

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SILICON LABORATORIES, INC.,
Petitioner,

v.

CRESTA TECHNOLOGY CORPORATION,
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*.

DECISION
Instituting *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

A. *Background*

Petitioner, Silicon Laboratories, Inc., 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 (Exhibit 1001, the “’792 patent”). See 35 U.S.C. § 311. Patent Owner, Cresta Technology Corporation, timely filed a Preliminary Response (Paper 8, “Prelim. Resp.”). We have jurisdiction under 35 U.S.C. § 314(a).

Upon considering the Petition and Preliminary Response, we determine that Petitioner has shown a reasonable likelihood that it would prevail in showing the unpatentability of claims 18, 19, and 24–29. Accordingly, we institute an *inter partes* review of those claims. See 35 U.S.C. § 314.

B. *Related Proceedings*

Patent Owner asserted the ’792 patent against Petitioner in *Cresta Technology Corporation v. Silicon Laboratories, Inc. et al.*, Case No. 1:14-cv-00078-RGA (D.Del), and International Trade Commission Investigation No. 337-TA-910. Pet. 1; Ex. 1002; Ex. 1003.

Petitioner and Petitioner’s co-defendant in these proceedings, MaxLinear, Inc., have filed the following petitions seeking *inter partes* review of the patents asserted by Patent Owner in the ITC Complaint:

IPR No.	Patent At Issue	Petitioner
2014-00728	7,075,585	Silicon Laboratories
2014-00809 ¹	7,265,792	Silicon Laboratories
2015-00591	7,075,585	MaxLinear
2015-00592	7,075,585	MaxLinear
2015-00593 ²	7,265,792	MaxLinear
2015-00594	7,265,792	MaxLinear

C. *Grounds*

Petitioner relies on the following references:

Thomson	EP 0696854 A1	Feb. 14, 1996	Ex. 1004
Grumman ³	US 5,381,357	Jan. 10, 1995	Ex. 1008
Zenith ⁴	US 6,377,316 B1	Apr. 23, 2002	Ex. 1011
Birleson	US 6,725,463 B1	Apr. 20, 2004	Ex. 1015
Oku	US 2002/0057366 A1	May 16, 2002	Ex. 1018
Ericsson ⁵	US 6,411,136 B1	June 25, 2002	Ex. 1024
Nguyen	US 6,400,598 B1	June 4, 2002	Ex. 1031

Clay Olmstead and Mike Petrowski, *A Digital Tuner for Wideband Receivers*, DSP APPLICATIONS MAGAZINE, Sept. 1992 (Exhibit 1005) (“Harris”).⁶

¹ We refer to the “’809 IPR,” or “’809 Petition,” as appropriate.

² The Petition at hand.

³ Grumman is the assignee; the first named inventor is Wedgwood.

⁴ Zenith is the assignee; the first named inventor is Mycynek.

⁵ Ericsson is the assignee; the first named inventor is Nianxiong.

⁶ According to Petitioner, this reference is called “Harris” because the authors are of Harris Semiconductor. See Pet. iv.

Petitioner contends that the challenged claims are unpatentable under 35 U.S.C. § 103(a) over five grounds (Pet. 7):

Claim(s)	Prior Art
29	Thomson and Harris
24, 25	Thomson, Harris, and Grumman
26, 28	Thomson, Harris, and Zenith
27	Thomson, Harris, Zenith, and Birleson
18, 19	Thomson, Harris, Oku, Ericsson, and Nguyen

II. THE '792 PATENT

A. Overview

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 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:

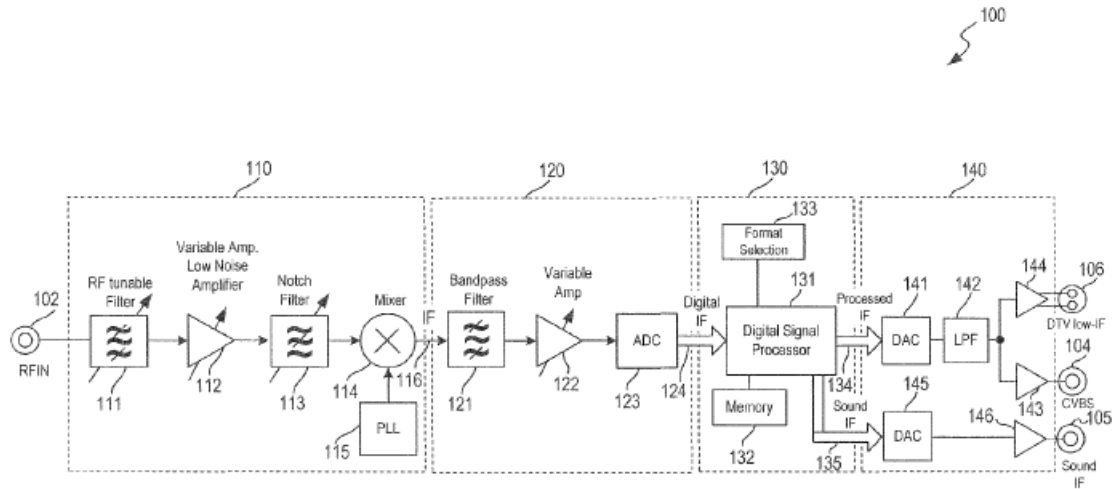


Fig. 1

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. As a result, although the Petition does not explicitly challenge claim 1, it implicitly does so. See Pet. 25 (acknowledging the implicit challenge).

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 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.

III. CLAIM CONSTRUCTION

We interpret the claims of an unexpired patent using the broadest reasonable interpretation in light of the specification of the patent. 37 C.F.R. § 42.100(b); *In re Cuozzo Speed Techs., LLC*, --- F.3d ----, 2015 WL

4097949 at *6 (Fed. Cir., July 8, 2015) , *reh'g en banc denied*, 2015 WL 4100060 (Fed. Cir. July 8, 2015). Under the broadest reasonable interpretation standard, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech. Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

Petitioner agrees with our claim construction in the '809 IPR, and provides one additional claim construction (“indexes,” discussed below). *See* Pet. 18–19; *Silicon Laboratories, Inc. v. Cresta Technology Corporation*, Case IPR2014-00809, slip op. at 6–9 (PTAB Oct. 24, 2014) (Paper 10). Petitioner also contends that Patent Owner’s claim constructions are incorrect. Pet. 20–25. Patent Owner contests our claim construction as detailed below. Prelim. Resp. 9–18.

A. *input RF signal*

Independent claim 1 recites “a frequency conversion circuit for receiving an input RF signal.”

In the Institution Decision of the '809 IPR, we construed “RF signals” as “signals having a frequency between 10 kHz and 100 GHz.” *Silicon Labs*, slip op. at 7 (citing *The Authoritative Dictionary of IEEE Standards Terms* (7th ed. 2000), 912, for a definition of “radio frequency”). Patent Owner contends that this construction dissects the claim term by not addressing the complete claim limitation, which is recited as an “input RF signal.” Prelim. Resp. 11. Patent Owner contends that when construed in light of the Specification, “‘input RF signal’ should be construed . . . as a signal that is an incoming signal that comes out of the medium of propagation and is external to the frequency conversion circuit without any

processing by the frequency conversion circuit.” *Id.* at 12; *see also id.* at 15 (“an ‘input RF signal’, is a signal that is an external signal received through a medium of transmission”). Patent Owner supports its position that “input RF signals” should be construed as external signals that have not been processed by a tuner by observing that the ’792 patent illustrates and describes the conversion of such signals to an intermediate frequency. *Id.* at 11–12 (citing Ex. 1001, 1:34–38; 4:49–57; 5:52–57; Fig. 1). Patent Owner also emphasizes that the Specification of the ’792 patent consistently refers to the input RF signal as a signal external to the tuner. Prelim. Resp. 13–14.

From these contentions, it appears Patent Owner contends that an “input RF signal” as claimed must be received at the frequency conversion circuit directly from the medium of propagation. Because the signal is received at the frequency conversion circuit directly from the medium of propagation, the signal is not received by or processed by an element prior to its input to the frequency conversion circuit.

We agree that the Specification describes that a conventional television receiver receives the incoming television signal in radio frequency (RF) and converts the incoming RF signal to an intermediate frequency (IF) signal. *See* Prelim. Resp. 11; Ex. 1001, 1:34–38. However, this is a description of a conventional receiver and not the claimed receiver.

Regarding the claimed device, the Specification describes that frequency conversion circuit 110 receives input RF signals on signal input terminal 102 from terrestrial broadcast or cable transmissions, and converts those input RF signals to an IF signal using one or more frequency conversions. *Id.* at 4:49–58.

