UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LUXSHARE PRECISION INDUSTRY CO., LTD.
Petitioner

v.

BING XU PRECISION CO., LTD.
Patent Owner

Case IPR2017-01492
U.S. Patent No. 8,758,044

PETITIONER'S NOTICE OF APPEAL TO THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

Via PTAB E2E
Patent Trial and Appeal Board

Via Priority Mail Express
Office of the Solicitor
United States Patent and Trademark Office
Mail Stop 8
P.O. Box 1450
Alexandria, Virginia 22313-1450

Via CM/ECF
United States Court of Appeals for the Federal Circuit

Pursuant to 37 C.F.R. § 90.2(a), 35 U.S.C. § 142, and Federal Circuit Rule 15(a)(1), Petitioner Luxshare Precision Industry Co., Ltd. respectfully gives Notice that it hereby appeals to the United States Court of Appeals for the Federal Circuit the Patent Trial and Appeal Board's ("Board") Final Written Decision in Case No. IPR2017-01492 (Paper 52) that Claims 1-20 of U.S. Patent No. 8,758,044 have not been shown to be unpatentable, and from all other underlying orders, decisions, rulings and opinions that are adverse to Petitioner, including, without limitation, those within the Decision on Institution of *Inter Partes* Review, entered January 12, 2018 (Paper 20) ("Institution Decision") and the Order on the Conduct of the Proceeding, entered May 1, 2018 (Paper 24) and that modified the Institution Decision in light of the Supreme Court's decision in *SAS Institute, Inc. v. Iancu*, 138 S. Ct. 1348 (2018). The Board entered its Final Written Decision on January 11, 2019, and thus, this Notice is timely filed within the 63-day period allowed by 35 U.S.C. § 142.

For the limited purpose of providing the Director with the information requested in 37 C.F.R. § 90.2(a)(3)(ii), issues in Petitioner's appeal may include: the Board's claim construction findings and conclusions; the Board's legal error and denial of Petitioner's rights, including its due process rights, by the Board's decision to change its claim construction findings and conclusions in the Final

Written Decision compared to the same in its Institution Decision; the Board's interpretation of the prior art; the Board's refusal to consider, and incorrect findings regarding, Petitioner's evidence and rationales for modifying and/or combining the prior art; the Board's decision that Patent Owner had not waived its arguments as to the invalidity grounds newly-instituted by the Order that modified the Institution Decision in light of the Supreme Court's *SAS* decision; the Board's determination that Claims 1-20 have not been shown to be unpatentable under 35 U.S.C. §§ 102 or 103; any findings supporting that determination; the Board's failure to consider evidence of record properly; the Board's legal errors in undertaking the obviousness analysis; the Board's findings that conflict with the evidence of record and are not supported by substantial evidence; and any other issues decided adversely to Petitioner in any orders, decisions, rulings, and opinions.

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Concurrent with this submission, a copy of this Notice of Appeal is being filed with the Board. In addition, a copy of this Notice of Appeal, along with the required docketing fees, are being filed electronically with the Clerk's Office for the United States Court of Appeals for the Federal Circuit.

Dated: March 14, 2019

Respectfully submitted,

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that on this the 14th day of March, 2019, a true and correct copy of the foregoing **PETITIONER'S NOTICE OF APPEAL TO THE UNITED STATES CIRCUIT COURT FOR THE FEDERAL CIRCUIT** is being served via electronic mail as agreed by the parties on the following attorneys of record:

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ATTACHMENT 1

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Paper 52
Entered: January 11, 2019

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LUXSHARE PRECISION INDUSTRY CO., LTD.,
Petitioner,

v.

BING XU PRECISION CO., LTD.,
Patent Owner.

Case IPR2017-01492
Patent 8,758,044 B2

Before DEBRA K. STEPHENS, BRYAN F. MOORE, and STACEY G. WHITE, *Administrative Patent Judges*.

MOORE, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C § 318(a)

I. INTRODUCTION

Luxshare Precision Industry Co., Ltd. ("Petitioner") requests *inter partes* review of claims 1–20 of U.S. Patent No. 8,758,044 B2 ("the '044 Patent," Ex. 1001) pursuant to 35 U.S.C. §§ 311 *et seq*. Paper 1 ("Pet."). Bing Xu Precision Co., Ltd. ("Patent Owner") filed a Preliminary Response. Paper 15 ("Prelim. Resp."). In a January 12, 2018, Institution Decision, we determined that Petitioner had a reasonable likelihood of prevailing only on following grounds:

Reference(s)	**Basis**	**Instituted Claim(s)**
Wu	§ 102	1
Wu	§ 103	1 and 3
Wu and the Array Interconnection Handbook	§ 103	8
Wu and Tang	§ 103	4

Paper 20, ("Inst. Dec."). Accordingly, we instituted an *inter partes* review on those grounds only pursuant to 37 C.F.R. § 42.108. Inst. Dec. 34.

Patent Owner filed a Patent Owner Response (Paper 23, "PO Resp.") to which Petitioner filed a Reply (Paper 33, "Pet. Reply"). Patent Owner also requested authorization to file and, receiving authorization, filed a Sur-Reply. Papers 37, 41 ("PO Sur-Reply").

Subsequent to the Supreme Court's decision in *SAS Institute, Inc. v. Iancu*, 138 S. Ct. 1348 (2018), we issued an Order, on May 1, 2018, modifying our Institution Decision to institute review of all challenged claims (1–20) and all grounds asserted in the Petition and instructed the parties to confer regarding any need for further briefing and changes to the schedule for trial. Paper 24 ("SAS Order"). Neither party requested additional briefing on the newly added claims.

Both parties requested a hearing for oral argument (Paper 47) and a prehearing conference (Paper 36), and a pre-hearing was held January 24, 2018 and a hearing was held on October 9, 2018. *See* Paper 49 ("Tr.").

As discussed below, upon consideration of the Petition and Patent Owner Response, the testimony of Dr. Pradeep Lall for Petitioner (Ex. 1002) and Dr. Michael G. Pecht for Patent Owner (Ex. 2002), Petitioner has not shown by a preponderance of the evidence that claims 1–20 are unpatentable.

A. Related Matters

We are informed that the '044 Patent is presently the subject of the following: *Bing Xu Precision Co., Ltd. v. Acer Inc. and Acer America Corp.* Case No. 5:16-cv-02491-EJD (N.D. Cal.). *See* Pet. 2. Petitioner also has filed IPR petitions, that are currently pending, challenging related U.S. Patents 8,512,071(IPR2017-01404) and 8,740,631 (IPR2017-01657).

B. The '044 Patent

The '044 Patent describes a connector assembly that allows easy inspection of the electrical connection between the PCB and the FFC. Ex. 1001, 1:47–52, 1:66–2:2. Figure 3 of the '044 Patent is reproduced below.

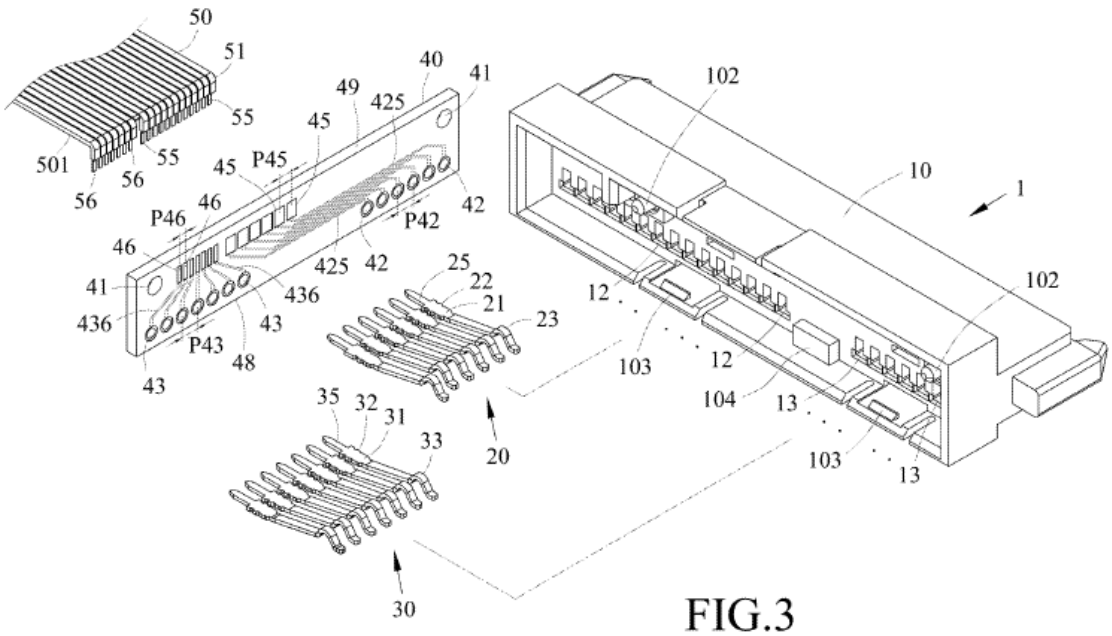

FIG.3

Figure 3 depicts an exploded diagram of the connector components. The connector assembly includes FFC 50, terminals 20, 30, PCB 40, and insulated housing 10. Figure 7, reproduced below, shows a side view of the connector.

