

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SILICON LABORATORIES, INC.,
Petitioner,

v.

CRESTA TECHNOLOGY CORP. and CF CRESPE LLC,
Patent Owner.

Case IPR2015-00626
Patent 7,265,792 B2

Before PHILLIP J. KAUFFMAN, GREGG I. ANDERSON, and
PATRICK M. BOUCHER, *Administrative Patent Judges*.

KAUFFMAN, *Administrative Patent Judge*.

FINAL WRITTEN DECISION

35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

A. PROCEDURAL OVERVIEW

Petitioner, Silicon Laboratories, Incorporated, filed a Petition (Paper 2, “Pet.”) to institute an *inter partes* review of claims 18, 19, and 24–29 (the “challenged claims”) of U.S. Patent No. 7,265,792 B2 (Ex. 1101, the “’792 patent”). Patent Owner, then Cresta Technology Corporation, timely filed a Preliminary Response (Paper 8, “Prelim. Resp.”). In the August 14, 2015, Decision to Institute (Paper 9, “Dec.”), we instituted trial on all of the challenged claims.

Subsequently, Patent Owner filed a Patent Owner Response (Paper 17, “PO Resp.”), and Petitioner filed a Reply (Paper 21, “Pet. Reply”).

Patent Owner’s contention that portions of Petitioner’s Reply are beyond the scope of Patent Owner’s Response is discussed in Section II. Patent Owner submitted observations on cross-examination of Petitioner’s expert, Dr. Holberg, and Petitioner submitted a reply. Papers 32, 37. We considered this information. Patent Owner did not file a motion to amend. Patent Owner filed a motion to exclude certain evidence which is discussed in the Section II below.

Prior to Due Date 5, Cresta Technology Corporation filed for bankruptcy, and the Board suspended all deadlines in the case. *See* Paper 36 (notifying the Board); Paper 39 (ordering all deadlines suspended). Subsequently, the ’792 patent was assigned to CF CRESPE LLC, Cresta’s counsel was retained, and this proceeding resumed. Papers 47 (defining the remaining schedule), 54 (CF CRESPE power of attorney), 55 (mandatory notice), 56 (motion to add Patent Owner), 59 (granting motion), 62 (erratum to granting motion).

Oral hearing was held on Wednesday, June 1, 2016, and a transcript of the oral hearing is included in the record.¹ Paper 64 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6(c). This Decision is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of the claims on which we instituted trial. For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 18, 19, and 24–29 of the ’792 patent are unpatentable.

B. RELATED PROCEEDINGS

Patent Owner asserted the ’792² patent against Petitioner in *Cresta Technology Corp. v. Maxlinear, Inc.*, Case No. 1:14-cv-00079-RGA (D.Del), and U.S. International Trade Commission Investigation No. 337-TA-910 (“the ITC proceeding”). See Pet. 1; Ex. 1002; Ex. 1003.

Petitioner and Petitioner’s co-defendant in these proceedings, MaxLinear, Inc., have filed the following petitions:

1. *IPR2014-00728 (“the ’728 IPR”) (US 7,075,585 B2)*

We determined that claims 1–3, 5, 10, and 16–19 are unpatentable. *Silicon Laboratories, Inc. v. Cresta Technology Corp.*, Case IPR2014-00728 (PTAB Oct. 21, 2015) (Paper 53). Patent Owner has appealed. Paper 55.

¹ The hearing was held with the hearing for IPR2015-00615, and a single transcript was produced.

² Petitioner’s citation to the “’585 patent” is presumed to mean the ’792 patent. See Pet. 1.

2. *IPR2014-00809 (“the ’809 IPR”) (US 7,265,792 B2)*

We determined that claims 1–17 of the ’792 are unpatentable. *Silicon Laboratories, Inc. v. Cresta Technology Corp.*, Case IPR2014-00809 (PTAB Oct. 21, 2015) (Paper 56).³ Patent Owner has appealed. Paper 58.

3. *IPR2015-00881 (US 7,251,466 B2, “the ’466 patent”)*

We determined that claims 1, 2, 5, 8, 12, 13, 20, 21, 25, 26, 31, 32, 35, and 36 of the ’466 patent are unpatentable. *Silicon Labs., Inc. v. Cresta Tech. Corp.*, Case IPR2014-00881 (PTAB Oct. 21, 2015) (Paper 47).

4. *IPR2015-00591 (US 7,075,585 B2)*

We denied institution of a trial. *MaxLinear, Inc., v. Cresta Technology Corp.*, Case IPR2015-00591 (PTAB June 15, 2015) (Paper 9).

5. *IPR2015-00592 (US 7,075,585 B2)*

We instituted trial of claims 1–21. *MaxLinear, Inc., v. Cresta Technology Corp. and CF CRESPE LLC*, Case IPR2015-00592 (PTAB Aug. 14, 2015) (Paper 9). Oral hearing was held in conjunction with IPR2015-00594 on June 3, 2016.

6. *IPR2015-00593 (US 7,265,792 B2)*

We denied institution of a trial. *MaxLinear, Inc., v. Cresta Technology Corp.*, Case IPR2015-00593 (PTAB Aug. 14, 2015) (Paper 9).

7. *IPR2015-00594 (US 7,265,792 B2)*

We instituted trial of claims 1–29. *MaxLinear, Inc., v. Cresta Technology Corp. and CF CRESPE LLC*, Case IPR2015-00594 (PTAB Aug. 21, 2015) (Paper 13). Oral hearing was held in conjunction with IPR2015-00592 on June 3, 2016.

³ A copy of this paper is at Ex. 1062.

8. *IPR2015-00615 (US 7,075,585 B2)*

We instituted trial of claims 11–15 and 20. *Silicon Laboratories, Inc. v. Cresta Technology Corp. and CF CRESPE LLC*, Case IPR2015-00615 (PTAB Aug. 14, 2015) (Paper 9). Oral hearing was held in conjunction with IPR2015-00626 on June 1, 2016.

II. PRELIMINARY MATTERS

A. 35 U.S.C. § 325(d)

In our Institution Decision, we declined to exercise our discretion to deny the Petition under § 325(d). Dec. 15–16. Patent Owner did not seek rehearing of that determination. In the Response, Patent Owner “disagrees” with our determination in the Institution Decision, “[f]or the reasons discussed in the Preliminary Response,” and “reserves the right” to raise the issue on appeal to the Federal Circuit. PO Resp. 3–4.

Patent Owner does not present new argument or evidence, or expressly ask that the Petition at hand be denied based on 35 U.S.C. § 325(d).

Given this, there is no question before us on this issue.

B. PERSON OF ORDINARY SKILL IN THE ART

Petitioner contends that a person of ordinary skill in the art would have held at least a Master of Science or higher degree in electrical engineering, and have at least four years of experience with mixed signal system design, including analog front ends and subsequent digital signal processing of various analog and digital signal formats of video and audio content. Pet. 18 (Ex. 1009 ¶ 22).

Patent Owner argues that Petitioner’s definition is incomplete in that a person of ordinary skill would need at least two years of experience in implementing radio-frequency circuits for television applications due to the unique challenges of television applications. PO Resp. 4 (citing Ex. 2032 ¶¶ 18–25; Ex. 2003 ¶¶ 19–22).

As an initial matter, we disagree with Patent Owner’s characterization that Petitioner’s definition excludes experience with television applications. Though not explicit, Petitioner’s definition of four years of experience with mixed signal system design fairly includes television applications. *See* Pet. 18. Further, Patent Owner’s citation to the testimony of its expert, Ion E. Opris, Ph.D., ignores that Dr. Opris testifies that a person of ordinary skill in the art would need “at least two years of professional experience in implementing radio-frequency circuits for television applications *or similar circuits*.” Ex. 2032 ¶ 20 (emphasis added).

We find that Patent Owner’s definition does not differ significantly from Petitioner’s. Experience is but one of several factors that may be considered when determining the level of ordinary skill in the art.⁴ That is, the distinction Patent Owner identifies relates to a portion of one factor (education) in a determination involving several factors.

Perhaps most importantly, the significance of the level of ordinary skill in the art is the role it plays in an obviousness analysis. *See Graham v.*

⁴ *See, e.g., In re GPAC*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) ((A) “type of problems encountered in the art;” (B) “prior art solutions to those problems;” (C) “rapidity with which innovations are made;” (D) “sophistication of the technology; and” (E) “educational level of active workers in the field. [] In a given case, every factor may not be present, and one or more factors may predominate.”).

John Deere Co., 383 U.S. 1, 17–18 (1966); *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (“[T]he level of skill in the art is a prism or lens through which a judge, jury, or the Board views the prior art and the claimed invention.”); *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991) (“[t]he importance of resolving the level of ordinary skill in the art lies in the necessity of maintaining objectivity in the obviousness inquiry”). Patent Owner has not explained persuasively how the alleged omission by Petitioner impacted the obviousness analysis.

We therefore conclude that Petitioner’s definition, along with the prior art of record reflects an appropriate skill level. *See Okajima*, 261 F.3d at 1355.

C. PATENT OWNER’S MOTION TO EXCLUDE EVIDENCE

Patent Owner moves to exclude: (1) Balaban (Ex. 1053), (2) paragraphs 33–44 of Dr. Holberg’s Reply Declaration (Ex. 1061) and paragraph 9 of Dr. Holberg’s Supplemental Declaration (Ex. 1063), and (3) paragraphs 14–32 of Dr. Holberg’s Reply Declaration (Ex. 1061). Paper 31 (“Mot.”). Petitioner submitted an opposition, and Patent Owner replied to that opposition. Paper 38 (“Opp.”); Paper 57 (“Reply”). For the reasons that follow, Patent Owner’s motion is *denied*.

The challenged Exhibits were submitted on Friday, February 12, 2016, in association with Petitioner’s Reply, and Patent Owner timely filed objections on Thursday, February 18, 2016. Pet. Reply 10; Exs. 1053, 1061, 1063; Paper 24; 37 C.F.R. § 42.64(b)(1). Petitioner does not challenge the sufficiency of the objections.

Patent Owner also contends that Paper 25 contains objections. *See* Mot. 1. Paper 25 is a transcript of a telephone conference with the parties held on February 22, 2016, in which Patent Owner asserted that portions of Petitioner's Reply were beyond the scope of Patent Owner's Response and that Petitioner's Reply improperly incorporated certain material. *See* Paper 25 (transcript), 1; Paper 27 (subsequent associated order), 1. The issues raised by Patent Owner do not relate to admissibility and, therefore, are not effective evidentiary objections. *See* 37 C.F.R. §§ 42.61–64. Further, the call was not timely because it was held more than five business days after the evidence at issue was served. 37 C.F.R. § 42.64(b)(1).

1. *Balaban*

According to Patent Owner, Petitioner relies upon Balaban (Ex. 1053) to disclose a claim element, and such reliance is improper because Balaban was not a basis of one of the instituted grounds of unpatentability, and is neither supplemental information nor supplemental evidence. Mot. 1–3; Reply 1–3 (citing *Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359 (Fed. Cir. 2016)).

We agree with Petitioner that Patent Owner raises concerns other than admissibility. *See* Opp. 1; *see also* 37 C.F.R. §§ 42.61–64 (regarding admissibility and the Federal Rules of Evidence). If a reply raises a new issue or belatedly presents evidence, the remedy is not to exclude that reply; rather, the remedy is that the reply is not considered. *See* 37 C.F.R. §§ 42.23(a), 42.104; Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,767 (Aug. 14, 2012).