From this disclosure, we agree with Patent Owner that the frequency conversion circuit converts the input RF signal to an IF signal. We also agree that terrestrial broadcast and cable transmissions are examples of an input RF signal. Despite our agreement on these two points, these disclosures undermine Patent Owner's claim interpretation.

None of the portions cited by Patent Owner describe that the input RF signal comes directly (without an intervening element) from the medium of propagation to the frequency conversion circuit. To the contrary, the Specification of the '792 patent describes that the input RF signal is received at signal input terminal 102, which is depicted as external to frequency conversion circuit 110. See Fig. 1 ("RFIN" depicted at input terminal 102); see also Figs. 3A, 3B (depicting "RFIN" at input terminal 102 external to receiver 100). Therefore, to the extent that Patent Owner contends that claim 1 requires that the input RF signal is received at the frequency conversion circuit directly from the medium of propagation, such a contention is inconsistent with the Specification. See *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004) (claims are given "their broadest reasonable interpretation consistent with the specification").

Our interpretation that an input RF signal is not received directly at the frequency conversion circuit from the medium of propagation is further illustrated by claim 29. The receiver of claim 29 includes a frequency conversion circuit that receives a terrestrial broadcast, and a terrestrial broadcast is received from the medium of propagation (the air) at an antenna, not at the frequency conversion unit. See Ex. 1001, 4:53–55; 14:50–53; Ex. 1005, 2 ("[t]he RF signal is received at the antenna"); Ex.

1007 ¶¶ 3 (referring to terrestrial broadcast), 22 (receiver 50 receives input RF signals such as those received on an antenna).

The plain language of claim 1 does not support Patent Owner's interpretation. *See Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996) (first looking to the words of the claim to define the invention). Claim 1 recites that the frequency conversion circuit is “for receiving an input RF signal” and does not recite that the input RF signal must be received at the frequency conversion circuit directly from the medium of propagation without any prior processing. Further, the transitional phrase “comprising” recited in claim 1 is open-ended and does not exclude additional, unrecited elements. *See Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495, 501 (Fed. Cir. 1997) (“Comprising” is a term of art used in claim language which means that the named elements are essential, but other elements may be added and still form a construct within the scope of the claim.). Therefore, for example, claim 1 covers a device that includes an element prior to the frequency conversion unit (e.g., input terminal 102).

The theory of claim differentiation undermines Patent Owner's interpretation. Claim 29, which depends from claim 1, includes a frequency conversion circuit that receives an input RF signal from terrestrial broadcast, satellite broadcast, and cable transmission. This suggests that the input RF signal of claim 1 is not limited to terrestrial broadcast, satellite broadcast, and cable transmission; rather, it may take other forms. *See Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 910 (Fed. Cir. 2004) (“[W]here the limitation that is sought to be ‘read into’ an independent claim already appears in a dependent claim, the doctrine of claim differentiation is

at its strongest.”). This supports Petitioner’s contention that the medium or source of the input RF signal is not a limitation of claim 1.

The ordinary meaning of “input” is something that is put in, such as energy put into a system for conversion of characteristics usually with the intent of sizable recovery in the form of output.⁷ There is a heavy presumption that this ordinary meaning applies. Such meaning suggests that an “input RF signal” is a signal having a frequency between 10 kHz and 100 GHz that is put in. In the context of claim 1, that signal is put in to the frequency conversion circuit.

Patent Owner asks that “input RF signal” be given the special meaning of a signal that is received directly from the medium of propagation without any prior processing. However, Patent Owner does not identify, nor do we discern, a lexicographical definition of the claim term “input” that would warrant such a deviation from the ordinary meaning of the phrase. The Specification does not explicitly describe that the input RF signal is received at the frequency conversion circuit directly from the medium of propagation without any prior processing. Rather, as detailed above, the input RF signal is received at a component external to the frequency conversion circuit (e.g., input terminal 102). As Petitioner emphasizes, the Specification does not equate “input RF signals” to the source (external) or the medium over which the signal is propagated. Pet. 21.

Accordingly, 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

⁷ Merriam-Webster Dictionary, available at <http://www.merriam-webster.com/dictionary/input> (last accessed on July 22, 2015). Ex. 3000, def. 1.

frequency conversion circuit. Claim 1 does not require that the input RF signal is received at the frequency conversion circuit directly from the medium of propagation. Nor does claim 1 preclude processing of the input RF signal prior to receipt at the frequency conversion circuit.