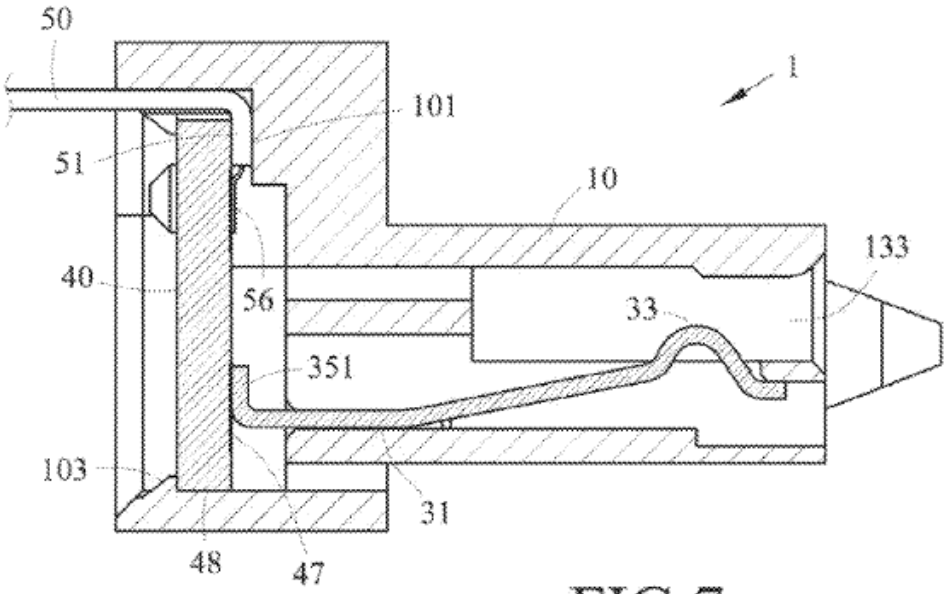

FIG.7

Figure 7, above, shows the connector includes a design where the PCB includes two sides where a rear facing side faces away from the insulated housing 10. Ex. 1001, Fig. 7.

C. Illustrative Claim

Independent claim 1, reproduced below, is illustrative of the claimed subject matter:

> 1. An electrical connector assembly comprising:
> an insulating housing having a plurality of grooves, a plurality of data terminal holes, and a plurality of power terminal holes;
> a PCB (printed circuit board) having a plurality of first soldering holes, a plurality of second soldering holes, a plurality of first contacts electrically connected to the first soldering holes, and a plurality of second contacts electrically connected to the second soldering holes;
> a plurality of power terminals fastened in the grooves of the insulating housing respectively, the power terminals each having a mating portion inserted into each of the power terminal holes, and the power terminals each having a soldering portion soldered in each of the first soldering holes;
> a plurality of data terminals fastened in the grooves of the insulating housing respectively, the data terminals each having a mating portion inserted into each of the data terminal holes, and the data terminals each having a soldering portion soldered in each of the second soldering holes;
> an FFC (flexible flat cable) having an insulating layer for enclosing a plurality of conductors; and
> wherein exposed ends of the conductors are electrically connected to the first contacts and the second contacts.

Id. at 8:4–28.

D. Instituted Grounds of Unpatentability

Petitioner asserts that claims 1–20 are unpatentable based on the following grounds (Pet. 15–63):

Reference(s)	Basis	Claim(s) challenged
Wu[1]	§ 102	1 and 3
Wu	§ 103	1–3, 8–10, 12, 13, and 15
Wu and the Handbook[2]	§ 103	2, 8, 9, and 13[3]
Wu and Tang[4]	§ 103	4, 5, 16, and 18
Wu, Green,[5] and De Lollis[6]	§ 103	14
Wu and Brennan[7]	§ 103	17
Wu, SATA Standard,[8] and Su[9]	§ 103	6, 7, 11, 19, and 20

II. DISCUSSION

A. Level of Skill

Petitioner asserts the level of skill includes, inter alia, "four years of experience or a Master's degree with two years of experience in the field of mechanical engineering and/or electrical engineering." Pet. 8 (citing Ex. 1002 ¶ 34). Patent Owner asserts the level of skill would include a Bachelor's degree (or the equivalent) in electrical engineering, and a few months of experience working with connectors. PO Resp. 5 (citing

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[1] US Patent No. 7,563,108 B1, issued Jul. 21, 2009 ("Wu," Ex. 1003).
[2] Puttlitz *et al*, THE AREA ARRAY INTERCONNECTION HANDBOOK, 2001 ("Handbook", Ex. 1004).
[3] While Petitioner argues Claim 13 under this ground, Petitioner instead lists Claim 12 in the summary of invalidity positions (Pet. 14–15). We consider this to be a clerical error, and it does not change our analysis.
[4] US Patent No. 6,152,765, issued Nov. 28, 2000 ("Tang," Ex. 1005).
[5] US Patent No. 5,501,612, issued Mar. 26, 1996 ("Green," Ex. 1006).
[6] De Lollis, THE USE OF ADHESIVES AND SEALANTS IN ELECTRONICS, IEEE TRANSACTIONS ON PARTS, MATERIALS AND PACKAGING, Vol. PMP-1, No. 3, Dec. 1965 ("De Lollis," Ex. 1007).
[7] US Patent No. 5,941,725, issued Aug. 24, 1999 ("Brennan," Ex. 1008).
[8] SERIAL ATA INTERNATIONAL ORGANIZATION: SERIAL ATA REVISION 2.6, 2007 ("SATA Standard," Ex. 1009).
[9] US Patent No. 7,803,009 B2, issued Sep. 28, 2010 ("Su," Ex. 1010).

Ex. 2002 ¶¶ 40–42). Patent Owner argues that the difference in the asserted level of skill would result in not appreciating "educational level of active workers in the field" and, among other things, the fact the Dr. Lall has published in technical areas other than connectors is reason to consider Dr. Pecht as higher authority over Dr. Lall. *Id.* at 5–7. Dr. Lall acknowledges that "a less skilled definition is possible for a [PHOSITA] of the '044 Patent." Ex. 1002 ¶ 35. Patent Owner asserts "[t]he prior art simply does not show technology so complex as to require a Master's degree or extensive experience. Ex. 2008 at ¶ 42." PO Resp. 6. We agree with Patent Owner that the level of skill is not particularly complex in this case.

Nevertheless, we find that nothing in the record suggests these alternative skill levels would lead to a different interpretation of the evidence necessary to resolve the issues in this case or affect the credibility of either expert. Thus, while for clarity we adopt Patent Owner's articulation of the level of skill, we find the level of ordinary skill in the art is reflected by the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995); *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978).

B. Expert Qualifications

Petitioner asserts that Dr. Pecht in not a credible expert witness because had difficulty remembering facts regarding his professional association with Dr. Lall and the circumstances under which he recommended Dr. Lall to Petitioner. Pet. Reply 3–4. Specifically, Petitioner asserts

> Dr. Pecht's selective memory regarding Dr. Lall, his belief that the claims of the '044 Patent were obvious [based on phone conversations with counsel], and other topics regarding which an

> expert in this field should have knowledge—such as how FFCs were traditionally connected to PCBs ([Ex. 1021] at 78:4-82:9, 97:23-98:21)—make his testimony in this proceeding completely unreliable.

Id.

We find that his memory regarding his work with Dr. Lall or negotiations leading to his or Dr. Lall's retention in this matter is irrelevant to his opinion on technical issues in this case. Additionally, we do not consider Petitioner's assertions regarding uncorroborated phone conversations. Finally, in reviewing the deposition transcript, we find that Dr. Pecht's inability to answer questions related to his personal knowledge of the pitch of connections prior to 2011 is not disqualifying. Ex. 1021, 78:4-82:9, 97:23-98:21. If we considered this part of his deposition, we would consider it in giving weight to his testimony regarding claim limitations to pitch. Because we find claim 1 is not shown to be unpatentable, the issue of pitch is moot.

FRE 702 permits expert testimony if a witness is qualified, "by [his or her] knowledge, skill, experience, training, or education," and if his or her testimony "will help the trier of fact to understand the evidence or to determine a fact at issue," inter alia. In determining who is "qualified in the pertinent art" under FRE 702, we need not find a complete overlap between the witness's technical qualifications and the problem confronting the inventor or the field of endeavor for a witness to qualify as an expert. *SEB S.A. v. Montgomery Ward & Co., Inc.*, 594 F.3d 1360, 1372-73 (Fed. Cir. 2010) (upholding admission of the testimony of an expert who admittedly lacked expertise in the design of the patented invention, but had experience

with materials selected for use in the invention). Overall, we find Dr. Pecht qualified to testify.

C. Claim Construction

In an *inter partes* review, we construe claim terms in an unexpired patent according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b). Consistent with the broadest reasonable construction, claim terms are presumed to have their ordinary and customary meaning as understood by a person of ordinary skill in the art in the context of the entire patent disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

1. FFC (flexible flat cable) – all claims

All claims contain a limitation to "an FFC (flexible flat cable) having an insulating layer for enclosing a plurality of conductors." Both parties offer constructions of this phrase.

a. Petitioner's Proposed Construction

Petitioner asserts "[u]nder the BRI standard, in the context of the specification of the '044 Patent and its claims, the term 'FFC' means a flexible flat cable that has a consolidated/unitary construction for housing both power and data conductor wires in one cable." Pet. 10. Petitioner cites to the Specification which states "[p]referably, the provision of the FFC 50 can save the production cost due to its unitary construction and eliminating cable management equipment and the step of cable managing processes. This is one of the important features of the invention." Pet. 10; Ex. 1001, 4:27–31. We agree that the concept of unitary construction should be incorporated into the construction, but we do not find evidentiary support for

the inclusion of the broader term "consolidated" as suggested by the Petitioner

> Petitioner also asserts that
>
> > the '044 Patent describes the FFC as 'compris[ing] a plurality of first conductors 55 [*i.e.*, power conductors], a plurality of second conductors 56 [*i.e.*, data conductors], and an insulating layer 501 for enclosing most portions of the first and second conductors[.]' ([Ex. 1001] at 3:66–4:2; *see also id.* at 4:6–67 (indicating that the first conductors are for power and the second are for data).).