2. Paragraphs 33–44 of Dr. Holberg’s Reply Declaration and Paragraph 9 of Dr. Holberg’s Supplemental Declaration

Patent Owner asserts that the supporting sections of Dr. Holberg’s Reply Declaration (Ex. 1061) and Supplemental Declaration (Ex. 1063) should be excluded because Petitioner construed “carrier signal” in Petitioner’s Reply rather than in the Petition as required by 37 C.F.R. § 42.104(b). Mot. 4–7; Reply 3–4. Patent Owner adds that these supporting sections are also improperly incorporated by reference in violation of 37 C.F.R. § 42.6(a)(3). Mot. 5–7; Reply 3–4.

Here, as with the prior exhibit, Patent Owner’s concerns do not go to admissibility and, therefore, are not the proper subject of a motion to exclude evidence.

3. Paragraphs 14–32 of Dr. Holberg’s Supplemental Declaration

Patent Owner moves to exclude paragraphs 14–32 of Dr. Holberg’s Reply Declaration (Ex. 1061) as irrelevant because it was never discussed in a substantive paper and because these paragraphs are improperly incorporated by reference under 37 C.F.R. § 42.6(a)(3). Mot. 7; Reply 4.

Regarding relevance, Patent Owner’s objection cites Federal Rule of Evidence 402 and states that the “exhibit is irrelevant, cumulative, and/or prejudicial to the issues on which IPR is progressing.” Paper 24, 7. This objection does not identify any particular portion of the Exhibit nor explain cogently why the Exhibit is not relevant. Patent Owner did not identify the grounds for the objection with sufficient particularity to allow Petitioner the opportunity to correct in the form of supplemental evidence. *See* 37 C.F.R. § 42.64(b)(1). Consequently, Patent Owner’s motion is deficient on that basis. Further, the paragraphs at issue deal with construction of the term “select signal.” *See* Ex. 1061 ¶¶ 14–32. This evidence is relevant because it

has a tendency to make the proper construction of the term more or less likely, and construction of that term is of consequence in this proceeding. *See* Fed. R. Evid. 401.

Regarding improper incorporation by reference, such a concern is not a proper consideration in a motion to exclude.

4. *Conclusion*

Patent Owner has not persuaded us that any of the challenged exhibits should be excluded. *See* 37 C.F.R. §§ 42.20(c), 42.22.

D. WEIGHT OF DR. HOLBERG'S TESTIMONY

In the Response, Patent Owner argues that Dr. Holberg's testimony should be given little or no weight for three reasons. Before addressing each of those reasons, we note that our rules provide that the opinion of an expert witness may be given little or no weight if the expert does not disclose the underlying facts or data on which the opinion relies. *See* 37 C.F.R. § 42.65. Patent Owner makes no such assertion here, and cites no other supporting authority. *See* PO Resp. 47–49.

First, according to Patent Owner, Dr. Holberg lacks ordinary skill in the art of the invention and, therefore, is not qualified to provide an opinion on any issues in this proceeding. PO Resp. 57–58 (citing Ex. 2003 ¶ 22). Although Patent Owner did not make a motion to exclude Dr. Holberg's testimony on this basis, Dr. Holberg need not be a person of ordinary skill in the art to testify as an expert under Federal Rule of Evidence 702. *See Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1363–64 (Fed. Cir. 2008). Nor must Dr. Holberg's qualifications perfectly match the patent at issue. *See SEB S.A. v. Montgomery Ward & Co. Inc.*, 594 F.3d 1360, 1373

(Fed. Cir. 2010). Patent Owner's argument is directed to the entirety of Dr. Holberg's testimony, essentially an assertion that we cannot give weight to anything Dr. Holberg said. Such a broad contention is less persuasive than targeting specific portions of Dr. Holberg's testimony. Further, Dr. Holberg's qualifications align with the challenged subject matter sufficiently so that his knowledge is helpful in understanding the evidence and determining facts in issue. For example, Dr. Holberg has over 30 years of experience in the electronics field, including experience in business and academic environments. Ex. 1009 ¶ 3. Dr. Holberg is a named inventor on numerous patents and has written numerous publications. *Id.* at App. A. Additionally, Dr. Holberg has a Bachelor degree in electrical engineering, as well as a Master of Science degree, and a Ph.D. *Id.*

Second, Patent Owner contends that Dr. Holberg's credibility was called into question by his inconsistent answers regarding his compensation rates. PO Resp. 58. Specifically, Patent Owner contends that Dr. Holberg stated there was no other matter that he worked on for Petitioner where he was paid a rate other than \$275 per hour, when in fact Dr. Holberg was paid a rate other than \$275 per hour (i.e., \$400 per hour) for trial preparation work for the related litigation. *Id.* (citing Ex. 2033, 18:1–8; Ex. 2031 ¶ 10).

The deposition testimony cited by Patent Owner must be considered in context. *See* PO Resp. 58. Regarding compensation rates, Patent Owner's counsel initially asked if Dr. Holberg was being paid at a rate of \$275 hour, and Dr. Holberg clarified that he was paid \$275 per hour for analysis and \$400 for depositions. Ex. 2033, 17:2–7 (first inquiry). Patent Owner's counsel then repeated Dr. Holberg's answer and asked if it was stated correctly. Dr. Holberg indicated that it was stated correctly. *Id.* at

17:8–12 (second inquiry). Patent Owner’s counsel then asked if the \$275 per hour rate applied to “some of the other ongoing matters” between the parties. *Id.* at 17:13–17 (third inquiry). On request, Patent Owner’s counsel restated the question and asked if the \$275 per hour rate applied to “other matters that are currently pending” between the parties. *Id.* at 17:18–23 (fourth inquiry). Dr. Holberg asked which “matters” Patent Owner’s counsel was referring to and Patent Owner’s counsel provided the ITC proceeding as an example. *Id.* at 17:24–25 (fifth inquiry). Dr. Holberg replied that the \$275 rate applied to the ITC related work he did for Petitioner. *Id.* at 18:2–4. Patent Owner’s counsel then asked if there are there “any other matters” that Dr. Holberg works on for petitioner where he was paid a rate other than \$275 per hour, and Dr. Holberg indicated there was not. *Id.* at 18:5–8 (sixth inquiry).

Dr. Holberg’s response was not inconsistent. It is possible, and reasonable, that Dr. Holberg did not understand the “other matters,” referred to by Patent Owner’s counsel to include the related litigation. As detailed above, Patent Owner’s counsel essentially asked six times if Dr. Holberg was paid a rate other than \$275 per hour, and in those six inquiries, Patent Owner’s counsel made no mention of the related litigation. If Patent Owner’s counsel wanted to ascertain if Dr. Holberg’s rate was different for the related litigation preparation work, Patent Owner’s counsel could have asked that question. In parity with this interpretation, just two days prior to the deposition in question, Dr. Holberg prepared a report that acknowledged he was compensated \$400 per hour for trial preparation work. *See* Ex. 2031 ¶ 10 (Nov. 2, 2015); Ex. 2033, 1 (Nov. 4, 2015). It seems unlikely that Dr. Holberg would attempt to conceal a different compensation rate when it

was acknowledged so close in time in another formal report. Further, Dr. Holberg's acknowledgment that he was paid at a rate other than \$275 per hour for deposition work does not suggest any deceptive intent in the testimony relating to compensation. *See* Ex. 2033, 17:2–7. Indeed, even assuming the testimony is inconsistent, Patent Owner fails to provide any persuasive authority for why such an inconsistency results in giving no weight to the testimony.

Third, Patent Owner contends that Dr. Holberg admitted he did not draft his report. PO Resp. 58 (citing Ex. 2033, 16:9–12). We have no rule concerning how an expert report is drafted. Analogous Federal Rule of Civil Procedure 26(a)(2)(B) states an expert report must be “prepared and signed by the witness” but the advisory notes clarify that “does not preclude counsel from providing assistance to experts in preparing the reports, and indeed, . . . this assistance may be needed. Nevertheless, the report, which is intended to set forth the substance of the direct examination, should be written in a manner that reflects the testimony to be given by the witness and it must be signed by the witness.” Fed.R.Civ.P. 26(a)(2)(B), advisory committee notes—1993 Amendment. Although Dr. Holberg stated that counsel drafted the report, this statement must also be considered in context. When preparing his report, Dr. Holberg performed the research that identified the majority of the material reviewed in preparation of the report, and further, Dr. Holberg reviewed the materials filed in this proceeding. Ex. 2033, 15:5–16:12. This is not a situation where counsel prepared the expert report in its entirety. *Cf. Numatics, Inc. v. Balluff, Inc.*, 66 F. Supp. 3d 934, 941 (E.D. Mich. 2014) (“An expert witness who is merely a party’s lawyer’s avatar contributes nothing useful to the decisional process.”). This

information does not cast sufficient doubt on the credibility of Dr. Holberg's testimony for it to affect the weight we accord that testimony.

For these reasons, we are not persuaded by Patent Owner's assertion that the whole of Dr. Holberg's declaration should be given little or no weight.

E. SCOPE AND INCORPORATION

Patent Owner requested authorization to file a Motion to Strike portions of Petitioner's Reply, alleging that portions exceeded the scope of Patent Owner's Response and improperly incorporated arguments. Paper 25 (transcript of call). We did not authorize a Motion to Strike; rather, we authorized Patent Owner to submit a paper in the form of a list "providing the location and a concise description of any portion of Petitioner's Reply" that Patent Owner alleges exceed the scope of Patent Owner's Response or improperly incorporates. Paper 27, 3–4 (order); Paper 28 (Patent Owner's submittal). We also authorized Petitioner to submit a response. Paper 29 (Petitioner's submittal).

Patent Owner's citation to Board determinations is argument and will not be considered. *See, e.g.*, Paper 28, 3 (citing *CaptionCall, LLC v. Ultratec, Inc.*, IPR2013-00549, slip op. at 5–6 (PTAB Dec. 1, 2015) (Paper 73)); Paper 27, 4 (prohibiting argument in the submittal); Paper 29, 1 (contending that Patent Owner's submittal improperly contains argument).

1. *Balaban*⁵ and Associated Portions of Petitioner's Reply⁶

Patent Owner argues that Petitioner's citation of Balaban (Ex. 1053) is outside the permissible scope of a reply under 37 C.F.R. § 42.23(b). Paper 28, 1–2 (citing Pet. Reply 10 and noting that Balaban was not submitted with the Petition nor was it the basis of an instituted ground of unpatentability). Patent Owner contends that “Petitioner relies on Balaban to teach the ‘detecting a carrier signal’ claim element in the ’626 patent.”⁷ *Id.* at 1.

Patent Owner mischaracterizes Petitioner's contention. Petitioner does not rely on Balaban as disclosing a claim element; rather, Petitioner relies on Balaban as evidence of what is disclosed in Zenith. *See* Pet. Reply 10; *see generally Continental Can Co. U.S.A. v. Monsanto Co.*, 948 F.2d 1264, 1268–69 (Fed. Cir. 1991) (permitting recourse to extrinsic evidence regarding a characteristic the reference is silent on). Specifically, Petitioner contends that a synchronization signal as disclosed in Zenith is a carrier signal as illustrated by Balaban. *Id.* Further, we agree with Petitioner that use of Balaban is properly in response to an argument made by Patent Owner, namely Patent Owner's argument that Petitioner has not explained how or why a “sync” signal could be a carrier signal. *See* Paper 29, 1–2; PO Resp. 44–45.