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.” Patent Owner proposes that this limitation should be construed as “a frequency conversion circuit that receives an incoming signal that comes out of the medium of propagation and is external to the frequency conversion circuit without any processing.” Prelim. Resp. 15–16. Petitioner does not proffer an express construction of the phrase.

We disagree with Patent Owner’s proposed construction because it relies on a construction of “input RF signal” that we have not adopted. For purposes of this Decision, we afford the expression its plain and ordinary meaning in light of the specification and our construction of “input RF signal.”

C. encoding information in one of a plurality of formats

Independent claim 1 recites, “the input RF signal encoding information in one of a plurality of television signal formats.” In the Institution Decision of the ’809 IPR, we construed “format” such that analog and digital signals are examples of distinct formats. *Silicon Labs.* at 7–8. We see no reason to apply a different construction of “format” in this proceeding.

Petitioner and Patent Owner disagree whether the phrase requires “receiving one format RF signal at a time.” Pet. 24–25; Prelim. Resp. 16.

We agree with Patent Owner that the indefinite article “a” in the phrase applies to the recited “plurality of television signal formats.” See Prelim. Resp. 16. But it is unclear what the parties mean by “format RF signal,” which appears nowhere in the ’792 patent, including its claims.

The claims unambiguously require encoding in one of a plural number of “television signal formats.” The specification of the ’792 patent describes that the input RF signal encodes information in “one of several television signal formats,” (e.g., analog or digital television format). Ex. 1001, 2:3–35, 46–47. Consequently, each received input RF signal encodes information in exactly one format. Thus, applying the broadest reasonable interpretation in light of the specification for purposes of this Decision, we construe “the input RF signal encoding information in one of a plurality of television signal formats” as requiring that each received input RF signal encode information in exactly one format.

D. processing in accordance with the format

Independent claim 1 recites “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.” Patent Owner contends that, under the broadest reasonable interpretation in light of the specification, the phrase excludes processing a plurality of formats in parallel. Prelim. Resp. 17. We agree.

In particular, we disagree with Petitioner’s characterization that Patent Owner “provides no basis for construing the definite article ‘a’ to mean ‘only one.’” Pet. 24. We do not understand Patent Owner’s contention to be based on a construction of “a” to mean “only one.” Rather, reference to “the television signal format” in the “processing” limitation refers to the “one of

a plurality of television signal formats” that provides its antecedent basis in the claims.

Accordingly, for purposes of this Decision and based on the record before us, we construe “processing the digital representation of the intermediate frequency signal in accordance with the television signal format of the input RF signal” to require processing in accordance with the exactly one format in which each received input RF signal is encoded.

E. signal processor

Independent claim 1 recites a “signal processor,” which we construed as “a digital module that processes signals in the digital domain” in the Institution Decision of the related proceeding. *Silicon Labs.* at 8–9. Petitioner adopts that construction for the purpose of its Petition. Pet. 19. Although Patent Owner asserts that it disagrees with that construction, Patent Owner does not otherwise address how the term should be construed. Prelim. Resp. 9–10, 17–18. We see no compelling reason to modify our previous construction in this proceeding. For purposes of this Decision, therefore, we construe “signal processor” as a digital module that processes signals in the digital domain.

F. 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.”

Petitioner proposes that “indexes” be construed according to its plain and ordinary meaning, which Petitioner asserts is “points to a block of memory when retrieving a set of coefficients [of filter functions].” Pet. 19–

20. Patent Owner does not propose a construction of the term. For purposes of this decision, we adopt Petitioner's proposed construction.

IV. SECTION 325(d)

Petitioner challenged claims 1–17, 26, and 27 of the '792 patent in the '809 IPR, and we instituted trial of claims 1, 2, and 4–17. *See Silicon Laboratories* at 5–6, 30. Petitioner asserts that the Petition at hand was filed “to challenge the remaining claims that the Patent Owner may likely assert in the district court case before Petitioner is barred from doing so [by 35 U.S.C. § 315(b)].” Pet. 3. We recognize that it would be more convenient for the Board to have had all challenges raised at the same time. But we are not persuaded that it would be a prudent exercise of the discretion granted by § 325(d) to truncate the ability of a petitioner to make full use of the one-year window Congress expressly provided through § 315(b). *See* 35 U.S.C. §§ 314(a), 325(d); *see generally Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, Case IPR2013-00324, slip op. at 4 (PTAB Nov. 21, 2013) (Paper 19) (“Congress did not mandate that an *inter partes* review must be instituted under certain conditions. Rather, by stating that the Director—and by extension, the Board—*may not* institute review *unless* certain conditions are met, Congress made institution discretionary.”).