Pet. 10. Nevertheless, the claim explicitly requires "an FFC (flexible flat cable) having an insulating layer for enclosing a plurality of conductors"; thus there is no need to add this limitation to the construction of FFC. Finally, FFC stands for "flexible flat cable" so stating that an FFC is a flexible flat cable is at best redundant. *See* PO Sur-Reply 10–11.

b. Patent Owner's Construction

Patent Owner urges that FFC be construed as "a cable with flat conductors that are arranged along the same plane and that arrangement is laminated with a pliable material." PO Resp. 8. Patent Owner also suggests that the phrase "laminated with a pliable material" means a single layer of insulation. *Id*. at 11–12 (contrasting FFCs from traditional jacketed cables with at least two layers of insulation), 28 ("the FFC required by Claim 1 is

not a traditional cable with individually wrapped round conductors.")[10] Below, we examine Patent Owner's arguments regarding its new construction.

c. Patent Owner – "an insulating layer"

Specification

Patent Owner asserts "the FFC required by Claim 1 is not a traditional cable with individually wrapped round conductors," but rather has a single layer of insulation. PO Resp. 28; PO Sur-Reply 5. Patent Owner argues that at least Figure 11 shows the FFC bending at sharp angles that Patent Owner asserts "would not be possible with the round conductors, jackets, shields, and additional insulation in a traditional jacketed cable." PO Resp. 15. Nevertheless, Petitioner asserts "it is improper to import features from a preferred embodiment [in the Figures]." Pet. Reply 4. Petitioner also argues that "Dr. Pecht necessarily admitted that a jacketed cable, which he asserts is the type of cable disclosed in Wu, can be flexible." Pet. Reply 10 (citing Ex. 1023, 139:17–24).

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[10] Petitioner acknowledges this claim construction argument in its Reply and presents extrinsic evidence that FFCs have a "jacket." Pet. Reply 6–8. Petitioner, however, subsequently argues "[b]ecause even Patent Owner's proposed construction of FFC does not include the negative limitation that a FFC cannot have a jacket, the latter argument fails (and, in any case, is completely unsupported by any intrinsic or extrinsic evidence)." *Id.* at 9. Petitioner also stated at the oral hearing that this claim construction position "appears to be a new argument," but did not lodge any objection to this argument. To the extent Petitioner is asserting this argument was untimely presented we disagree. We determine this argument was properly presented in Patent Owner's Response. Additionally, Petitioner did not move to strike this argument and thus has waived any argument regarding the timing of the argument.

To show the claims should be limited to a single insulating layer, Patent Owner relies on the claim's recitation of "an" insulating layer and six separate passages from the Specification describing an FFC as "having *an* insulating layer for enclosing a *plurality of* first conductors and a *plurality of* second conductors." PO Sur-Reply 5–6 (citing Ex. 1001, 2:16–19, 2:40–43, 2:64–67, claims 1, 8, and 12 (emphasis added)). Patent Owner also relies on two additional sections of the Specification that explain "[t]he FFC 50 comprises a *plurality of* first conductors 55 and a *plurality of* second conductors 56, and *an* insulating layer 501 for enclosing most portions of the first and second conductors 55, 56 . . ." *Id.* at 4-5 (citing Ex. 1001, 3:66–4:2, 6:21–24).

Nevertheless, claims 1, 8 and 12 use the transitional phrase "comprising." An indefinite article, such as "an," in patent parlance means "one or more" in open-ended claims containing the transitional phrase "comprising." *KCJ Corp. v. Kinetic Concepts, Inc.*, 223 F.3d 1351, 1356 (Fed. Cir. 2000). Therefore, we disagree that the claims are limited to a single insulating layer based solely on the use of the indefinite article "an." Nonetheless, intrinsic evidence can indicate that a patentee intended to limit a claim to one and only one. *See TiVo, Inc. v. EchoStar Commc'ns Corp.*, 516 F.3d 1290, 1303–04 (Fed. Cir. 2008); *Insituform Technologies, Inc. v. Cat Contracting, Inc.*, 99 F.3d 1098 (Fed. Cir. 1996); *North American Vaccine, Inc. v. American Cyanamid Co.*, 7 F.3d 1571 (Fed. Cir. 1993).

"While the term 'comprising' in a claim preamble may create a presumption that a list of claim elements is nonexclusive, it 'does not reach into each [limitation] to render every word and phrase therein open-ended.'" *Promega Corp. v. Life Techs. Corp.*, 773 F.3d 1338, 1350 (Fed. Cir. 2014)

(quoting *Dippin' Dots, Inc. v. Mosey*, 476 F.3d 1337, 1343 (Fed. Cir. 2007)). We also determine that although the overall claim recites "comprising," that the FFC limitation itself does not use the word "comprising" may suggest that limitation was meant to be closed ended. *TiVo,* 516 F.3d at 1304.

Patent Owner asserts that the Specification emphasizes "elimination of cable management equipment and elimination of cable managing processes." PO Sur-Reply 5. According to Patent Owner, in the background section of the Specification, the inventors distinguish the connector assembly of the '044 Patent from the connector of the '459 Patent (Ex. 1011, "Chen") by noting the drawbacks of special cable management equipment and processes required to solder cable 5 to contacts 2. Ex. 1001, 1:30–34. In Chen, a traditional round wire with a jacket and individually insulated conductors is connected to the contacts 2 as shown in Figure 2, reproduced in excerpted form below.

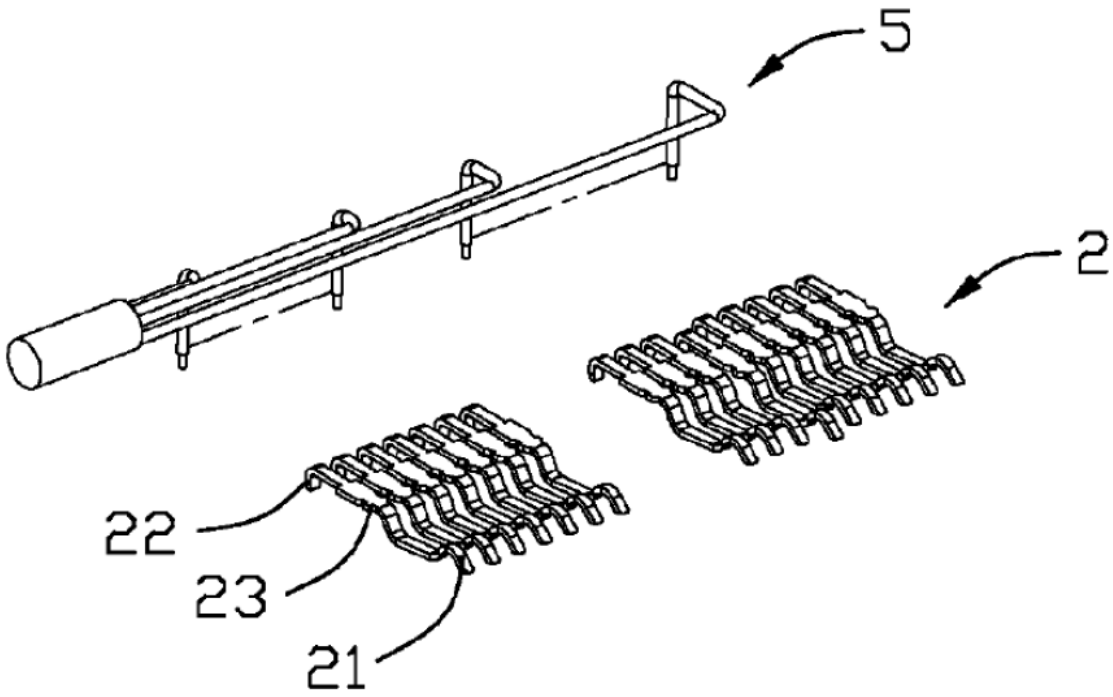


Figure 2 (excerpt) of Chen, shown above, presents a round wire with jacketed round conductors. Ex. 1011, Fig. 3. Patent Owner asserts that, to overcome these drawbacks, the inventors disclose the novel idea of using an FFC, which has a single insulating layer, to yield a much more cost effective and easier to manufacture connector by "eliminating cable management equipment and the step of cable managing processes." PO Sur-Reply 6 (citing Ex. 1001, 4:28–31). We find that Chen has a consolidated structure in which the round individually insulated wires are encased in a round insulation layer but it is not unitary because it has multiple individual layers of insulation.

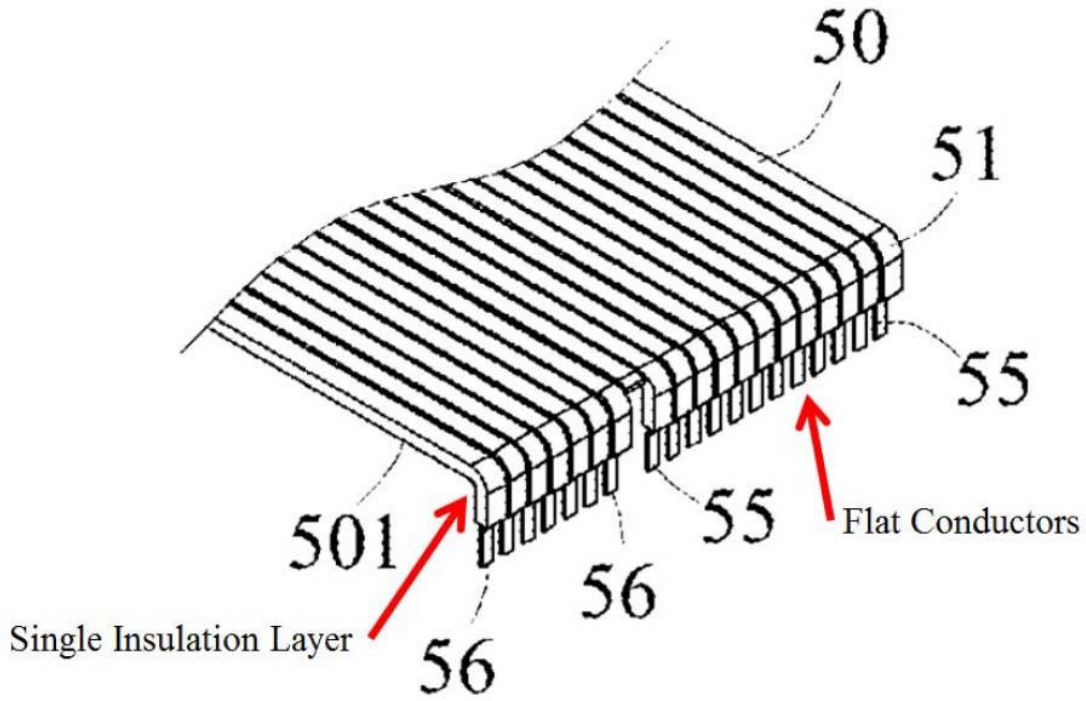
The Specification also states specifically that the "unitary construction" of an FFC "is one of the important features of *the* invention" (Ex. 1001, 4:30–31) (emphasis added). Unitary generally means one piece and is narrower than consolidated or integrated. PO Sur-Reply. 6–7; *In re Morris* (finding "integrated" is broader than unitary, i.e. one piece under broadest reasonable construction).