⁵ Balaban is a cited reference of the ’792 patent. Ex. 1001, (56).

⁶ Pet. Reply 10 (last bullet).

⁷ Patent Owner reference to the “’626 patent,” means the ’792 patent of the ’626 IPR.

Consequently, Patent Owner has not demonstrated persuasively that reference to Balaban in this manner is prohibited by 37 C.F.R. § 42.23(b).

2. *Carrier Signal*⁸

Patent Owner argues that Petitioner's claim construction of the term "carrier signal" is not properly in response to an argument by Patent Owner, and should have been provided in the Petition. Paper 28, 2–3 (citing 37 C.F.R. §§ 42.23(b), 42.104(b)(3)). Based on this, Patent Owner asks that we consider neither the definition of a carrier signal found at Exhibit 1054 nor Petitioner's construction of the term. *Id.* at 2.

Patent Owner does not provide a claim construction for the term "carrier signal," nor does Patent Owner otherwise challenge the merits of Petitioner's assertion that a synchronization signal is a form of a carrier signal. We agree with Petitioner that Patent Owner's argument that Petitioner did not explain how a synchronization signal is a carrier signal opens the door regarding a proper interpretation of the claim term "carrier signal." *See* Paper 29, 2; PO Resp. 44–45.

Regarding Patent Owner's contention that "carrier signal" must have been construed in the Petition, although 37 C.F.R. § 42.104(b)(3) requires a petition to include a statement of how each challenged claim is to be construed, it is sufficient for a petition to state that a broadest reasonable interpretation applies. *See* Office Patent Trial Practice Guide, 77 Fed. Reg. at 48,764 ("[I]t may be sufficient for a party to provide a simple statement that the claim terms are to be given their broadest reasonable interpretation, as understood by one of ordinary skill in the art and consistent with the

⁸ Specifically, Pet. Reply 2 ("Carrier Signals" section); Ex. 1061 ¶¶ 33–44; Ex. 1063 ¶ 9; Ex. 1054 (entirety).

disclosure.”); Pet. 18 (asserting that the claims should be given the broadest reasonable construction, and that all terms carry their plain and ordinary meaning). Petitioner initially asserted that “carrier signal” carries its plain and ordinary meaning and now asserts that at the time of filing the ’792 patent it was understood that a synchronization signal was a type of carrier signal. *See* Pet. 18; Pet. Reply 2. These assertions are consistent and do not represent a change in the ground of unpatentability.

Consequently, Patent Owner has not demonstrated that Petitioner’s claim construction of the term “carrier signal” exceeds the scope of Patent Owner’s Response or should have been provided in the Petition.

Patent Owner also contends that Petitioner improperly incorporates by reference by including one sentence in the Reply that does not include meaningful discussion of the three cited paragraphs of Dr. Holberg’s Declaration. Paper 28, 2–3 (citing Pet. Reply 2; citing Ex. 1061 ¶¶ 42–44); 37 C.F.R. § 42.6(a)(3).

Patent Owner’s argument is unpersuasive for several reasons. First, 37 C.F.R. § 42.6(a)(3) prohibits incorporation of *arguments*, and an expert declaration, such as that at issue here, generally is considered *evidence*, not argument. To the extent that the cited portions of Dr. Holberg’s Declaration can be considered argument, Patent Owner’s analysis is incomplete in that Patent Owner only cites to 37 C.F.R. § 42.6(a)(3) and does not address the interplay with 37 C.F.R. § 42.24 (page limits). The Board often analyzes whether incorporation by reference is improper based on whether such incorporation would circumvent page limits.⁹ *See, e.g., Conopco, Inc. v. The*

⁹ Under this rule, page limits for petitions were recently replaced by word limits. *See* 81 FR 24702, April 27, 2016, effective May 2, 2016.

Procter & Gamble Company, IPR2013-00510, slip op. at 8 (PTAB Feb. 12, 2014) (Paper 9). Patent Owner makes no assertions regarding circumventing page limits. Petitioner’s 16 page Reply is below the applicable limit of 25 pages.¹⁰ 37 C.F.R. § 42.24(c)(1).

Third, contrary to Patent Owner’s characterization, Petitioner provides a sufficient discussion of the cited portions of Dr. Holberg’s Declaration (Ex. 1061). Specifically, Petitioner’s explanation that Dr. Holberg’s testimony is consistent with the plain and ordinary meaning of the term “carrier signal” is a sufficient explanation of the cited portions of the Declaration.

3. *Select Signal*¹¹

Patent Owner contends that at page 1 and 2 of the Reply, when construing the term “select signal,” Petitioner improperly incorporates paragraphs 14–32 of Exhibit 1061 and paragraph 8 of Exhibit 1063. Paper 28, 3–4. Patent Owner goes on to contend that Petitioner also improperly incorporates arguments in Dr. Holberg’s Declaration that are not cited in the Reply. *Id.* at 3–4 (citing Ex. 1061 ¶¶ 15–28, 30).

As before, Patent Owner’s argument is unpersuasive because 37 C.F.R. § 42.6(a)(3) prohibits incorporation of argument, not evidence.

Patent Owner’s contention regarding portions of Dr. Holberg’s Declaration that are not cited in the Reply is moot because we only consider those portions of the Declaration that are cited in the Reply. *See generally*

¹⁰ Petitioner’s Reply was filed on February 12, 2016. Effective May 29, 2015, replies were limited to 25 pages. *See* 80 FR 28561; 37 C.F.R. § 42.24(c)(1).

¹¹ Pet. Reply 1 (bottom paragraph)–4 (middle paragraph); Ex. 1061 ¶¶ 14–32.

Cisco Systems, Inc. v. C-Cation Techs., LLC, IPR2014-00454, slip op. 7–10 (PTAB Aug. 29, 2014) (Paper 12) (informative, expanded panel) (Information contained in exhibits or portions of exhibits, but not discussed in the Petition, is not incorporated into the Petition merely by the exhibits’ presence in the record.).

III. CLAIMED SUBJECT MATTER

A. INTRODUCTION TO THE SUBJECT MATTER

The ’792 patent is directed towards “a broadband television signal receiver for receiving multi-standard analog television signals and digital television signals.” Ex. 1001, 1:7–10. A dual-format television receiver includes a signal input terminal for receiving an incoming radio frequency (“RF”) signal. *Id.* at 3:57–59. A frequency conversion circuit converts the input RF signal to an intermediate frequency (IF) signal. *Id.* at 4:55–57. The analog IF signal generated by the frequency conversion circuit is converted to a digital signal that digitizes an IF circuit. *Id.* at 5:22–23. The receiver processes the digitized signal entirely in the digital domain. *Id.* at 5:23–25.

Figure 1 of the '792 patent is reproduced below:

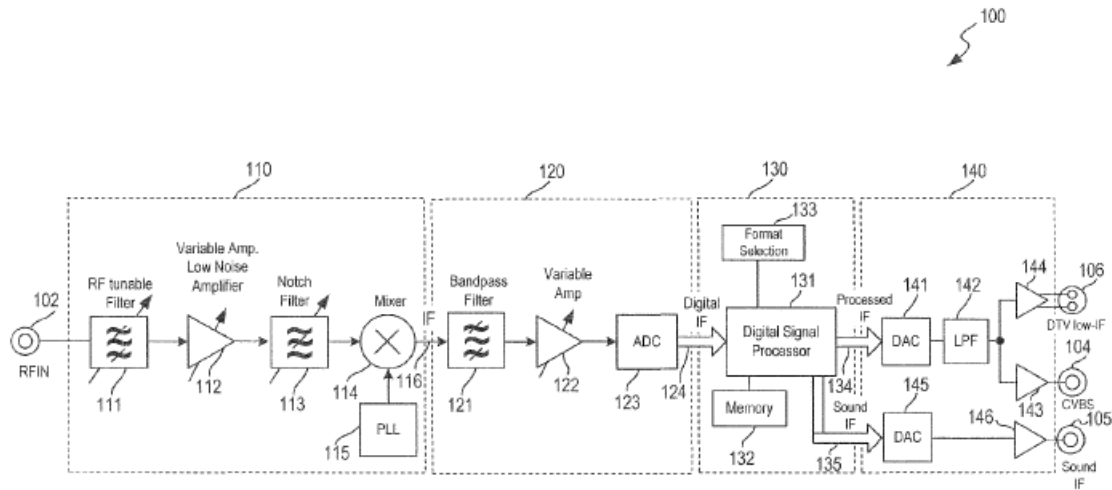


Fig. 1

Figure 1 depicts a schematic diagram of a dual-format television receiver. As shown in Figure 1, in addition to frequency conversion circuit 110 and digitizing IF circuit 120, receiver 100 includes digital signal processor (DSP) circuit 130 and signal output circuit 140. *Id.* at 4:49–52. “By applying . . . the appropriate signal processing functions at DSP circuit 130, receiver 100 can handle television signals in any format (analog or digital) and in any standard (e.g.: NTSC, PAL, SECAM, DVB or ATSC).” *Id.* at 5:25–29.

The receiver disclosed in the '792 patent processes all signals in the digital domain and it, therefore, eliminates the need for analog components like a Surface Acoustic Wave (SAW) filter. *Id.* at 1:55–56, 3:32–35. In addition, a single signal processing path is used to process television signals in either the analog format or the digital format. *Id.* at 3:45–49.

B. ILLUSTRATIVE CLAIM

Independent claim 1 is the sole independent claim of the '792 patent, and consequently each of the challenged claims depends from claim 1.

Claim 1 follows:

1. A television receiver comprising:

a frequency conversion circuit for receiving an input RF signal and for converting the input RF signal to an intermediate frequency signal having an intermediate frequency (IF), the input RF signal encoding information in one of a plurality of television signal formats;

an analog-to-digital converter for sampling the intermediate frequency signal and generating a digital representation thereof;

a signal processor for processing the digital representation of the intermediate frequency signal in accordance with the television signal format of the input RF signal, the signal processor generating digital output signals indicative of information encoded in the input RF signal, wherein the signal processor applies one of a plurality of finite impulse response filters to the digital representation of the intermediate frequency signal, each of the plurality of finite impulse response filters¹² corresponding to a format of the input RF signal; and

a signal output circuit for receiving the digital output signals from the signal processor and for providing one or more output signals corresponding to the digital output signals.

¹² The word “filters” was added by certificate of correction dated March 11, 2014. *See* Ex. 1001 (last page).