Further, we disagree with Patent Owner's contention that the Petition at hand relies upon substantially the same arguments that the Board considered and rejected in the '809 IPR.⁸ *See* Prelim. Resp. 3–8. Specifically, with regard to claim 26, the Petition at hand and the '809

⁸ By contending only that the Petition at hand relies upon substantially the same arguments as the '809 Petition, Patent Owner apparently concedes that the Petition at hand does not present the same or substantially the same prior art.

Petition differ in that Zenith and associated arguments were not previously presented to the Office. Regarding claim 27, the Petition at hand and the '809 Petition differ in that Zenith and Birleson, and associated arguments, were not previously presented to the Office. The Petition at hand and the '809 Petition also differ in that claims 18, 19, 24, 25, 28, and 29 were not challenged in the '809 IPR. As a consequence, the arguments related to the limitations of these claims were not previously considered. Further, the following prior art and associated arguments were not presented in the '809 Petition: Grumman (claims 24 and 25), Zenith (claim 28), Oku, Ericsson, and Nguyen (claims 18 and 19). Regarding claim 29, although Thomson and Harris were considered in the '809 Petition, the argument in the Petition at hand differs in that the additional limitation of claim 29 was not addressed in the '809 IPR.

Accordingly, we decline to exercise our discretion to deny the Petition under § 325(d).

V. ANALYSIS OF GROUNDS

A. *Thomson*

Thomson describes a broadcast receiver. Ex. 1004, col. 1, ll. 3–4. Figure 1 of Thomson is reproduced below.

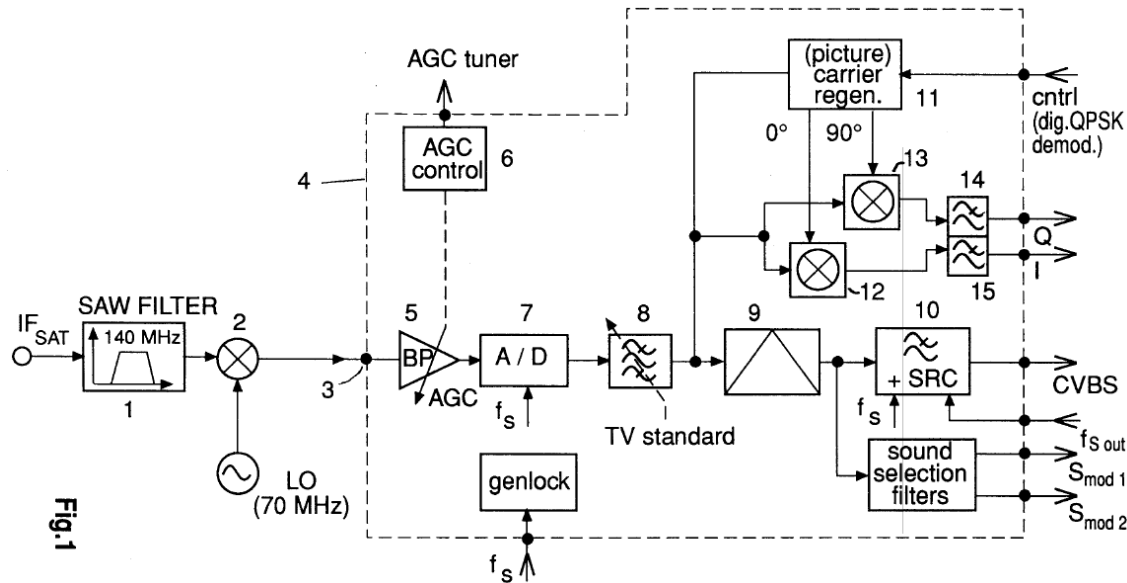


Figure 1 is a block diagram showing components of the broadcast receiver, which may receive incoming signal IF_{SAT} from an outdoor station. *Id.* at col. 2, ll. 30–31. Incoming signal IF_{SAT} is input to SAW filter 1 and results from the outdoor station supplying satellite channels already down-converted in a frequency band covering 950–1750 MHz. *Id.* at col. 1, l. 56 – col. 2, l. 1. Incoming signal IF_{SAT} is, therefore, an “input RF signal” as we have construed the term. Thomson teaches that the “proposed architecture allows a digitizing of the Sat-IF signals no matter that they are analog or digital ones.” *Id.* at col. 1, ll. 42–43.