Patent Owner suggests that Petitioner's declarant Dr. Lall "admits that the statement 'having *an* insulating layer for enclosing a *plurality of* first conductors and a *plurality of* second conductors' means that you have a single insulating layer for at least four separate conductors. Ex. 2026, 74:13-75:3, 78:23-79:21, 80:9-17." *Id.* Nevertheless, we are persuaded that a fair reading of the cited testimony is that Dr. Lall maintains that a "conductor" may be defined as wire that is individually insulated such that the "single" insulating layer could actually be a layer applied to at least 4 conductors, i.e. individually insulated wires by his definition. Ex. 2026, 74:13–75:3, 78:23–79:21, 80:9–86:6. Dr. Lall does admit that the "layer" mentioned in the

Specification is a layer applied to uninsulated conductors. *Id*. at 84:9–19. Dr. Lall additionally admits that it is "possible" to make a wire as the FFC shown in "Figure 6 on [] page 21 of the 1404 Exhibit 1022." *Id*. at 79:9–17. Page 21 of Exhibit 1022 shows an excerpt of Exhibit 2009 at Figure 6 which is a flat cable with flat rectangular conductors with a single laminated cover. Ex. 2009, 10.

The '044 Patent also describes the FFC as having "unitary construction," and, according to Patent Owner, unlike individually insulated round wires in a jacket, which require "multi-phase (non-unitary) construction" because each round wire must be insulated prior to being placed together within a jacket. PO Sur-Reply 6–7 (citing Ex. 1001, 4:27–28). According to Patent Owner, insulating wires prior to placing them together within a jacket requires separate construction steps and equipment. *Id.* at 7. Therefore, according to Patent Owner, cables with individually insulated round wires in a jacket, as shown in Wu, do not have "unitary construction" as the FFCs described and claimed in the '044 Patent. *Id.*

The figures in the '044 Patent also show a single insulating layer 501, as depicted in Patent Owner's annotated and excerpted version of Figure 3 reproduced below.



Patent Owner's annotated and excerpted version of Figure 3 of the '044 Patent shows the single insulating layer 501 encloses the plurality of first conductors 55 (12 total conductors) and the plurality of second conductors 56 (7 total conductors). Ex. 1001, Fig. 3.

We agree with Patent Owner that the use of the term "unitary," the '044 Patent distinguishing over Chen, the use of a single layer in the figures of the '044 Patent, and the accompanying description that the use of an FFC would eliminate cable management suggests a single layer of insulation over an arrangement of wires in a plane. Nevertheless, we do not find that lamination specifically is mentioned or suggested by the Specification.

Extrinsic Evidence

Patent Owner argues that two distinct but related types of flat cable existed at the time of the invention (i.e. either when the patent was filed or

issued[11]: (a) ribbon cable, and (b) flexible flat cable (FFC). Figure 6 of Ex. 2013, reproduced below, illustrates these types of cables. PO Resp. 8–9.

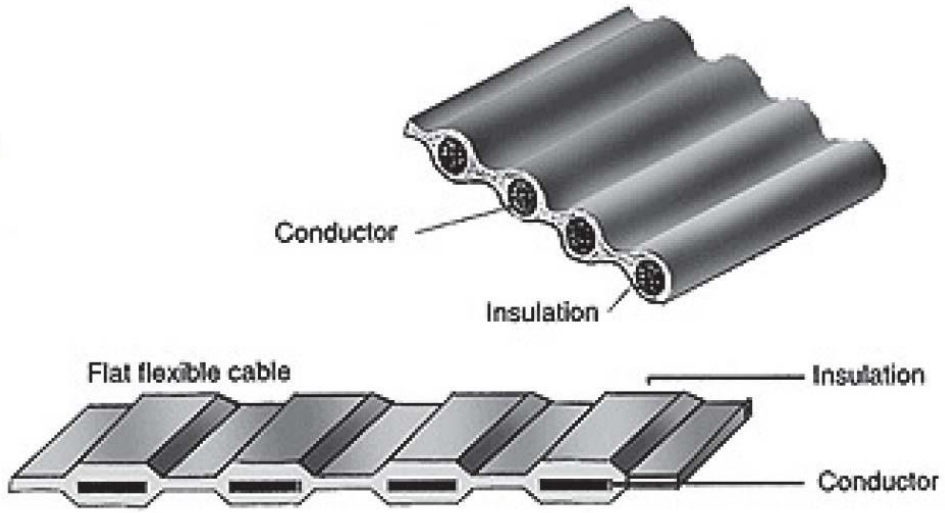


FIGURE 6: Schematic illustration of (a) ribbon, and (b) FFC cable constructions.

Figure 6, above illustrates a ribbon cable and an FFC. *Id.* at 9 (highlighting added by Patent Owner). Patent Owner asserts that ribbon cables are generally made up of round conductors that are constructed in a variety of ways, including extruded, laminated, and braided constructions. *Id.* at 8 (citing Ex. 2008 ¶ 48; Ex. 2013, 8, Fig. 6). In contrast, according to Patent

[11] The Federal Circuit has stated that "[o]ur decisions have not always been consistent as to whether the pertinent date [for dictionaries] is the filing date of the application or the issue date of the patent." *Inverness Medical v. Princeton Biomeditech Corp.*, 309 F.3d 1365, 1370 n.1 (Fed. Cir. 2002) (citing *Tex. Digital Sys., Inc. v. Telegenix, Inc.*, 308 F.3d 1193, 1202– 1203 (Fed. Cir. 2002) (pertinent date is issue date); *Schering Corp. v. Amgen, Inc.*, 222 F.3d 1347, 1353 (Fed. Cir. 2000) (pertinent date is filing date)). Given that the filing date is recent (2013) and there is no evidence presented that the definition of FFC has changed in a consistent way since the issuance of the patent, we consider all references presented by the parties from around the time of the filing of the patent application in this case until the present time including those with dates as late as 2018.

Owner, FFC cables are generally constructed by laminating flat conductors with a flexible polymer backing using a number of technologies. *Id*.

Patent Owner asserts that Ex. 2013 shows various round jacketed cables that are not labeled at flat flex cables. PO Resp. 9–10 (citing Ex. 2008 ¶ 48; Ex. 2013, Fig. 1). Patent Owner presents an industry catalog that appears to show "flat" cables that are ribbon cables with round conductors and "flat flex" cables with flat conductors. PO Resp. 10 (citing Ex. 2008 ¶ 48; Ex. 2010, 23. Patent Owner asserts, based on the catalog, that the structure of an FFC typically comprises a flat and flexible insulation. *Id.*

Patent Owner further asserts that jacketed cables including a jacketed SATA cable "has a primary insulation that surrounds the conductor, a shield that wraps around the primary insulation for additional protection, and a jacket that wraps around the conductor and the shield." PO Resp. 11–12 (citing Ex. 2008 ¶¶ 50–52; Ex. 2013, 5; Ex. 2011, Fig. 1. Figure 1 of Exhibit 2011, reproduced below, shows a jacketed SATA cable.

Figure 1: Details of the Inside of a SATA Cable

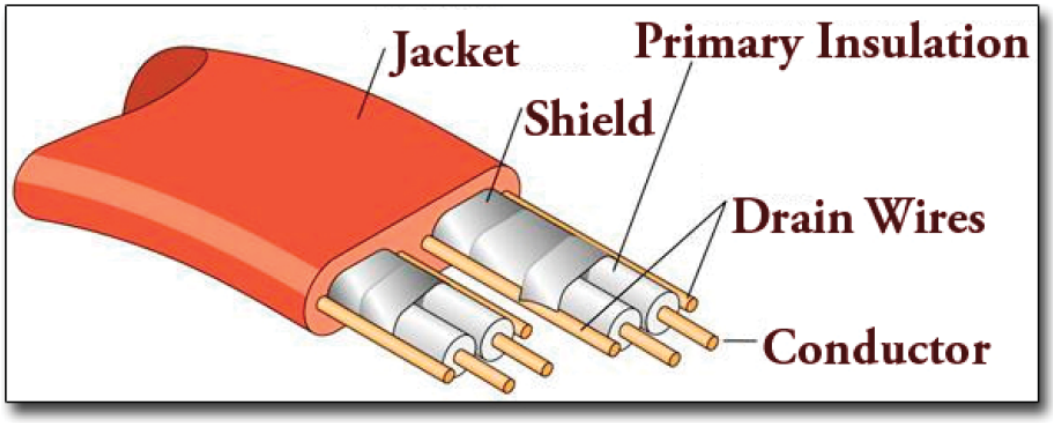


Figure 1 of Exhibit 2011, above, shows the shield and jacket of a jacketed SATA cable. We find that Exhibit 2011 is consistent with the Chen reference, distinguished by the '044 Patent, showing a jacket over

individually insulated round wires except that Chen shows a round cable and Exhibit 2011 shows a flatter cable.