C. CLAIM CONSTRUCTION

1. *Uncontested Interpretations*

Patent Owner “applies the claim constructions provided by the Board in the Institution Decision.” PO Resp. 5–6. We incorporate those constructions, and here repeat our conclusion, but not our analysis. In the interests of consistency, we identify applicable portions from the final decision in the ’809 IPR (Ex. 1062).

a) *“input RF signal”*

Independent claim 1 recites “a frequency conversion circuit for receiving an input RF signal.” Claim 1 requires that the input RF signal is a signal having a frequency between 10 kHz and 100 GHz that is put into the frequency conversion circuit. *See* Dec. 7–12; Ex. 1062, 7–8.

b) *“frequency conversion circuit”*

Independent claim 1 recites a “frequency conversion circuit for receiving an input RF signal and for converting the input RF signal to an intermediate frequency signal.” We afforded this expression its plain and ordinary meaning in light of the specification and our construction of “input RF signal.” Dec. 12. Thus, “frequency conversion unit” means “a circuit for converting the frequency of the input RF signal to an intermediate frequency signal having an intermediate frequency.” Ex. 1062, 9–10.

c) *“encoding information in one of a plurality of television signal formats”*

Independent claim 1 recites, “the input RF signal encoding information in one of a plurality of television signal formats.” We construed “format” such that analog and digital signals are examples of distinct formats. Dec. 12–13. We construed the claim to require each received input

RF signal encodes information in exactly one format. *Id.* at 13; Ex. 1062, 11.

d) “signal processor”

Independent claim 1 recites a “signal processor.” We construed “signal processor” as a digital module that processes signals in the digital domain. Dec. 14. Further, we construe “signal processor for processing . . . in accordance with the television signal format” to mean “a digital module that processes signals in the digital domain in the exactly one format in which each received input RF signal is encoded.” Ex. 1062, 13.

e) “indexes”

Claim 24 depends from claim 1 and recites, “wherein the plurality of finite impulse response filters are stored in a memory, and the signal processor indexes the memory to retrieve one of the plurality of finite impulse response filters.” We construed that “indexes” as recited in claim 24, to point to a block of memory when retrieving a set of coefficients of filter functions. Dec. 14–15.

2. *Contested Claim Constructions*

a) “select signal”

Claim 26 depends from claim 1 and recites, “further comprising a format/standard selection circuit coupled to the signal processor, the format/standard selection circuit generating a select signal indicative of a format of the input RF signal and the signal processor selecting a finite impulse response filter in response to the select signal.”

Patent Owner contends that the broadest reasonable interpretation of this claim phrase is “a signal that performs a selection and that comprises information about the format of the input RF signal.” PO Resp. 6. Patent

Owner contends that the ordinary meaning of “indicative of” is “indicating information about.” PO Resp. 7–8. This interpretation is based on “indicative” meaning “serving as a sign or indication (of),” and “indicate” meaning “to be a sign or token of.” Ex. 2034.¹³ Patent Owner adds that the phrase “indicative of” must have a different meaning from the claim term “in response to.” PO Resp. 7–8.

Patent Owner’s interpretation has several shortcomings. First, under Patent Owner’s interpretation, the signal performs a selection, yet, claim 26 contains no such recitation. *See* Pet. Reply 1–2; Ex. 1061 ¶ 32. Although the signal is a “select signal,” the language of claim 26 requires that the signal processor perform the selection of the FIR filter in response to the select signal.

Second, it is somewhat circular logic to contend that the claim term “indicative of” means “indicating information about,” because the term “indicating” is a form of the word “indicative” (i.e., the word is used to define itself).

Third, claim 1 illustrates why Patent Owner’s interpretation is incorrect. Claim 1 recites that the signal processor generates digital output signals “indicative of information” encoded in the input RF signal.” If “indicative” means “indicating information about” as Patent Owner contends, then the term “information” in claim 1 would be redundant. *See Rexnord Corp. v. Laitram Corp.*, 274 F.3d 1336, 1342 (Fed. Cir. 2001) (a claim term should be construed consistently with its appearance in other claims of the same patent).

¹³ The definitions are found on page 2034-2. This Exhibit contains two pages marked 2034-1.

Fourth, Patent Owner fails to identify support for the term “information.” Neither definition provided by Patent Owner recites the word “information.” *See* PO Resp. 6–10; Ex. 2034, 2034-2. The definitions provided by Patent Owner suggest a different interpretation. An ordinary meaning of “indicate” is a “sign of.” Ex. 2034, 2034-2. In the context of claim 26, this suggests that the select signal is “indicative of” the format of the input RF signal, in that the select signal provides a sign of the format of the RF input signal. The specification does not provide a lexicographical definition of “select signal.” The term “select signal” is not explicitly found in the specification outside of the claims. Consistent with the interpretation that “indicative of” means “a sign of,” the specification describes that standard selection circuit 133 can automatically select the correct standard using a variety of techniques, to include by detecting the presence or absence of carrier signals.¹⁴ Ex. 1001, 6:6–23; Figs. 1, 2.

Consequently, we agree with Petitioner that claim 26 requires that the select signal serves as a sign of a format of the input RF signal. *See* Pet. Reply 1–4.

b) “carrier signals”

Claim 28 depends from claim 26, and recites, “wherein the format/standard selection circuit generates the select signal by detecting carrier signals identifying one of the formats of the input RF signals.”

We agree with Petitioner’s contention that the claim term “carrier signals” should be given its plain and ordinary meaning as reflected in the

¹⁴ The interpretation that “indicative of” means a “sign of” has a different meaning than “in response to.” *See* PO Resp. 7.

IEEE dictionary. Pet. Reply 2; Ex. 1063 ¶ 9; *see also* Ex. 1054, 134.¹⁵ That is, a carrier wave as recited is a wave having at least one characteristic that may be varied from a known reference value by modulation. We elaborate on this interpretation in Section IV.C., below.

IV. PATENTABILITY

A. INTRODUCTION

We instituted trial on the challenged claims on the following grounds:

- (1) claim 29 as unpatentable under 35 U.S.C. § 103(a) over Thomson¹⁶ and Harris¹⁷;
- (2) claims 24 and 25 as unpatentable under 35 U.S.C. § 103(a) over Thomson, Harris, and Grumman¹⁸;
- (3) claims 26 and 28 as unpatentable under 35 U.S.C. § 103(a) over Thomson, Harris, and Zenith¹⁹;

¹⁵ This is the native page number of the Exhibit which is the third page of the Exhibit.

¹⁶ Ex. 1004, EP 0696854 A1, published Feb. 14, 1996.

¹⁷ Exhibit 1005, Clay Olmstead & Mike Petrowski, *A Digital Tuner for Wideband Receivers*, DSP APPLICATIONS MAGAZINE (1992).

¹⁸ Ex. 1008, Grumman, US 5,381,357, Jan. 10, 1995. Petitioner refers to this reference by the assignee rather than the inventors; we do so as well for consistency.

¹⁹ Ex. 1011, Zenith, US 6,377,316 B1, Apr. 23, 2002. Petitioner refers to this reference by the assignee rather than the inventors; we do so as well for consistency.

(4) claim 27 as unpatentable under 35 U.S.C. § 103(a) over Thomson, Harris, Zenith, and Birleson²⁰; and

(5) claims 18 and 19 as unpatentable under 35 U.S.C. § 103(a) over Thomson, Harris, Oku²¹, Ericsson²², and Nguyen.²³

Dec. 27.

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness.²⁴ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

Arguments for patentability not raised in the Patent Owner response are waived. Paper 10, 3 (“The patent owner is cautioned that any arguments for patentability not raised in the response will be deemed waived.”).

²⁰ Ex. 1015, Birleson, US 6,725,463, B1 Apr. 20, 2004.

²¹ Ex. 1018, Oku, US 2002/0057366 A1, May 16, 2002.

²² Ex. 1024, Ericsson, US 6,411,136, B1 June 25, 2002. Petitioner refers to this reference by the assignee rather than the inventors; we do so as well for consistency.

²³ Ex. 1031, Nguyen, US 6,400,598 B1, June 4, 2002.

²⁴ The level of ordinary skill in the art was discussed earlier.

B. OBVIOUSNESS OVER THOMSON AND HARRIS
CLAIM 29

1. *Claimed Subject Matter and Ground*

Claim 29 depends from claim 1. As mentioned above, we determined in the '809 IPR that claim 1 is obvious over Thomson and Harris. Ex. 1062, 14–28. Here, Petitioner relies upon the same showing with respect to the elements of claim 29 that are present by virtue of dependence from claim 1. *See* Pet. 25–35. We adopt our analysis from the '809 IPR here, and add the following with regard to Petitioner's contention that the additional limitations of claim 29 would have been obvious over Thomson and Harris. Pet. 35–39.

Claim 29 recites, “wherein the input RF signal comprises an RF signal received from terrestrial broadcast, an RF signal received from satellite broadcast, and an RF signal received from cable transmission.”

Petitioner contends that Thomson discloses a multistandard receiver that can receive an input RF signal from a satellite broadcast, a terrestrial broadcast, and a cable broadcast. Pet. 35 (citing Ex. 1004, 1:55–2:3; Ex. 1009 ¶ 55).

2. *Patent Owner Arguments*

Patent Owner contends that Thomson discloses processing input RF broadcast satellite signals, but not terrestrial broadcast or cable transmission. PO Resp. 12–15. Specifically, Patent Owner argues that

In particular, the section of Thomson cited by Silicon Labs, which discusses a “frequency band covering 950–1750 MHz which should be handled by a multi-standard tuner,” Ex. 1004 at 1:58-2:1, does not disclose terrestrial broadcasts or cable transmission.

PO Resp. 14–15. Patent Owner agrees with the interpretation in our Institution Decision that claim 29 requires the capability of processing each of the three enumerated types of input RF signals, but does not require doing so simultaneously. *Id.* at 14 (referring to claim interpretation at Dec. 21).

Petitioner counters that Thomson’s receiver is capable of receiving an input RF signal from each of the three different sources as required by claim 29. Pet. Reply 3–4. Petitioner’s contention is supported by Dr. Holberg’s explanation that Thomson is capable of receiving the signal whether transmitted by satellite, cable, or antenna. *Id.* at 4; Ex. 1063 ¶ 13.

Patent Owner’s contention that Thomson’s receiver is not capable of receiving terrestrial broadcast or cable transmission is attorney argument unsupported by evidence. *See In re Pearson*, 494 F.2d 1399, 1405 (CCPA 1974) (attorney’s arguments do not take the place of evidence). In contrast, Petitioner’s expert, Dr. Holberg²⁵ explains effectively that without regard for how the signal originates (satellite, cable, or terrestrial) Thomson’s receiver is capable of receiving an RF signal as required by claim 29. *See* Ex. 1063 ¶ 13

Petitioner has demonstrated by a preponderance of the evidence that Thomson’s receiver is capable of receiving each of the three enumerated types of input RF signals required by claim 29.

3. *Secondary Considerations*

Patent Owner raises the secondary considerations of long-felt but unmet need, and industry praise.

²⁵ As explained in Section II above, we considered Patent Owner’s comments on Dr. Holberg’s credibility.

