. After *Nautilus*, the Federal Circuit explained that “[t]he claims, when read in light  
of the specification and the prosecution history, *must provide objective boundaries* for  
those of skill in the art.” *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1371 (Fed.  
Cir. 2014). The Federal Circuit also explained that “[w]hen a ‘word of degree’ is used,  
the court must determine whether the patent provides ‘*some standard for measuring that*

1 *degree.*” *Biosig inst., Inc. v. Nautilus, Inc.*, 783 F.3d 1374, 1378 (Fed. Cir. 2015)  
2 (quoting *Enzo Biochem*, 599 F.3d at 1332).

3 Although it is a close question, the Court concludes that the patents satisfy this  
4 standard. Language from the specification quoted above explains that the cavities should  
5 extend under the surface of the dielectric material (“actually burrowed under the  
6 dielectric material”) so that the teeth that fill the cavities “mechanical[ly] grip” the  
7 dielectric material. ’582 Patent at 1:58 to 2:3. This suggests that the base of the cavity  
8 should not be perfectly aligned with the surface of cavity, the sides of the cavity forming  
9 a perpendicular wall, but instead should be sufficiently offset from the surface opening to  
10 permit the tooth to engage the dielectric material in a mechanical grip. The Court  
11 concludes that one skilled in the art could determine the extent to which the cavity must  
12 extend under the dielectric material to permit such a mechanical grip. The claims provide  
13 additional guidance by stating that the peel strength formed by these gripping teeth must  
14 exceed the peel strength of a layer created by a single-pass desmear process. And Figure  
15 1 provides further explanation, illustrating the kinds of cavities and teeth intended by the  
16 patent.

17 Admittedly, this language requires some judgment by persons skilled in the art,  
18 but it is judgment informed by the intended function of the cavities (to create a  
19 mechanical grip), the result that should be realized (peel strength greater than single-pass  
20 desmearing creates), and the illustration in Figure 1. As the Federal Circuit explained  
21 after *Nautilus*, “absolute or mathematical precision is not required.” *Interval Leasing*, 766  
22 F.3d at 1370. The Federal Circuit also favorably cited its previous holding that the  
23 phrase “not interfering substantially” was not indefinite even though the construction  
24 “define[d] the term without reference to a precise numerical measurement.” *Enzo*  
25 *Biochem*, 599 F.3d at 1335.

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**E. Indefiniteness Conclusion.**

With respect to the claims in Category 4, the Court concludes that Defendants have not satisfied their “clear and convincing” burden of showing that the claims are indefinite.

Dated this 9th day of August, 2017.



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David G. Campbell  
United States District Judge