Patent Owner further asserts that there are several differences between an FFC and a jacketed cable. According to Patent Owner, jacketed cable cannot be bent at sharp angles[12], takes up more space and adds weight, and is more burdensome to terminate when wanting to gain access to the conductors because the jackets, sleeves, and additional insulation need to be stripped. PO Resp. 13–14 (citing Ex. 2008 ¶ 53; Ex. 2012, 1; Ex. 2013, 12; Ex. 2014, 3). In contrast, according to Patent Owner, FFCs do not possess the drawbacks of jackets, sleeves and additional insulation; are small, light, flexible, and have a low profile and can be creased, punched, and folded at extreme angles. *Id.*

Patent Owner states that one of Petitioner's exhibits, a WellPCB blog post (Ex. 1019), depicts a normal round cable and then says an FFC "may be used instead of the normal round cables." PO Sur-Reply 9. According to Patent Owner, a picture shown on page one of the blog post is the "normal round cable" that is being distinguished from the more FFC shown on page 2 of the blog post. *Id.* Patent Owner points out the blog post also states, "[t]he wires [of an FFC] are not wrapped around several times and so they are lighter and flexible." *Id.*

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[12] Petitioner argues that Patent Owner is improperly reading a limitation to bending at a sharp angle into the claim. Pet. Reply 5. We disagree. Patent Owner uses its reference to bending at a sharp angle as evidence that their construction is consistent with the Specification and the purpose of the invention, rather than explicitly construing the claim to require the ability to bend at a sharp angle. PO Sur-Reply 8.

Petitioner asserts that the blog post refers to the jacked round cable as the FFC. Pet. Reply 6. The first page of the blog post (Ex. 1019) is reproduced below:

Flat Flex Cable-Simple Useful Technology It's Here

Abstract

FFC (flat flex cable) refers to electrical cable that are flat and flexible. It may also refer to thin cables found in high-density electronics such the cell phones and laptops. Flat flexible printed circuits, therefore, refers to components built using straight connectors. On the other han flat flexible miniature cable consists of a flexible film base that comes with multiple of metallic conductors bonded on the surface of the bc Stiffeners are then used to reinforce the end of the cable. This is critical in that it makes insertion easier and helps to provide strain relief.

A flat flex cable may be used instead of the normal round cables because they are easy to manage and can suitably be deployed in areas t require flexibility. They take less space and offer better EMI suppression in addition to eliminating wire coupling problems. The wires are protected and are not wrapped around several times and so they are lighter and flexible.

Page 1 of Exhibit 1017 shows three jacketed round cables in a shield consistent with the traditional SATA cable. The image shows round wires that appear to be "wrapped around several times," but the image is consistent with Exhibits 1018, 1019, and 1020, which refer to similar images as "flat flexible cables" or "flat cables." Petitioner's declarant asserts credibly that the phrase wrapped around refers to a traditional twisted pair in which the wire is wrapped around itself. Ex. 2026, 60:15–62:6. We cannot determine whether the text of Exhibit 1017 suggests that the image shown on page 1 is an example of normal round cables or of an FFC and, thus, do not rely on page 1 of Exhibit 1017.

Petitioner asserts the "the '044 Patent attempts to meet that stated objective by housing the power and data conductor wires in a unitary cable, which would lessen the manufacturing and management costs associated with a set of loose wires that must be individually managed. (*See* Ex. 1001 at 1:46-50.)"[13] Pet. 10. Nevertheless, the cable in Chen, which is characterized by the Specification as having cable management issues, is not a "set of loose wires." *See* Ex. 1001, 1:30–34, 3:46–50.

Based on the arguments and evidence above, on balance, we find that the extrinsic evidence is consistent with a finding that the '044 Patent intended to claim a FFC that is distinguished from a normal jacketed cable in that it has a single layer of insulation. The extrinsic evidence also suggests using lamination to form the insulation layer of the FFC.

d. Patent Owner – FFC

Specification

Petitioner states "[*n*]*one* of the claims of the '044 Patent refer to any shape of any *conductor* . . . [and] nothing in the [text of] specification describes the *conductors* of an FFC as being flat, or as being "laminated with a pliable material." Pet. Reply 4. Nevertheless, we find that the figures of the '044 Specification do show flat (rectangular) conductors. Ex. 1001, Fig. 3.

Patent Owner emphasizes that the figures of the '044 Patent depict only flat conductors in the FFC 50. PO Sur. Reply 8. Additionally, the '044

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[13] We acknowledge that the record contains a definition of cable management, but neither party cited to or discussed that definition and we do not rely on it. The Digikey glossary defines "Cables, Wires – Management" as "Devices used to control, arrange, or guide cables or wires." Ex. 2025, 4.

Patent does not disclose or depict round conductors anywhere. *Id.* According to Patent Owner, that is because the inventor understood that an FFC by definition only included flat conductors. *Id.* Additionally, the figures all depict the same FFC cable, even where the figures are directed to multiple embodiments of the invention. *Id.* Thus, flat conductors are not a preferred embodiment but appear to be the only embodiment shown in the figures.[14] *Id.* We agree. All embodiments shown have the same FFC cable with a single insulating layer and flat conductors. Ex. 1001, Figs. 1–14. However, our reviewing court has repeatedly held that it is "'not enough that the only embodiments, or all of the embodiments, contain a particular limitation' to limit claims beyond their plain meaning." *Unwired Planet, LLC v. Apple Inc.*, 829 F.3d 1353, 1359 (Fed. Cir. 2016).

The Specification states that "advantages of the invention provided by the FFC comprise greatly facilitating the manufacturing process and reducing the manufacturing cost by eliminating cable management equipment and the step of cable managing processes" (Ex. 1001, 1:53–57)

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[14] Petitioner does not provide a intrinsic evidence showing that the figures are accurate or drawn to scale. *Cf. Nystrom v. Trex Co.*, 424 F.3d 1136, 1149 (Fed. Cir. 2005) ("[U]nstated assumptions in prior art patent drawings cannot be the basis for challenging the validity of claims reciting specific dimensions not disclosed directly in such prior art."); *see Hockerson-Halberstadt, Inc. v. Avia Grp. Int'l., Inc.*, 222 F.3d 951, 956 (Fed. Cir. 2000) ("[P]atent drawings do not define the precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue."). But this "does not mean that things patent drawings show clearly are to be disregarded." *In re Mraz*, 455 F.2d 1069, 1072 (CCPA 1972). Rather, drawings can be relied upon for what they reasonably disclose and suggest to one of ordinary skill in the art. *See In re Aslanian*, 590 F.2d 911, 914 (CCPA 1979).

(emphasis added) and that this "is one of the important features of the invention" (*id*. at 4:30–31) (emphasis added). Thus, the applicants state that the FFC in the invention provides a cable management advantage over managing soldering round cable connectors. *See* Ex. 2002 (Pecht Decl.) ¶ 25; Ex. 1021 (Pecht Dep.), 32:25–33:12.

We also credit Patent Owner's declarant who states:

> . . . part of the cable management is that you -- in order to get to the wires and -- you need to have a lot of what they call stripping of the cable. So you have to first strip off the jacket and then you may have to strip off the shield and then you may have to strip off the primary insulation and then you might get to the conductor and then you have to move the conductors around and properly locate them.

Ex. 1023, 104:18–105:1.

The prosecution history also supports the importance of cable management. The Examiner's reasons for allowance stated that "[s]uch a feature [including, among others, an FFC] reduces manufacturing processes and costs by eliminating cable management equipment and processes." Ex. 2001, 97, Notice of Allowability (January 25, 2014).

Nevertheless, we find that Patent Owner has not sufficiently tied "cable management" to flat conductors in the Specification or prosecution history. For the reasons above, we agree with Patent Owner the figures of the '044 Patent suggesting the FFC shown has flat conductors but, as explained below, we do not find an explicit statement that the claims are limited to that embodiment.

Extrinsic Evidence

Figure 6 of Exhibit 2009, reproduced below, illustrates ribbon and FFC cables. Ex. 2009, 8.

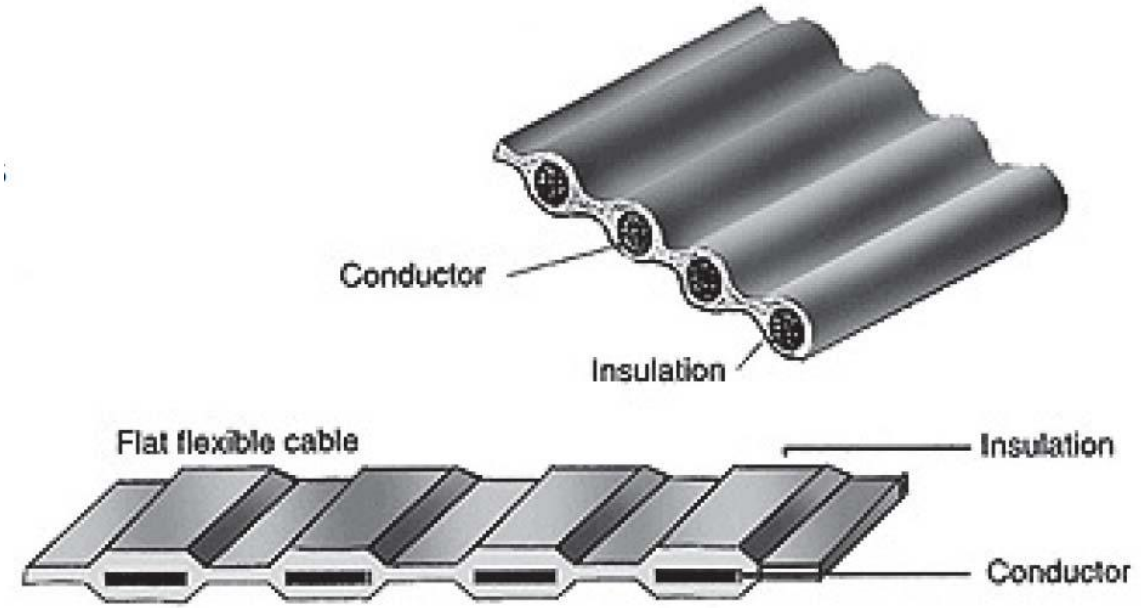

FIGURE 6: Schematic illustration of (a) ribbon, and (b) FFC cable constructions.