To be relevant, evidence of non-obviousness must be reasonably commensurate in scope with the claimed invention. *In re Huai-Hung Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011) (citing *In re Tiffin*, 448 F.2d 791, 792 (CCPA 1971); *In re Hiniker Co.*, 150 F.3d 1362, 1369 (Fed. Cir. 1998)). To be accorded substantial weight, there must be a nexus between the merits of the claimed invention and the evidence of secondary considerations. *In re GPAC*, 57 F.3d at 1580. “Nexus” is a legally and factually sufficient connection between the objective evidence and the claimed invention, such that the objective evidence should be considered in determining non-obviousness. *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851 F.2d 1387, 1392 (Fed. Cir. 1988). The burden of showing that there is a nexus lies with the patent owner. *Id.*

Patent Owner does not identify any particular claim, nor otherwise explain how these secondary considerations are commensurate in scope with the claimed invention. *See* PO Resp. 59–60.

a) Long-felt but unmet need

Patent Owner contends that Petitioner tried and failed to develop its own digital tuner technology as evidenced by several patents, and “somehow, just one year after seeing” Patent Owner’s product, Petitioner introduced its first digital tuner.²⁶ PO Resp. 59 (citing several of Petitioner’s patents filed as Exhibits 2014–2021 of IPR2014-00728; Ex. 2036, 2). Patent Owner’s expert, Dr. Opris, opines that creating a universal receiver was a

²⁶ To the extent that Patent Owner’s assertion suggests copying by Petitioner, such a contention is not persuasive. For example, Patent Owner presents no argument or evidence that Petitioner’s product is substantially identical to the claimed product, or that Petitioner expended great effort to develop its own solution, but failed.

very complex task as evidenced by the fact that “no such product was created until after” Patent Owner’s innovations. *Id.*; Ex. 2003 ¶¶ 32–45.

Patent Owner did not file Exhibits 2014–2021 of the ’728 IPR as exhibits in this proceeding, and for that reason we need not consider that evidence. Further, Patent Owner has not explained cogently how these patents illustrate a long-felt but unmet need. *See* PO Resp. 59–60. Even considering this evidence, it does not persuasively support Patent Owner’s contention. The ’792 patent was filed on July 1, 2004, and the oldest of Petitioner’s patents cited by Patent Owner was filed on February 28, 2003. *See* Ex. 1001, (22); Ex. 2014 of the ’728 IPR. At most, this evidence may suggest a need shortly (less than two years) before, the invention. It does not demonstrate effectively that an art-recognized problem existed for a long period of time without solution.

Even accepting as true that development of the claimed subject matter was difficult, as Dr. Opris contends, such contention does not demonstrate an art-recognized problem existed for a long period of time without solution. Nor does this evidence demonstrate that others expended substantial effort and resource in an attempt to solve the problem.

Consequently, Patent Owner has not demonstrated effectively that an art-recognized problem existed for a long period of time without solution. *See Newell Cos. v. Kenney Mfg. Co.*, 864 F. 2d 757, 768 (Fed. Cir. 1988); *see also In re Gershon*, 372 F.2d 535, 538–39 (CCPA 1967) (the evidence must show that the need was a persistent one that was recognized by those of ordinary skill in the art).

Patent Owner’s contention that Petitioner introduced its first digital tuner in 2009, “somehow, just one year after seeing” Patent Owner’s

product, implies copying. *See* PO Resp. 59–60. “[C]opying by a competitor may be a relevant consideration in the secondary factor analysis.” *Iron Grip Barbell Co., Inc. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004) (citing *Vandenberg v. Dairy Equip. Co.*, 740 F.2d 1560, 1567 (Fed. Cir. 1984)). “[A] nexus between the copying and the novel aspects of the claimed invention must exist for evidence of copying to be given significant weight in an obviousness analysis.” *Wm. Wrigley Jr. Co. v. Cadbury Adams USA LLC*, 683 F.3d 1356, 1364 (Fed. Cir. 2012) (internal quotation omitted). “[M]ore than the mere fact of copying by an accused infringer is needed to make that action significant to a determination of the obviousness issue.” *Cable Elec. Products, Inc. v. Genmark, Inc.*, 770 F.2d 1015, 1028 (Fed. Cir. 1985). *Accord Vandenberg*, 740 F.2d at 1567 (finding that copying of a patented device, despite the failure of protracted efforts by the copyist to design a similar device, was an admission of the mechanical superiority of the patented version, but “not strong evidence of nonobviousness.”).

Patent Owner’s copying contention is unpersuasive for two reasons. First, Patent Owner provides no evidence of when Petitioner began development efforts. Second, Patent Owner does not explain or provide evidence demonstrating that Petitioner’s tuner is substantially identical to the claimed product or that Petitioner expended great effort, but failed to develop its own solution. *See Pentec, Inc. v. Graphic Controls Corp.*, 776 F.2d 309 (Fed. Cir. 1985).

b) Industry Praise

Patent Owner contends that the 2008 ECN Reader's Choice Tech Award won by Patent Owner's subsidiary, Xceive Corporation, demonstrates industry praise.²⁷ PO Resp. 59–60 (citing Ex. 2037, 1).

Industry praise for an invention may provide evidence of non-obviousness where the industry praise is linked to the claimed invention. *See, e.g., Geo. M. Martin Co. v. Alliance Mach. Sys. Int'l LLC*, 618 F.3d 1294, 1305 (Fed. Cir. 2010); *Asyst Techs., Inc. v. Emtrak, Inc.*, 544 F.3d 1310, 1316 (Fed. Cir. 2008).

Exhibit 2037 appears to be a magazine page dated December 15, 2008, captioned "ECN Readers Choice TECH AWARDS," "Boards, Modules & Embedded Systems • TOP FIVE," and includes the following relevant article:

Module Aids in TV Tuner Architecture Conversion

Exceeding ATSC, OpenCable, DVBT/C/H, DMB-TH, and ISDB-T standards, Xceive Corporation's SN5000A SiliconNOW tuner module helps bridge the gap between CAN tuner architecture and silicon-based TV tuner architecture. The component offers plug-and-play physical compatibility with specific CAN tuners, Xceive's XC5000 silicon tuner, and integrated programmable DSP to optimize hardware. The 50-mm x 27-mm module exhibits a two-in-one CAN-replacement supporting onboard demodulation of NTSC, PAL, and SECAM TV standards. The unit comes with Xceive's QuickTune technology for a complete channel scan of more than 100 channels in less than five seconds. Another available offering includes ChannelVista, Xceive's picture-in-picture (PIP) television technology, allowing the viewer to watch up to 12 video channels simultaneously with a single tuner. The module presents RF input, CVBS output, and SIF output impedances of

²⁷ ECN stands for Electronic Component News. Ex. 2037, 11.

75 Ω , and VSWR of 2:1 in frequencies from 42 MHz to 864 MHz while operating from a 5-V power supply. **Xceive Corporation, 408-486-5610, www.xceive.com**^[28]

Ex. 2037, 1.

Patent Owner provides no argument or evidence regarding the prestige of this award in the industry. Patent Owner does not identify a single feature mentioned in the award that corresponds to a limitation of any of the claims of the '792 patent. The article mentions several features of the Xceive module that are not found in the challenged claims, such as: exceeding ATSC, OPENCable, DVBT/C/H, DMB-TH, and ISDB-T standards; “plug-and-play physical compatibility;” support for NTSC, PAL, and SECAM TV standards; the ability to scan 100 channels in under five seconds; picture in picture technology, and operating from a 5 volt power supply.

Consequently, Patent Owner has not demonstrated persuasively that the praise is attributable to claimed features. *See Power-One, Inc. v. Artesyn Techs., Inc.*, 599 F.3d 1343, 1352 (Fed. Cir. 2010) (praise specifically related to features of the patented invention is probative of the nonobviousness of an invention); *cf. PPC Broadband, Inc. v. Corning Optical Communications RF, LLC*, 815 F.3d 734, 746–47 (Fed. Cir. 2016) (reversing the Board’s finding of no commercial success where the Patent Owner presented undisputed evidence that the successful product was the claimed product).

c) Summary of Secondary Considerations

Patent Owner provides some evidence of a need at the time of invention, but does not show persuasively that an art-recognized problem existed for a long period of time without solution. Nor has Patent Owner

²⁸ Formatting here differs from the Exhibit.

demonstrated a connection between the evidence and claimed invention. Patent Owner's implied assertion of copying is unpersuasive, and Patent Owner has not shown that the evidence of praise for Xceive's tuner is tied to claimed features. Patent Owner's evidence of secondary considerations do little or nothing to demonstrate the nonobviousness of the claimed subject matter.

4. *Conclusion*

We have considered the entirety of the evidence, including the evidence of secondary considerations. The weak evidence of secondary considerations does not outweigh the strong case for obviousness of claim 29 as outlined above. We conclude that Petitioner has demonstrated by a preponderance of the evidence that claim 29 is unpatentable for obviousness under 35 U.S.C. § 103(a) over Thomson and Harris.

C. OBVIOUSNESS OVER THOMSON HARRIS, AND GRUMMAN²⁹
CLAIMS 24 AND 25

1. *Claim 24*

a) *Claimed Subject Matter and Ground*

Claim 24 follows:

24. The television receiver of claim 1, wherein the plurality of finite impulse response filters are stored in a memory, and the signal processor indexes the memory to retrieve one of the plurality of finite impulse response filters.^[30]

²⁹ Claims 24 and 25 are similar in scope to claims 11 and 12 in the '615 IPR, respectively. Patent Owner's arguments here parallel those of the '615 patent, and consequently our analysis parallels as well.

³⁰ This claim is similar to claim 11 of the '585 patent.

Petitioner explains that it was well-known to implement FIR filters by storing sets of FIR filter coefficients in memory and utilizing the signal processor to index those coefficients for retrieval, and then details how Grumman (Ex. 1008) discloses such a technique. Pet. 35–39; Ex. 1009 ¶¶ 56–57. Specifically, Petitioner explains that Grumman discloses a two bank architecture (banks 0, 1) that allows the filter to operate with data in one bank while the other memory bank is updated with a new set of coefficients. Pet. 36–37; Ex 1009 ¶ 62; Ex. 1008, 11:25–29. Petitioner explicitly states that a set of coefficients corresponds to a FIR filter as claimed. Pet. 36; Ex. 1009 ¶ 56. Petitioner reasons that a person of ordinary skill in the art would have incorporated Grumman’s technique into the combination of Thomson and Harris, to provide easy and efficient access by a processor. Pet. 38–39; Ex. 1009 ¶ 58. That is, Petitioner proposes to modify the combination of Thomson and Harris so that Harris’s FIR filter stores coefficient sets in memory and utilizes the signal processor to index those coefficients for retrieval as taught by Grumman.

b) Patent Owner Arguments

Patent Owner does not directly contest Petitioner’s assertion that a set of coefficients corresponds to a FIR filter as claimed. *See* Pet. 43; PO Resp. 15–26. Rather, Patent Owner argues that Grumman discloses a single FIR filter having a real and an imaginary data portion that processes an incoming data signal ($Yin(n)$).³¹ PO Resp. 22–26; Ex. 1008, 5:33–41, 5:44–53; Figs.

³¹ Patent Owner also argues that Thomson and Harris do not disclose implementing FIR filters by storing sets of FIR filter coefficients in memory and utilizing the signal processor to index those coefficients for retrieval as claimed. *See* PO Resp. 16–20. We need not address this contention because

1a, 1b, 2, 3. In support, Dr. Opris opines that Grumman discloses a simple adaptive complex filter with a real and an imaginary portion that work simultaneously and in parallel. Ex. 2032 ¶ 77 (citing Ex. 1008, 7:32–35); PO Resp. 22–26.

We disagree with Patent Owner’s framing of the dispositive issue as whether Grumman discloses a single two-part FIR filter or two FIR filters. Such a contention is not responsive to the ground of unpatentability as articulated by Petitioner. As detailed above, Petitioner proposes to modify the combination of Thomson and Harris so that Harris’s FIR filter stores sets of FIR filter coefficients in memory and utilizes the signal processor to index those coefficients for retrieval, as taught by Grumman. Pet. 43–46.