Figure 6, above, illustrates a ribbon cable and an FFC. *Id.* (highlighting added by Patent Owner). Notably, the conductor in the FFC is shown as flat and rectangular.

Patent Owner assert the extrinsic evidence shows the term "FFC" is a term of art that has a specific meaning in the industry which is "a type of cable made of flat conductors arranged in parallel along the same plane and laminated with a pliable material." PO Resp. 16-17 (citing Ex. 2008 ¶¶ 54–56; Ex. 2015, 5). Patent Owner points to a technical paper dated April 2016, which defines a "flat flexible cables" as "an extremely thin cable in which multiple rectangular conductors are laminated within an insulation material." *Id.* at 14 (citing Ex. 2015, 5).

Additionally, Patent Owner, citing to evidence introduced by Petitioner, states "a webpage from the Digi-key website…(Ex. 1018)… Digi-key website's glossary also explains that 'FFC cables are a series of

single *flat conductor wires* placed parallel to each other and *molded* together.'" PO Sur-Reply 9 (citing Ex. 2025, 10).

Petitioner states that:

> Taken as a whole, however, the extrinsic evidence plainly shows that there is no commonly-used specific definition of "flexible flat cable" within the cable industry, and certainly not the unduly narrow definition set out by Patent Owner. Instead, the term is used broadly to indicate cables of varying degree of flatness, varying degrees of flexibility and which include a wide variety of conductor types, including round conductors. (*See* also Dr. Lall's Reply Declaration, Ex. 1024, ¶¶37-46.)

Pet. Reply 8. While we agree that it appears that the industry has used the term flexible flat cable in a broader way than urged by Patent Owner, Patent Owner has shown that some in the industry had a specific definition of "flat flexible cable" that is consistent with the figures in the Specification.

In addition to Exhibit 1017, Petitioner provides three web pages that purport to refer to jacketed round wires with a shield as "flat flex cable" and "flat flexible cable." Pet. Reply 6–8. Exhibits 1018 and 1019 are web pages offering a product for sale and Exhibit 1020 is a catalog of cables for sale.

Petitioner also introduced Exhibits 1031–1035, which are patents, each dated no later than 1994, that allegedly show round conductors. *See generally*, Exs. 1031–1035. Given the early date of these references, we assign less weight to this evidence. We acknowledge that the record shows that the term "flat cable" has evolved over time, to at least 2013, such that flat cables "have their history from ribbon cables," but "flat cables" are described more broadly as coming in various forms as a generally flatter and more flexible alternative to round cables (Ex. 2004, 1). Additionally, Exhibits 1031–1035 were not discussed in the briefing by the parties and

were only introduced at Dr. Lall's deposition by Petitioner's counsel. Thus, we given them very little weight.

"[A] word that has an ordinary meaning encompassing two relevant alternatives may be construed to encompass both alternatives," (*Inverness Medical Switzerland v. Warner Lambert Co.*, 309 F.3d 1373, 1379 (Fed.Cir.2002)), however, the court must interpret the term to encompass meanings consistent with the intrinsic evidence. *Texas Digital Sys., Inc.*, 308 F.3d at 1203 (citing *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1250 (Fed.Cir.1998).

For the reasons above, we agree with Patent Owner that the extrinsic evidence suggests that one of ordinary skill in the art would have known that the term FFC has at least one meaning, among others, that is limited to flat conductors as opposed to just a flat cable which may have round conductors.

e. Analysis

This case presents the unusual situation where the claim language is ambiguous and overly vague, the extrinsic evidence presents alternately a broad and a narrow interpretation of the claim term, and the intrinsic evidence provides a consistent view as to the claim term in the figures, but not an explicit disavowal of any scope of the claim. We acknowledge "there is sometimes a fine line between reading a claim in light of the specification, and reading a limitation into the claim from the specification." *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Grp., Inc.*, 262 F.3d 1258, 1270 (Fed.Cir.2001) (quotation omitted). "Generally, there is a 'heavy presumption' in favor of the ordinary meaning of claim language as understood by one of ordinary skill in the art. This presumption is overcome: (1) where the patentee has chosen to be his own lexicographer, or

(2) where a claim term deprives the claim of clarity such that there is "no means by which the scope of the claim may be ascertained from the language used." *Bell Atlantic*, 262 F.3d at 1268 (citing *Johnson Worldwide Assocs., Inc.*, 175 F.3d at 989–90).

As to flat conductors, we find that the specification also does not provide explicit lexicography as to what FFC means. The '044 Patent also does not explicitly disavow round conductors. The Federal Circuit has stated:

> Where the specification makes clear that the invention does not include a particular feature, that feature is deemed to be outside the reach of the claims of the patent, even though the language of the claims, read without reference to the specification, might be considered broad enough to encompass the feature in question.

SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc., 242 F.3d 1337, 1341 (Fed. Cir. 2001). In this case, however, there is not express statement that the "present" invention or "the" invention is flat conductors as in *SciMed*, nor is there an explicit statement disavowing round conductors.

Nevertheless, "a claim term may be clearly redefined without an explicit statement of redefinition." *See Bell Atlantic*, 262 F.3d at 1268 (Fed. Cir. 2001); *AIA Eng'g Ltd. v. Magotteaux Int'l S/A*, 657 F.3d 1264, 1278 (Fed. Cir. 2011) ("[t]he specification need not reveal such a definition explicitly," but may do so "by implication.") (quoting *Astrazeneca LP v. Apotex, Inc.*, 633 F.3d 1042, 1051–52 (Fed.Cir.2010)); *Columbia Univ.*, 811 F.3d at 1364. An implied redefinition must be clear and unmistakable. *Columbia Univ.*, 811 F.3d at 1364 (Fed. Cir. 2016). A disavowal of scope can be found when the specification describes a feature as "this invention"

or "the present invention"). *Honeywell Int'l, Inc. v. ITT Indus., Inc.*, 452 F.3d 1312, 1318 (Fed. Cir. 2006).

Here, Petitioner provides a broad construction that is consistent with industry sales websites (Exs. 1018, 1019, and 1020) and a dictionary definition of "flat" (Pet. Reply 11), but is broader than the drawings in the Specification and certain extrinsic definitions.

Petitioner's construction is consistent with the explicit words of the claim outside of the term "FFC" but does not define "FFC" itself. Petitioner relies on extrinsic references to show that a round insulated cable which is then further insulated in a flat insulator with at least 3 other round insulated cables can meet the claim language. *See* Exs. 1018, 1019, and 1020. Nevertheless, "it is improper to read the term to encompass a broader definition simply because it may be found in a dictionary, treatise, or other extrinsic source." *Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.*, 711 F.3d 1348, 1362 (Fed. Cir. 2013) (citing *Nystrom v. TREX Co.*, 424 F.3d 1136, 1145 (Fed.Cir.2005)).

Patent Owner proposes a construction that is consistent with the drawings, and at least two dictionary or glossary definitions of the term. As detailed above, our decision as to the construction of FFC, at least as to the shape of the conductors, is guided by both the intrinsic and extrinsic record.

As explained above, a reference with round individually insulated conductors was distinguished in the Specification. The Specification distinguishes the Chen reference by stating "special cable management equipment and processes are particularly required to solder cable to conductors." Ex. 1001, 1:38–40.

Reviewing the evidence in the Specification, regarding cable management, we find it is unclear that how the flat shape of a conductor alone contributes significantly to cable management. Patent Owner has not shown sufficiently that a flat conductor would be more or less flexible than a round conductors if we assume that the insulation layer is the same. Thus, Patent Owner has not shown sufficiently that the "cable management" statement in the Specification sufficiently supports Patent Owner's construction requiring flat conductors such that the '044 Patent is clearly and unmistakably limited to flat conductors.

As to a single layer of insulation, the Specification does state specifically that the "unitary construction" of an FFC "is one of the important features of *the* invention" (*id.* at 4:30–31) (emphasis added). *See Honeywell,* 452 F.3d at 1318; *see also, e.g., Inpro II Licensing, S.A.R.L. v. T–Mobile USA Inc.*, 450 F.3d 1350, 1354–55 (Fed.Cir.2006) (finding a disclaimer limiting a claim element to a feature of the preferred embodiment when the specification described that feature as a "very important feature . . . in an aspect of the present invention" and disparaged alternatives to that feature); *The Toro Co. v. White Consolidated Industries, Inc.*, 199 F.3d 1295, 1301–02 (Fed.Cir.1999) (finding disavowal when a feature is described as "important to the invention"). Thus, Patent Owner has shown sufficiently that the "unitary construction" statement in the Specification supports Patent Owner's construction requiring a single layer of insulation.

As additional support, every embodiment disclosed in the figures of the Specification includes an apparently flat conductor and a single layer of insulation. We understand that "it is 'not enough that the only embodiments, or all of the embodiments, contain a particular limitation' to limit claims

beyond their plain meaning." *Unwired Planet*, 829 F.3d at 1359 (Fed. Cir. 2016) (internal citation omitted). Here, we are not reading a limitation into the claims. Instead, we must determine if a requirement is implicit in the claim limitation—that the "FFC" language is limited to flat conductors or that "an insulation layer" is limited to a single layer as shown in the drawings and defined in some extrinsic sources. *See Microsoft Corp. v. Proxyconn, Inc.*, 789 F.3d 1292, 1298 (Fed. Cir. 2015), overruled on other grounds by *Aqua Prod., Inc. v. Matal*, 872 F.3d 1290 (Fed. Cir. 2017) ("Even under the broadest reasonable interpretation, the Board's construction 'cannot be divorced from the specification and the record evidence.'").

Finally, the extrinsic evidence shows that various cable configurations are called "flat flexible cables." Petitioner's declarant asserts "[i]t's not a term of art . . . it's used loosely to represent a number of different types of cables." Ex. 2026, 68:15–18. As detailed above, Petitioner introduced references that show that companies referred to relatively flat cables with a layer of insulation surrounding individually insulated conductors as FFCs.

Nevertheless, the use of the generic term FFC does not necessarily provide clarity as to the bounds of the invention because the industry appears to have several definitions of what an FFC or flat flexible cable is and the Specification does not explicitly define the term. To clarify the definition, Patent Owner points to an exhibit, Exhibit 2009, dated in the year 2000, which contrasts a ribbon cable with round conductors individually insulated and laid parallel and further insulated with a so-called FFC with flat conductors with a single insulator. PO Resp. 8–9 (Ex. 2009, Fig. 6). Patent Owner also points to an exhibit, dated in 2018, which is part of a

webpage relied on by Petitioner, which defines a "flat flexible" connector as "FFC cables are a series of single *flat conductor wires* placed parallel to each other and *molded* together." PO Sur-Reply 9 (citing Ex. 2025, 10). Patent Owner also points to a technical paper dated April 2016, a few years after the patent issued, which defines a "flat flexible cables" as "an extremely thin cable in which multiple rectangular conductors are laminated within an insulation material." PO Resp. 14 (citing Ex. 2015, 5).

We are mindful of the "broadest reasonable construction" we are applying in this IPR. As our reviewing courts confirmed in *Cutsforth, Inc. v. Motivepower, Inc.*, 643 Fed.Appx. 1008 (Fed. Cir. 2016) (nonprecedential), "[w]hile claims are given their broadest reasonable interpretation in IPR proceedings, claim interpretation still 'must be *reasonable* in light of the claims and specification.'" (quoting *PPC Broadband, Inc. v. Corning Optical Commc'ns RF, LLC*, 815 F.3d 747, 755 (Fed. Cir. 2016)); *see also SAS Inst., Inc., v. ComplementSoft, LLC.*, 825 F.3d 1341, 1343 (Fed. Cir. 2016) ("While we have endorsed the Board's use of the broadest reasonable interpretation standard in IPR proceedings, we also take care to not read 'reasonable' out of the standard. This is to say that '[e]ven under the broadest reasonable interpretation, the Board's construction cannot be divorced from the specification and the record evidence, and must be consistent with the one that those skilled in the art would reach.' " (quoting *Microsoft*, 789 F.3d at 1298 (internal quotation marks omitted) (first quoting *In re NTP, Inc.*, 654 F.3d 1279, 1288 (Fed. Cir. 2011); and then quoting *In re Cortright*, 165 F.3d 1353, 1358 (Fed. Cir. 1999))).

f. *Conclusion*

In summary, we find that "FFC" is a term used in the industry that has multiple meanings, the patentee used FFC in a consistent way in the figures requiring flat conductors, and the extrinsic evidence supports a finding that one of ordinary skill would have understood that meaning. Nevertheless, an implied redefinition must be clear and unmistakable. *Columbia Univ.*, 811 F.3d at 1364 (Fed. Cir. 2016). As to flat conductors, we are not persuaded that the distinction over Chen's round conductors, and the consistent use in the figures clearly and unmistakably redefines a FFC as defined in the extrinsic references cited by Patent Owner.

However, the Specification is clear that a single unitary layer of insulation is required by the invention. Specifically: the Specification distinguishes over a reference with round individually insulated cables that is consolidated into one unit but does not have a unitary layer of insulation, the Specification specifies explicitly that an FFC has a "unitary construction," the Specification states that unitary construction is an "important feature" of "the" invention, the claims recite "an" insulating layer, and Petitioner's construction shows that Petitioner agrees that the concept of unitary should be brought into the claims. We do not need to and do not rely on the extrinsic evidence presented for the construction of "an insulated layer." We also recognize, as Petitioner notes, that lamination as a way of constructing the cable is not mentioned in the Specification. Pet. Reply 4. Thus, we determine the term "FFC" is not limited to flat conductors and is limited to a single layer of insulation such that it does not contain individually insulated conductors.

D. Asserted Prior Art

1. Wu (Ex. 1003)

Wu describes a cable assembly with a cable that extends laterally in a direction perpendicular to the insulated housing. Ex. 1003, 3: 22–24, 36–39. Figure 1 of Wu is reproduced below.

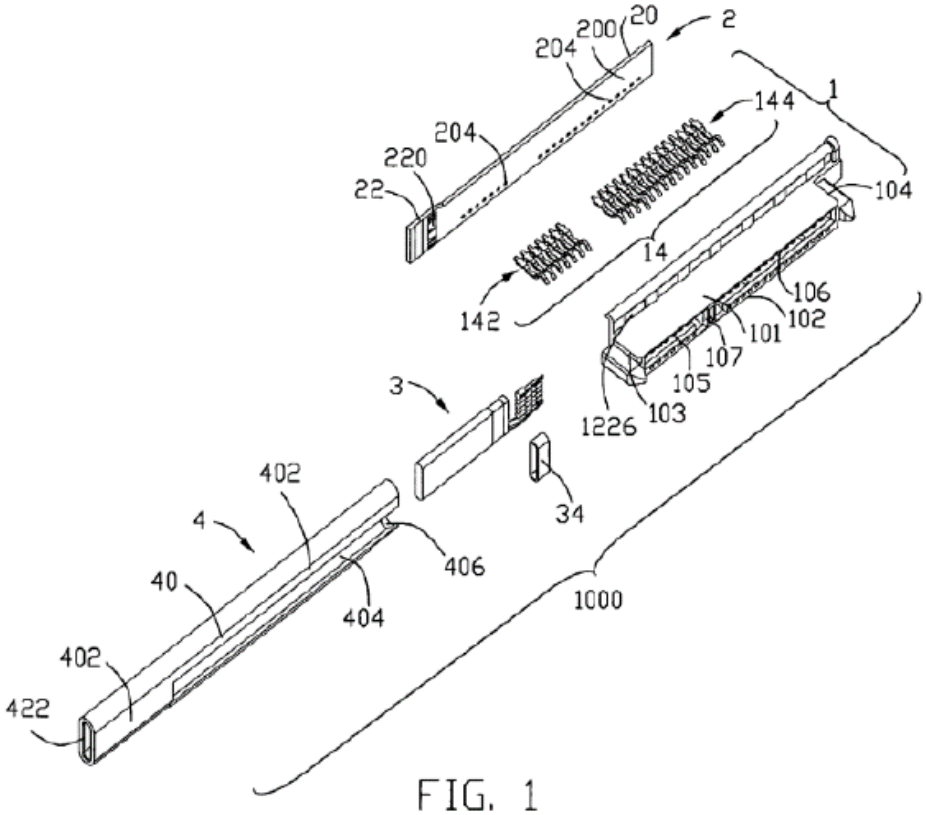

FIG. 1

As illustrated in Figure 1 of Wu, above, the cable of Wu enters the connector on the side and the wires of the cable are soldered to the conductive pads 220 of the connection portion 22. *Id*. at 3:36–39, Fig. 1.

2. The Handbook (Ex. 1004)

The Handbook excerpt relied on by Petitioner describes area-array interconnections for semiconductor chips and microelectronic packages (substrates). Ex. 1004, 1.

3. Tang (Ex. 1005)

Tang is directed to an electrical connector that uses a securing device 20 for connecting to the PCB. Ex. 1005, Fig. 1.

4. Green (Ex. 1006)

Green is directed to an electrical connector that uses a potting compound. Ex. 1006, Abstract. The connector has a hole at each solder location. *Id.* at 3:55–60. The potting compound is disposed in each hole to embed and seal electrical connections. *Id.*

5. *De Lollis* (*Ex. 1007*)

De Lollis is an article that discusses some of the resin compounds available for use with electronics. Ex. 1007. Those adhesives include epoxies, nylon epoxies, phenolics, polysulfides, epoxy polyamide or polyurethane conformal coatings, silicone resins, polyurethanes, heat-activated thermoplastic or thermosetting adhesives. *Id.*

6. Brennan (Ex. 1008)

Brennan discloses an electrical connector with a metal shield that snaps together in an up-down mounting direction. Ex. 1008, Abstract. The lower shield half has hook projections 70 that fit into the detent openings 58 of the upper shield half 48. *Id.* at 3:52–4:25.

7. SATA Standard (Ex. 1009)

The SATA standard describes a broad generalized data link interface. Ex. 1009, 29. The SATA standard discloses two 1-to-4 port multipliers used to create eight SATA connections. *Id.* at 56.

8. Su (Ex. 1010)

Su discloses a plug connector with wiring cables (wires 32) that connect to a PCB board 61. Ex. 1010, 4:5–27. Figure 3 of Su is reproduced below.

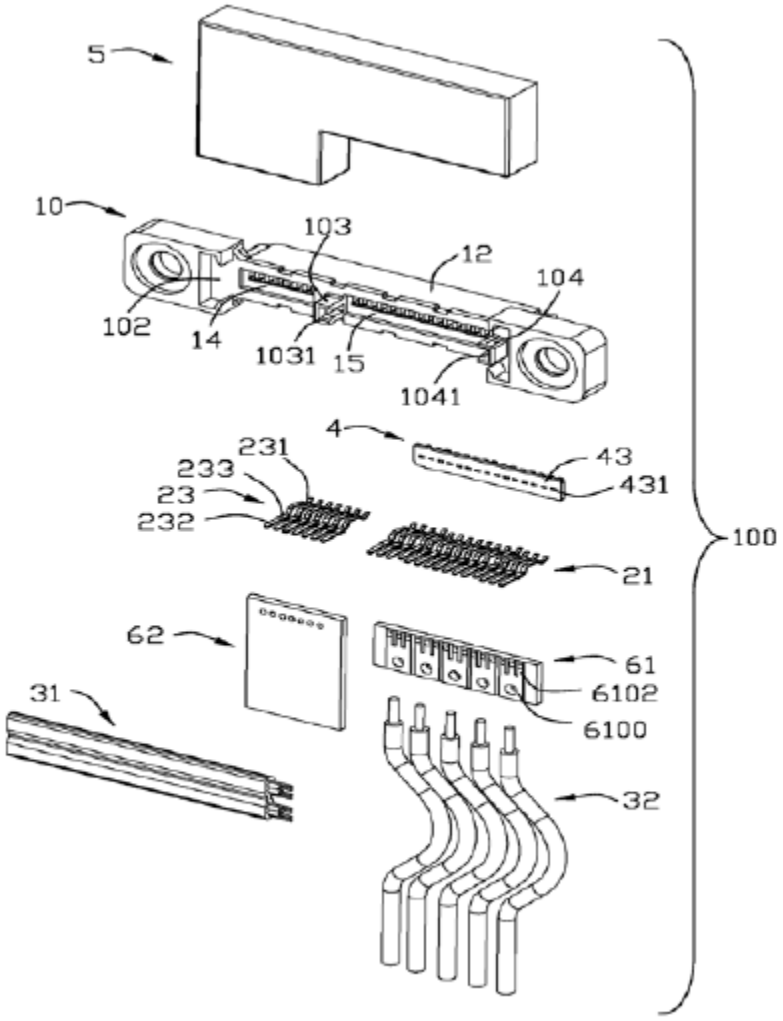

FIG. 3

Figure 3, above, shows the components of the connector disclosed in Su. *Id.* at 2:27, Fig. 3.