We disagree with Dr. Opris’ characterization of Grumman as somewhat incomplete. Grumman does not disclose two memory banks that “work simultaneously.” *See* Ex. 2032 ¶ 98. Rather, as Petitioner correctly asserts, Grumman expressly discloses a filter that operates on the data (coefficient pair) in the first coefficient memory bank while the second bank is being updated with a new set of coefficients. *See* Ex. 1008, 11:25–29 (“[W]hile the filter is operating with data present in the first coefficient memory bank, the alternative memory bank, i.e., the one not being used by the filter, is being updated with the new set of coefficients.”), Abstract (“While the coefficient data stored in the first and second memory storage circuits are being used by the adaptive weight circuits for processing thereof, the coefficient data values may be updated in the first alternate and second alternate memory storage banks and vice versa.”); 4:7–9 (referring to

Petitioner relies on Grumman as combined with Thomson and Harris, not Thomson or Harris individually.

coefficient data values stored in the memory banks); Ex. 1009 ¶ 62; Pet. Reply 6–8; Ex. 1061 ¶¶ 49, 54–61.

Patent Owner argues that Grumman does not disclose format-specific finite impulse response filters as required by claim 24. PO Resp. 25–26; Ex. 2032 ¶ 78. The limitation at issue is present in claim 24 by virtue of dependence from claim 1. *See* Pet. Reply 9–19. Again, Patent Owner’s argument is unpersuasive because it characterizes the ground of unpatentability as if Petitioner relies upon Grumman alone when, as discussed above, Petitioner relies upon Thomas and Harris for this limitation. Ex. 1062, 14–28.

Patent Owner argues that the Petition is “utterly silent” regarding the signal processor of the combination of Thomson, Harris, and Grumman. PO Resp. 30. According to Patent Owner, Petitioner’s contention that Grumman’s real and imaginary processing circuitry correspond to a signal processor as claimed, reads the term “signal processor” out of claim 24. *Id.* at 28. Patent Owner adds that Petitioner’s expert, Dr. Holberg, agrees that Grumman does not disclose a signal processor as claimed. *Id.* at 29–30 (citing Ex. 2033, 75:1–16).

It is somewhat inconsistent for Patent Owner to contend that the Petition is “utterly silent” regarding the signal processor and also contend that the ground relies upon Grumman’s real and imaginary processing circuitry as corresponding to a signal processor as claimed. More importantly, Patent Owner characterizes the ground of unpatentability as if Petitioner relies only on Grumman for a “signal processor” as claimed. Such is not the case. The ground of unpatentability against claim 24 must be understood in the context that it builds upon the ground against claim 1.

Petitioner relies on Thomson's adaptive bandpass filter as corresponding to the signal processor of claim 1. Pet. 25–35; *see also* Ex. 1062, 14–28 (relying on Thomson in the same manner). For claim 24, Petitioner explains why a person of ordinary skill would modify the combination of Thomson and Harris to store coefficient sets in memory and utilize the signal processor to index those coefficients for retrieval as taught by Grumman. Pet. 35–39. Dr. Holberg's testimony supports Petitioner's explanation. Specifically, Dr. Holberg testifies that Grumman's signal processor is not by itself the signal processor of claim 24; rather, Grumman is relied on for the FIR filters that index memory to retrieve one of a plurality of FIR filters (from bank 0 or bank 1) to modify the combination of Thomson and Harris. *See* Ex. 2033, 73:7–75:23. Consequently, Patent Owner's argument is not persuasive.

Patent Owner argues that the references cannot be combined to render claim 24 obvious. PO Resp. 31–35. In particular, Patent Owner asserts that Petitioner has “not provided any reasons” for combining the references, and that Petitioner has not demonstrated a reasonable expectation of success. *Id.* Patent Owner contends that the ground of unpatentability is unclear and could mean one of two types of substitution (i.e., that Grumman's single FIR filter is substituted for all of Harris's FIR filters, or that Grumman's FIR filter is substituted for each of Harris's FIR filters). *Id.* at 32–35. For the reasons that follow, these arguments are not persuasive.

Patent Owner's contention that Petitioner has “not provided any reasons” is incorrect. As explained above, Petitioner reasons that a person of ordinary skill in the art would have incorporated Grumman's technique with

Thomas and Harris, to provide easy and efficient access by a processor. *Id.* at 38–39; Ex. 1009 ¶ 58.

Patent Owner’s contention that Petitioner has not demonstrated a reasonable expectation of success is premised on the characterization that Grumman discloses a single FIR filter; however, as detailed above, that is not the proper focus of this inquiry.

Patent Owner’s characterization that the ground of unpatentability is unclear and could mean one of two kinds of substitution is unpersuasive. Petitioner does not propose a substitution. Instead, as explained above, Petitioner proposes to modify the combination of Thomson and Harris so that Harris’s FIR filter stores coefficient sets in memory and utilizes the signal processor to index those coefficients for retrieval as taught by Grumman.

c) Conclusion

Patent Owner’s weak evidence of secondary considerations does not outweigh the strong case for obviousness of claim 24 detailed above. We conclude that Petitioner has demonstrated by a preponderance of the evidence that claim 24 is unpatentable for obviousness under 35 U.S.C. § 103(a) over Thomson, Harris, and Grumman.

2. Claim 25

a) Claimed Subject Matter and Ground

Claim 25 follows:

25. The television receiver of claim 1, wherein the signal processor comprises a first computing unit and a second computing unit, the first computing unit processing a real part of the finite impulse response filter operation while the second computing unit processing an imaginary part of the finite impulse response filter operation.

Petitioner contends, and we agree, that Grumman discloses a first and a second computing unit (circuits 17, 16), wherein the first computing unit processes a real part of the FIR filter operation (circuit 17) while the second computing unit processes the imaginary portion of the FIR filter operation (circuit 16). Pet. 39–42; Ex. 1008, 2:63–3:2, 3:36–39, 3:41–44, 7:32–35, Fig. 2; Ex. 1009 ¶¶ 65–68. Petitioner reasons that a person of ordinary skill in the art would have made the proposed modification because Grumman’s architecture is very efficient, especially in the context of minimizing any delays caused by selecting a different set of FIR filter coefficients by indexing memory. Pet. 42 (citing Ex. 1009 ¶ 62; Ex. 1008, claims 10, 11).

b) Patent Owner Arguments

Patent Owner contends that the Petition relies solely on Grumman for the limitation of claim 25, and is silent regarding any role of Harris in the combination. PO Resp. 32 (citing Pet. 38–39), 34–35. To the extent that Patent Owner is contending that Harris plays no role in this ground of unpatentability, we disagree. Petitioner explains that claim 25 depends from claim 1, and Petitioner addresses the limitations of claim 1 to include the role of Harris. *See* Pet. 25–35. Consequently the ground of unpatentability for claim 25 relies upon Grumman to further modify the combination of Thomson and Harris asserted against claim 1.

Patent Owner argues that Petitioner’s proffered reason of “efficiency” does not explain adequately why a person of ordinary skill in the art would combine these references when the complex Grumman filter is not needed. PO Resp. 36. In particular, Patent Owner contends that the modification would add additional cost and complexity, and contends that Petitioner has

not explained adequately how the benefit of efficiency is provided by Grumman's separate real and imaginary computing units. *Id.* at 36–37.

As noted above, Petitioner explains that Grumman's improves the efficiency of the combination of Thomson and Harris because Grumman's architecture is efficient in that it minimizes delays caused by selecting a different set of FIR filter coefficients by indexing memory. Pet. 42 (citing Ex. 1009 ¶ 62); *see also* Pet. Reply 6–7 (citing Ex. 1061 ¶ 71). As explained in the analysis of claim 24 above, Grumman expressly discloses a filter that operates on the data in the first coefficient memory bank while the second bank is being updated with a new set of coefficients. For that reason, we find that Petitioner's reasoning is based upon a rational underpinning. Patent Owner's conclusory assertion that Grumman's filter is complex and not needed does not persuade us otherwise.

c) Conclusion

Patent Owner's weak evidence of secondary considerations does not outweigh the strong case for obviousness of claim 12 as outlined above. We conclude that Petitioner has demonstrated by a preponderance of the evidence that claim 25 is unpatentable for obviousness under 35 U.S.C. § 103(a) over Thomson, Harris, and Grumman.

D. OBVIOUSNESS OVER THOMSON, HARRIS, AND ZENITH³²
CLAIMS 26 AND 28

1. *Claim 26*

a) *Claimed Subject Matter and Ground*

Claim 26 follows:

26. The television receiver of claim 1, further comprising a format/standard selection circuit coupled to the signal processor, the format/standard selection circuit generating a select signal indicative of a format of the input RF signal and the signal processor selecting a finite impulse response filter in response to the select signal.

Regarding selecting a FIR filter in response to the select signal, Petitioner relies upon the combination of Thomson and Harris discussed with regard to claim 1, further modified to include a selection signal as disclosed by Zenith. *See* Pet. 42–47; Ex. 1009 ¶ 74. Petitioner contends that the standard selection input of Thomson’s signal processor suggests to a person of ordinary skill in the art that a circuit should be used to generate a standard selection signal.³³ Pet. 43; Ex. 1009 ¶ 63. Petitioner relies on Zenith for such a circuit. Pet. 42–47. For the reasons that follow, we agree with Petitioner.

Thomson’s signal processor includes an adaptive filter 8 that selects based on TV standard, and therefore discloses a standard selection input.

³² Claims 26 and 28 are similar in scope to claims 13 and 15 in the ’615 IPR, respectively. Patent Owner’s argument’s here parallel those in the ’615 IPR, and consequently our analysis parallels as well.

³³ Regarding selecting a FIR filter in response to the select signal, Petitioner relies upon the combination of Thomson and Harris discussed with regard to claim 1, further modified to include a selection signal as disclosed by Zenith. *See* Pet. 52–54; Ex. 1009 ¶ 74.

See Pet. 28; Ex. 1004, 3:16–19, Fig. 1; Ex. 1009 ¶ 44. Dr. Holberg explains that this disclosure suggests to a person of ordinary skill in the art that a circuit should be used to generate a standard selection signal. Ex. 1009 ¶ 63.

Zenith discloses a television receiver that includes a tuner for receiving either analog or digital signals. Ex. 1011, 1:8–10; Pet. 50. Zenith’s microprocessor selectively couples the tuner to either the analog or digital demodulator based upon the type of signal (analog or digital) received device. Ex. 1011, 3:13–15, Figs. 1–3³⁴; Pet. 50–51; Ex. 1009 ¶¶ 70–71. For example, in the embodiment shown in Figure 1 when sync signals are present, microprocessor 22 causes switch 14 to route the IF signal from tuner 12 to analog demodulator 16, and when sync signals are not present, microprocessor 22 causes switch 14 to route the IF signal to digital demodulator 18.³⁵ Ex. 1011, 2:38–45, Fig. 1; Pet. 44. Therefore, the sync signals result in identification of a specific television standard. Ex. 1009 ¶ 71.

b) Patent Owner Argument

Patent Owner argues that neither Zenith, nor the combination as a whole, disclose a select signal indicative of a format of an input RF signal as claimed. PO Resp. 38–43. Specifically, Patent Owner contends that Zenith’s microprocessor does not generate a select signal indicative of a format of an input RF signal as claimed, in that the signal does not contain

³⁴ Figures 1 and 2 are the invention of prior applications and Figure 3 is the invention of Zenith. Ex. 1011, 2:6–13, 2:18–23.

³⁵ Petitioner uses the description of the operation of the Figure 2 embodiment in association with the Figure 1 embodiment. *See* Pet. 42–43. This oversight is of no consequence because the operation of the Figure 2 embodiment is the same as that of Figure 1. *See* Ex. 1011, 3:13–15.

information. *Id.* at 38–40 (Ex. 2032 ¶¶ 89–97). Patent Owner’s argument is unpersuasive because it is not commensurate in scope with claim 26.

Although not explicit, Dr. Opris’ assertion that a one-bit signal, such as disclosed by Zenith, “is not indicative of a format,” is based on the same improper claim interpretation. *See* Ex. 2032 ¶ 92. As detailed in our claim construction above, the select signal need not contain information; rather, it must serve as a sign of a format of the input RF signal. Consequently, we agree with Petitioner that a single bit such as Zenith’s provides an indication (sign) of one of the plurality of formats. *Pet* Reply 9–12; Ex. 1061 ¶¶ 49–50; Ex. 1011, 5:22–23; *see also* Ex. 1001, 5:12–15 (describing that the preferred embodiment of the ’585 patent that detects the presence of absence of carrier signals, just as Zenith detects the presence of absence of sync signals).

Patent Owner argues that Petitioner has not provided a sufficient reason for combining the references. *PO Resp.* 41. This conclusory assertion is unpersuasive because it does not address the reason provided by petitioner. As detailed above, Petitioner contends, and we agree, that the standard selection input of Thomson’s signal processor suggests to a person of ordinary skill in the art that a circuit should be used to generate a standard selection signal. *Pet.* 46–47; Ex. 1009 ¶ 69.

Patent Owner argues that none of the references, taken individually, disclose the selection of a FIR filter. *PO Resp.* 41–42. This contention is unpersuasive because, rather than addressing the combination of references as articulated by Petitioner, Patent Owner attacks the references individually. *See Pet.* 42–47. Further, these limitations are present in claim 26 by virtue of dependence from claim 1, and we have already determined that the

subject matter of claim 1 is obvious over Thomson and Harris. *See* Ex. 1062, 14–28.

c) Conclusion

Patent Owner’s weak evidence of secondary considerations does not outweigh the strong case for obviousness of claim 26 as outlined above. We conclude that Petitioner has demonstrated by a preponderance of the evidence that claim 26 is unpatentable for obviousness under 35 U.S.C. § 103(a) over Thomson, Harris, and Zenith.

2. Claim 28

a) Claimed Subject Matter and Ground

Claim 28 follows:

28. The television receiver of claim 26, wherein the format/standard selection circuit generates the select signal by detecting carrier signals identifying one of the formats of the input RF signals.

Claim 28 is more specific than claim 26 in that the format of the input RF signals must be determined by detecting a carrier signal.

Petitioner contends that Zenith’s sync separator 20 and microprocessor 22 detect sync signals, which are carrier signals.³⁶ Pet. 47–48 (citing Ex. 1001, 3:15–18, 3:12–15; Ex. 1009 ¶¶ 71–72). In support, Dr. Holberg states that “by identifying syncs in the demodulated analog signal, Zenith identifies carrier signals in the input RF signal.” Ex. 1009 ¶ 71 (citing Ex. 1011, 3:12–18). We agree.

³⁶ Zenith refers to element 20 as “sync separator” and “SYNC DET.” *See, e.g.*, Ex. 1011, 2:34, Figs. 1–3.

b) Patent Owner Arguments

Patent Owner argues that Zenith's synchronization signal is demodulated and does not include a carrier signal. PO Resp. 43–48. In support, Dr. Opris opines that a demodulator removes the carrier signal, and specifically, Zenith's analog demodulator 16 removes the carrier signal so that there is no carrier signal for SYNC DET 20 to detect. Ex. 2032 ¶¶ 102–103.

Petitioner asserts that Balaban, “expressly teaches that ‘***detecting a carrier signal includes detecting*** at least one of a picture carrier, a sound carrier, and ***a synchronization signal.***’”³⁷ Pet. Reply 10–11 (citing Ex. 1053, 19:18–20 (claim 31)). Indeed, claim 31 is a method of receiving a television signal that may be analog or digital signal format, wherein detecting a signal characteristic unique to the analog signal format includes detecting a carrier signal, and detecting the carrier signal includes at least one of detecting: a picture carrier, a sound carrier, and a synchronization signal.³⁸ Ex. 1053, 18:65–19:20. Thus, we agree with Petitioner that Balaban is evidence that a synchronization signal is a type of carrier signal.

Patent Owner argues that Zenith does not disclose that a sync signal is a carrier signal. PO Resp. 38–40. We agree that Zenith does not explicitly disclose that a sync signal is a type of carrier signal; however that does not end our inquiry. According to Patent Owner, a demodulated analog signal does not contain a carrier signal, and Petitioner's expert acknowledged as much. *Id.* at 44–47 (citing Ex. 2033, 50:9–51:1, 52:14–21, 125:7–126:25).

³⁷ As detailed above, Petitioner reliance on Balaban is not improper under 37 C.F.R. § 42.23(b).

³⁸ Claim 31 depends from claim 30 which depends in turn from claim 29.

We disagree with Patent Owner's characterization of Dr. Holberg's testimony. In the referenced Deposition, during cross-examination, Dr. Holberg stated that a carrier signal is a signal that carries the modulation during transmission. Ex. 2033, 49:12–50:14. Dr. Holberg also stated that the output of an analog demodulator does not include transmission modulation. *Id.* at 50:23–51:1. Dr. Holberg did not state that demodulation removes the carrier signal. Later during that Deposition, on redirect, the questioner asked Dr. Holberg to recall the discussion regarding whether the output of Zenith's analog demodulator contains a carrier signal. Ex. 2033, 125:7–126:5. Dr. Holberg indicated that the answer was in either the '792 or the '585 patent. *Id.* at 126:8–12. The questioner directed Dr. Holberg's attention to column five, line 12 of the '585 patent. *Id.* at 126:13–17. Dr. Holberg read that section and opined that this portion of the '585 patent is not referring to a transmission carrier, it is referring to carrying the sync signals in the form of video signals. *Id.* at 126:18–25. Turning then to Figure 2 of the '585 patent, Dr. Holberg stated that standard selection circuit 68 was downstream (received the output signal of) the demodulators. *Id.* at 126:1–14. Dr. Holberg indicated that this aspect of the '585 patent informed his opinion regarding operation of Zenith's sync detector 20 detects carrier signals as claimed. In other words, Dr. Holberg explained the standard selection circuit of the '792 patent detects carrier signals downstream of a demodulator. Consequently, we are not persuaded by Patent Owner's assertion that demodulators remove the carrier signal.³⁹

³⁹ Patent Owner's assertion that Zenith's microprocessor 22 only samples the output of analog demodulator 16 and is unsuited for carrier detection is unpersuasive for similar reasons. *See* PO Resp. 44; Ex. 2032 ¶ 94.

c) Conclusion

Patent Owner's weak evidence of secondary considerations does not outweigh the strong case for obviousness of claims 26 and 28. We conclude that Petitioner has demonstrated by a preponderance of the evidence that claims 26 and 28 are unpatentable for obviousness under 35 U.S.C. § 103(a) over Thomson, Harris, and Zenith.

E. OBVIOUSNESS OVER THOMSON, HARRIS, ZENITH, AND BIRLESON
CLAIM 27

1. Claimed Subject Matter and Ground

Claim 27 follows:

27. The television receiver of claim 26, wherein the format/standard selection circuit generates the select signal in response to an input signal from a user.

Petitioner contends that it was well-known to utilize “user selection” for control of a television. Pet. 49–51. Petitioner relies upon Birleson (Ex. 1015) as disclosing a standard selection circuit as claimed. *Id.* Petitioner concludes that it would have been obvious to generate the select signal of Thomson in response to the most common type of input (user selection) and such a choice would have been obvious to try as such input is one of a finite set of inputs that could be used. *Id.* at 50–51.

Birleson discloses a dual mode tuner for co-existing digital and analog television signals that includes an automatic carrier detection (ACD) circuit that monitors the output of two second intermediate frequency filters to determine whether the signal being processed in digital or analog format. Ex. 1015, (54), 1:18–20, 2:50–59, 10:52–11:19. Birleson's ACD circuit 30 can also operate in a signal test mode. *Id.* at 11:20–38; Figs. 1, 3. For

example, signal testing may be initiated by a channel change or input change by a user, causing the selection circuit to generate a select signal. *Id.*

2. *Patent Owner Arguments*

The parties do not disagree on operation of Birleson's selection circuit; the focus of the dispute is whether signal testing as disclosed by Birleson corresponds to generating a select signal as claimed. Patent Owner contends that the '792 patent distinguishes manual (claim 27) from automatic (claim 28) selection. PO Resp. 49–50 (citing Ex. 1001, 6:7–12). According to Patent Owner, a user can initiate signal testing in Birleson's device, but signal testing is not generating a select signal in response to an input signal from a user as required by claim 14. PO Resp. 50–51 (citing Ex. 2032 ¶¶ 104–109). Dr. Opris opines that a user initiated channel or input change is not sending an “input signal” as claimed rather it is a form of auto-detection. Ex. 2032 ¶¶ 104–109.

For the reasons that follow, we agree with Petitioner that Patent Owner's argument is unpersuasive because it is not commensurate in scope with claim 14. Pet. Reply 12–13.

The word “manual” is not found in claim 27.⁴⁰ Nor does the claim recite that the input signal must directly (with no intervening action) cause generation of the select signal. Instead, claim 27 recites that the selection circuit generates the select signal “in response to” an input signal from the user.

The specification describes that the selection of the correct standard can be made “manually by the user of the television system, such as by

⁴⁰ Nor is the term “automatically” found in claim 28.

activating a switch, or the selection can be made automatically by providing an auto-detection capability in TV receiver 100.” Ex. 1001, 6:7–11. This description is not a lexicographical definition and does not provide a basis for reading the term “manual” into claim 27. Nor does this description state the input signal from the user must directly cause generation of the select signal.

Claim 27 requires that the standard selection circuit generates a select signal in response to input from the user. Claim 27 does require that the select signal is manually generated nor that the user input signal directly causes generation of the select signal. Birleson’s signal testing technique can be initiated by a user’s channel or input change, and that user action triggers generation of a select signal. Consequently, the select signal is “in response to” the user’s input signal as required by claim 27.

3. *Conclusion*

Patent Owner’s weak evidence of secondary considerations does not outweigh the strong case for obviousness of claim 27. We conclude that Petitioner has demonstrated by a preponderance of the evidence that claim 27 is unpatentable for obviousness under 35 U.S.C. § 103(a) over Thomson, Harris, Zenith, and Birleson.

F. OBVIOUSNESS OVER THOMSON, HARRIS, OKU, ERICSSON, AND NGUYEN

CLAIMS 18 AND 19

Petitioner contends that the subject matter of claims 18 and 19 is unpatentable over Thomson, Harris, Oku, Ericsson, and Nguyen. Pet. 51–59.