E. Asserted Anticipation and Obviousness over Wu

Petitioner contends claims 1 and 3 are unpatentable under 35 U.S.C. § 103(a) as anticipated by Wu and claims 1–3, 8–10, 12, 13, and 15 are unpatentable under 35 U.S.C. § 103(a) as obvious over Wu. Pet. 15–37. Petitioner explains how Wu allegedly describes all of the claim limitations. *Id.* (citing Ex. 1002). For the reasons below, Petitioner has not shown by a preponderance of the evidence that claims 1–3, 8–10, 12, 13, and 15 are unpatenable.

1. Analysis

Claim 1 recites "an FFC (flexible flat cable) having an insulating layer for enclosing a plurality of conductors." Petitioner argues that Wu anticipates this limitation. Pet. 21–22. Petitioner also argues that Wu discloses and/or teaches the flexible aspect of this limitation inherently. *Id.* at 37–38.

Patent Owner argues: Wu does not use the term FFC or flat flexible cable or ribbon cable; Wu's cable is a "traditional" cable; and, Wu's use of the term "jacket" and its allegedly individually insulated wires is inconsistent with a FFC. PO Resp. 23–25, 28–29 (citing Ex. 2002). Patent Owner also argues

> Wu is a prime example of the cable management that is required when an FFC is *not* disclosed and used. Ex. 2008 ¶ 70. Wu requires additional components such as a metal ring crimped to the cable to provide strain relief. *Id.* Crimping the metal ring to a cable and assembling it to make sure the metal ring abuts the protrusion of 422 of cover 4 increases manufacturing processes and costs. *Id.*

PO Resp. 28–29. We agree. Wu's cable does not have a single layer of insulation as required by our construction.

Patent Owner correctly notes that Petitioner does not present evidence in the Petition that using a FFC would be obvious. PO Resp. 31. As stated above, Petitioner argues in the Petition that Wu anticipates an FFC. Subsequently in the Petition, Petitioner turns to obviousness and mentions the reasons to modify Wu to show "the use of a soldering portion (i.e., soldering contact) in place of a soldering hole to join a terminal with a bent tail would have been obvious" (Pet. 28) and "distinguish[ing] between a set of first contacts for the power conductors and a set of second contacts for the data conductors" would have been obvious." Pet. 27. Petitioner does state broadly that "[t]he difference, if any, between the scope of Claim 1 and the disclosures of Wu would have been obvious and readily apparent, simple design choices for a POSA." Pet. 27 (citing Ex. 1002 ¶ 85).

A mere design choice, which does not need to be shown explicitly in the prior art, is generally a minor and obvious choice that solves no stated problem. *Cf. In re Kuhle*, 526 F.2d 553, 555 (CCPA 1975) ("Use of such a means of electrical connection in lieu of those used in the references solves no stated problem and would be an obvious matter of design choice within the skill [in] the art." (citations omitted)); *see also In re Gal*, 980 F.2d 717, 719–20 (Fed. Cir. 1992) (finding of "obvious design choice" precluded where the claimed structure and the function it performs are different from the prior art). Thus, "design changes that [do] not 'result in a difference in function or give unexpected results' [are] 'no more than obvious variations consistent with the principles known in th[e] art' of the patent at issue in [the] case" are obvious design choices. *TRW Auto. US LLC v. Magna Elec. Inc.*, Case IPR2014–00251, slip op. at 6 (PTAB July 31, 2014) (Paper 18) (quoting *In re Rice*, 341 F.2d 309, 314 (CCPA 1965)).

Here, the use of an FFC with a single layer of insulation performs a function related to cable management that is different than the prior art presented and solved a stated problem. It is Petitioner's burden to identify, in the Petition, the problem and the finite known solutions. "Merely stating 'design choice' when confronted with a missing limitation, without citing any authority or references to establish why the feature in question amounts to a mere design choice, does not carry Petitioner's burden." *Kartri Sales Co. v. Zahner Design Grp.*, Case IPR2016-01327, Paper 10 at 17 (PTAB Jan. 3, 2017)). Thus, we are not persuaded that use of an FFC with a single layer of insulation was a design choice as required by the case law.

Petitioner does not, however, argue in the Petition that the use of an FFC with a single layer of insulation specifically would be obvious. *Id.* at 24–27. Petitioner does argue in its Reply that the using the FFC according to Patent Owner's definition would have been obvious. Pet. Reply 11–12. Petitioner does not present such an obviousness case in the Petition. As such, Petitioner's arguments in the Reply do more than just respond to Patent Owner's arguments. Petitioner's new arguments in Reply modify the ground by espousing a new theory of obviousness. Thus, we do not consider this new obviousness contention presented in the Reply. Petitioner's attempt to cure the deficiencies of its Petition in its Reply is inappropriate. Petitioner is not entitled to a second bite to cure deficient grounds or arguments in the Petition.

Even if we were to consider that argument, it is conclusory and based only on Dr. Pecht's statements regarding the benefits of using an FFC (and certain "exhibits on which he relied—all of which predate the priority date of the '044 Patent" (*id.* at 11). Rather, Petitioner would have been required,

in the Petition, to present a contention based on a specified printed publication showing an FFC meeting the claim construction that has been shown to be prior art and to which a motivation to combine that reference with Wu specifically has been shown. Petitioner has not met these requirements in its conclusory argument it its reply. *See* Pet. Reply 11–12. Thus, we are not persuaded by this vague contention which was not presented in the Petition.

Independent claims 8 and 12 also recite an FFC. For the reasons above, Petitioner has not shown by a preponderance of the evidence that Wu anticipates claims 1 and 3 or Wu renders claims 1–3, 8–10, 12, 13, and 15 obvious.

F. Asserted Obviousness over Wu and the Handbook

Petitioner contends claims 2, 8, 9, and 13 are unpatentable under 35 U.S.C. § 103(a) as obvious over Wu and the Array Interconnection Handbook. Pet. 37.

As noted above, Petitioner has not shown that claim 1 is obvious over Wu. Petitioner does not assert that Area Array Interconnection Handbook overcomes the above noted deficiency of Wu. As such, we are not persuaded that Petitioner has put forth a sufficient showing that claims 2, 8, 9, and 13 would have been obvious over Wu and Array Interconnection Handbook.

G. Asserted Obviousness over Wu and Tang

Petitioner contends claims 4, 5, 16, and 18 are unpatentable under 35 U.S.C. § 103(a) as obvious over Wu and Tang. Pet. 42. Petitioner does not assert that Tang overcomes the above noted deficiency of Wu. As such,

we are not persuaded that Petitioner has put forth a sufficient showing that claims 4, 5, 16, and 18 would have been obvious over Wu and Tang.

G. Asserted Obviousness over Wu, Green, and De Lollis

Petitioner contends claim 14 is unpatentable under 35 U.S.C. § 103(a) as obvious over Wu, Green, and De Lollis. Pet. 50-52. Petitioner does not assert that Area Array Interconnection Handbook overcomes the above noted deficiency of Wu. As such, we are not persuaded that Petitioner has put forth a sufficient showing that claim 14 would have been obvious over Wu and Array Interconnection Handbook.

H. Asserted Obviousness over Wu and Brennan

Petitioner contends claim 17 is unpatentable under 35 U.S.C. § 103(a) as obvious over Wu and Brennan. Pet. 53–56. Petitioner does not assert that Brennan overcomes the above noted deficiency of Wu. As such, we are not persuaded that Petitioner has put forth a sufficient showing that claim 17 would have been obvious over Wu and Brennan.

I. Asserted Obviousness over Wu, SATA Standard, and Su

Petitioner contends claim 6, 7, 11, 19, and 20 is unpatentable under 35 U.S.C. § 103(a) as obvious over Wu, SATA Standard, and Su. Pet. 62–68. Petitioner does not assert that the SATA Standard or Su overcomes the above noted deficiency of Wu. As such, we are not persuaded that Petitioner has put forth a sufficient showing that claims 6, 7, 11, 19, 20 would have been obvious over Wu, the SATA Standard, and Su.

III. MOTION TO EXCLUDE

Patent Owner has filed Motions to Exclude certain of Petitioner's evidence under 37 C.F.R. § 42.64. Paper 43. This Final Written Decision holds that Petitioner does not demonstrate unpatentability of all of the challenged claims in light of all of the evidence presented by Petitioner, including the evidence subject to Patent Owner's Motion to Exclude. Consequently, Patent Owner's Motion to Exclude is dismissed as moot.

IV. CONCLUSION

For the foregoing reasons, we determine that the information presented does not establish by a preponderance of the evidence that claims 1–20 of the '044 Patent are unpatentable.

V. ORDER

Accordingly, it is:

ORDERED that that Petitioner has not shown by a preponderance of the evidence that claims 1–20 of the '044 Patent are unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2; and

FURTHER ORDERED that Patent Owner's Motions to Exclude are dismissed as moot.

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