1. *Claim 18*

a) *Claimed Subject Matter and Ground*

Claim 18 follows:

18. The television receiver of claim 1, wherein the signal output circuit comprises:

a first digital-to-analog converter coupled to receive digital output signals from the signal processor and convert the digital output signals to analog output signals;

a first driver circuit for driving the analog output signals from the first digital-to-analog converter onto a first output terminal;

a second driver circuit for driving the analog output signals from the first digital-to-analog converter, the second driver circuit comprising a differential output driver circuit having a first differential output terminal and a second differential output terminal, the first differential output terminal being coupled to the first output terminal and the second differential output terminal being coupled to a second output terminal;

a second digital-to-analog converter coupled to receive digital output signals from the signal processor encoding audio information and convert the digital output signals to analog output signals; and

a third driver circuit for driving the analog output signals from the second digital-to-analog converter onto the second output terminal wherein the first and second output terminals provide differential output signals indicative of video and audio information encoded in the input RF signal when the input RF signal has a digital television signal format; and the first output terminal provides video information encoded in the input RF signal and the second output terminal provides signals indicative of audio information encoded in the input RF signal when the input RF signal has an analog television signal format.

b) First digital-to-analog converter and first driver circuit

Petitioner explains that Oku (Ex. 1018) discloses a television receiver that includes a first digital-to-analog converter (DAC 21), and a first driver circuit (driving circuit 22) as claimed.⁴¹ *Id.* ¶¶ 51–52.

c) Second driver circuit

Petitioner relies on the combination of Oku and Ericsson for a second driver circuit as claimed. Specifically, Petitioner contends that Oku discloses a second driver circuit (output circuit 26) for driving analog output signals from the first digital-to-analog converter (DAC 21), and contends it would have been obvious to modify Oku to use differential signaling, a well-known choice illustrated by Ericsson. *Id.* ¶¶ 52–53; Ex. 1009 ¶¶ 79–82; Ex. 1024, Fig. 2.

d) Second digital-to-analog converter

Petitioner contends that Oku discloses a second digital-to-analog converter (first DAC 16) coupled to driving circuit 17 to drive a monitor, and contends that it would have been obvious to input digital signals encoding audio information into a digital-to-analog converter when audio signals are desired. Pet. 53–54; Ex. 1009 ¶ 83.

e) Third driver circuit

Petitioner contends that Oku discloses a third driver circuit (driving circuit 17) for driving the analog output signals from a second digital-to-analog converter (first DAC 16) onto the second output terminal. *Id.* at 54–

⁴¹ Petitioner mistakenly states that circuit 22 drives analog output signals from first DAC 16, when second DAC 21 was intended. *See* Pet. 52, 54 (contending DAC 16 corresponds to the claimed second digital-to-analog converter).

55. Petitioner contends it would have been obvious to modify the combination of Oku and Ericsson to include a multiplexing architecture as shown in Nguyen. *Id.* at 55; Ex. 1009 ¶ 85.

f) wherein the first and second output terminals provide differential output signals indicative of video and audio information encoded in the input RF signal when the input RF signal has a digital television signal format; and the first output terminal provides video information encoded in the input RF signal and the second output terminal provides signals indicative of audio information encoded in the input RF signal when the input RF signal has an analog television signal format.

Petitioner contends that this limitation is a multiplexing function so that when the input RF signal is digital the first and second output terminals are indicative of video and audio information, and when the input RF signal is analog, the signal on the first output terminal provides video information and the signal on the second output terminal provides audio information.

Pet. 56. According to Petitioner, use of such a multiplexing scheme would have been “an obvious design choice to a POSITA because the outputs are normally mutually exclusive.” *Id.* (citing Ex. 1009 ¶ 86). Petitioner adds that Thomson outputs audio and video information (I, and Q signals) when the input RF signal is in a digital format, and when the input RF signal is in analog format, Thomson outputs video and audio information. Pet. 56.

According to Petitioner, a person of ordinary skill would understand that digital and analog output do not occur simultaneously (“mutually exclusive”) so that the signals may be multiplexed on the same terminals based on whether output is digital or analog. *Id.* at 56–57; Ex. 1009 ¶¶ 87–88. Using the same terminals reduces the number of lines needed and lowers design cost. *Id.* at 57–59. We agree with Petitioner’s contentions,

and determine that Petitioner has established a reasonable expectation of success.

b) Patent Owner arguments⁴²

Patent Owner makes two arguments against this ground of unpatentability.

(1) Design Choice

Patent Owner argues that providing differential output signals is not an obvious design choice. PO Resp. 52–55. In particular, according to Patent Owner, the mutual exclusivity of analog and digital television reception does not provide a sufficient reason for a person of ordinary skill in the art to modify Oku’s driving circuit 22, and Petitioner has failed to provide, “any fact-based analysis” nor pointed to “substantial evidence.”⁴³ *Id.* at 52–54 (citing Ex. 2032 ¶ 112). Patent Owner also contends that Oku’s first driving circuit 17 includes a first output terminal having only a video information signal and second driving circuit 22 includes a second output terminal having only audio information, while in contrast, claim 18 requires

⁴² Patent Owner emphasizes that the ground of unpatentability is based upon a combination of five references. PO Resp. 52 (stating “**five separate references**”), 55 (“**five reference** combination”). To the extent that Patent Owner is suggesting that the combination is not obvious because the ground includes five references, such a contention is not persuasive. The proper criterion is not the number of references; rather, the proper criterion is what the references would have meant to a person of ordinary skill in the field of the invention. *See, e.g., In re Gorman*, 933 F.2d 982, 987 (Fed. Cir. 1991).

⁴³ To the extent that Patent Owner’s assertion regarding “substantial evidence” suggests a burden other than a preponderance of the evidence, we disagree. *See* 35 U.S.C. § 316(e).

the first and second output terminals to provide signals indicative of video and audio information. PO Resp. 54–55; Ex. 2032 ¶ 111.

Contrary to Patent Owner’s assertion, Petitioner has provided fact-based analysis, and we are persuaded by that analysis. As detailed above, Petitioner explains that: (1) Thomson outputs both audio and video from both digital and analog input RF signals, (2) that televisions output either an analog or a digital signal but not both simultaneously (mutual exclusivity), and (3) Nguyen discloses a multiplexing architecture that has the advantage of utilizing the same terminals so that the number of terminals is reduced with the corresponding reduction in production cost. Patent Owner does not persuasively contest any of these underlying factual assertions.

Patent Owner’s contention that Oku’s driving circuit 17 only outputs video information and that driving circuit only outputs audio information is also unpersuasive because it does not address the ground as articulated by Petitioner.

(2) *Combining*

Patent Owner argues that the references cannot be combined to render claim 18 obvious. PO Resp. 55–56. In particular, Patent Owner asserts that Thomson teaching minimizing the number of electronic components, and such teaching would have lead a person of ordinary skill in the art away from the claimed subject matter. *Id.* (citing Ex. 1004, 1:29–33); Ex. 2003 ¶ 105. The portion of Thomson identified by Patent Owner discloses that it is an object of Thomson to provide a receiver suitable for digital and analog input signals that uses a common analog to digital converter. Ex. 1004, 1:29–33. Although this disclosure implies that use of a common analog to digital converter is superior to use of separate converters, such disclosure

does not explicitly criticize, discredit, or otherwise discourage solutions that include something other than a common converter. This disclosure is better characterized as an alternative than a teaching away. *See In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004).

Patent Owner contends that a person of ordinary skill in the art would have no expectation of success inputting analog signals to Thomson's satellite analog television modulator which accepts only digital signals. PO Resp. 56. In support, Dr. Opris opines that a person of ordinary skill would have no expectation of success because Thomson's demodulator and elements 12 and 13 only accept digital signals and processing in the digital domain. Ex. 2003 ¶ 105. This contention is nonresponsive. Petitioner does not rely upon Thomson alone; rather, Petitioner relies upon a combination of the references and Patent Owner does not address that combination.

c) Conclusion

Patent Owner's weak evidence of secondary considerations does not outweigh the strong case for obviousness of claim 18. We conclude that Petitioner has demonstrated by a preponderance of the evidence that claim 18 is unpatentable for obviousness under 35 U.S.C. § 103(a) over Thomson, Harris, Oku, Ericsson, and Nguyen.

2. Claim 19

a) Claimed Subject Matter and Ground

Claim 19 follows:

19. The television receiver of claim 18, wherein the signal output circuit further comprises:

a low pass filter coupled between the first digital-to-analog converter and the first and second driver circuits, the low pass filter providing low pass filtering function.

Petitioner contends, with support from Dr. Holberg, that a digital to analog converter (DAC) can cause the signal not to be smooth, and can introduce high-frequency noise that may result in unwanted electromagnetic radiation. Pet. 59; Ex. 1009 ¶ 90. Petitioner contends that it would have been obvious to add a low pass filter to smooth waveforms and reduce or eliminate high-frequency noise. Pet. 59; Ex. 1009 ¶ 90. According to Petitioner, use of such a technique was a matter of design choice and would have led to predictable results. Pet. 59; Ex. 1009 ¶ 90.

b) Patent Owner Arguments

Patent Owner argues that the proposed modification is not needed and would not provide any functionality because the signal has already been bandwidth limited, and the modification adds cost without reason. PO Resp. 56. In support, Dr. Opris opines that electromagnetic radiation reduction at the demodulator/decoder interface of a television receiver would not be a factor so that a low pass filter is not needed, and would unnecessary cost and complexity. Ex. 2032 ¶¶ 113–114.

Petitioner's contention that use of low pass filters to smooth waveforms and remove high-frequency noise introduced by DACs is supported by a preponderance of the evidence. Pet. 59; Ex. 1009 ¶ 90; Pet. Reply 15; Ex. 1062 ¶¶ 69–76 (citing in turn to Ex. 1059, 28–29, *TV & Video Engineer's Reference Book*, which includes two figures with a low pass filter downstream of a DAC). Dr. Opris fails to address Petitioner's specific contention that a DAC introduces unwanted electromagnetic radiation; rather, Dr. Opris makes the general assertion that a low pass filter is not needed. Consequently we are not persuaded by Patent Owner's contention.

c) Conclusion

Patent Owner's weak evidence of secondary considerations does not outweigh the strong case for obviousness of claims 18 and 19. We conclude that Petitioner has demonstrated by a preponderance of the evidence that claims 18 and 19 are unpatentable for obviousness under 35 U.S.C. § 103(a) over Thomson, Harris, Oku, Ericsson, and Nguyen

V. ORDER

For the reasons given, it is:

ORDERED that claims 18, 19, and 24–29 have been shown by a preponderance of the evidence to be unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Exclude is denied; 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.

IPR2015-00626
Patent 7,265,792 B2

PETITIONER:

Peter Ayers
John Shumaker
Brian Mangum
LEE & HAYES, PLLC
peter@leehayes.com
JShumaker@leehayes.com
brianm@leehayes.com

PATENT OWNER:

Michael Fleming
Benjamin Haber
IRELL & MANELLA LLP
mfleming@irell.com
bhaber@irell.com
crestaiprs@irell.com

Mihai Murgulescu
CRESTA TECHNOLOGY CORPORATION
mihaihm2000@gmail.com