Incoming signal IF_{SAT} is down-converted by SAW filter 1 and mixer 2, which respectively suppress adjacent channel components and achieve a “frequency transposition into an IF signal of around 75 MHz.” *Id.* at col. 2, ll. 30–33; col. 2, ll. 47–57. AGC amplifier 5 includes “an internal bandpass limitation”) (*id.* at col. 2, ll. 58–59) that prevents aliasing when A/D converter 7 digitizes the IF signal at a sampling frequency. *Id.* at col. 3, ll. 1–14. Bandpass filter 8 applies “an adaptively controlled bandwidth [to] select[] the desired signal with a minimal remainder of the adjacent channel

signals.” *Id.* at col. 3, ll. 16–19. FM demodulator 9 and low-pass filter 10 output a CVBS (“composite video baseband signal”), and synchronous demodulators 12 and 13 effect QPSK (“quadrature phase shift keying”) demodulation to provide quadrature (“Q”) and in-phase (“I”) signals. *Id.* at col. 2, ll. 37–44.

B. Harris

Harris discloses a digital tuner that uses “standard off the shelf DSP [integrated circuits] as digital replacements for the analog intermediate frequency (IF) processing stage in wideband receivers.” Ex. 1005, 1. As illustrated in Figure 6 of Harris, such wideband channelized receivers use an analog-to-digital converter to convert an incoming RF signal to an IF signal, which is subsequently processed by a set of finite impulse response filters. *Id.* at 5–6. Harris further teaches that “[i]n systems where the second IF filter stage consists of a bank of filters to support various operational modes, cost and board space can be saved [by] reconfiguring a single [digital decimation filter] to implement the filter required by each operational mode.” *Id.* at 5.

C. Claim 1

We recognize that claim 1 is not named expressly by Petitioner as a challenged claim. However, the challenged claims depend from independent claim 1, and therefore, it is appropriate to analyze Petitioner’s contentions regarding claim 1.

Patent Owner argues that the preamble of claim 1 is limiting and that Thomson does not disclose a television receiver. Prelim. Resp. 20. Thomson discloses this element. See Pet. 25; Ex. 1004, 1:3–4; 1:55–2:19; Ex. 1009 ¶ 38.

Patent Owner argues that Thomson does not disclose a frequency conversion circuit as claimed because Thomson's device down converts the alleged input RF signal and because it does not receive the alleged input RF signal directly from the medium of propagation. Prelim. Resp. 19– 26.⁹ This contention is not persuasive because, as detailed above, it is not commensurate in scope with claim 1.

With respect to the “processing” limitation, which is recited in foundation claim 1 as a function of the “signal processor,” Patent Owner contends that “Petitioner has failed to show that Thomson teaches or discloses this element.” Prelim. Resp. 26. Petitioner contends that Thomson's bandpass filter 8 is a “signal processor” that performs such “processing.” Pet. 26–30, 34–35. Consistent with our construction of “signal processor” as a digital module that processes signals in the digital domain, Petitioner observes that the “Thomson bandpass filter is a digital module because it is a circuit that receives digital input signals that are output from the A/D 7.” *Id.* at 29. We are persuaded further that Petitioner has made a sufficient showing that bandpass filter 8 of Thomson makes a selection based on the “TV standard” input to the filter. Petitioner supports its reasoning that such a selection “process[es] . . . in accordance with said format” with testimony by Douglas Holberg, Ph.D. *Id.* at 29 (citing Ex. 1009 ¶ 45).

⁹ Patent Owner cites to Exhibits 2003 and 2004. *See, e.g.*, Prelim. Resp. 8, 34. Patent Owner contends that these Exhibits are not new testimonial evidence under 37 C.F.R. § 42.107(c) because they were created for the '809 IPR. *Id.* We do not address this issue because Petitioner has not objected to this evidence. Further, in light of there being several relevant issues in the related proceeding, we see little purpose to be served by excluding Dr. Opris's testimony at this stage of this proceeding.

Patent Owner argues that Harris does not disclose Finite Impulse Response (FIR) filters as claimed, and that Petitioner has not provided a sufficient rationale for combining Thomson and Harris. Prelim. Resp. 31–40.

We are persuaded that Petitioner has demonstrated sufficiently that Harris discloses a FIR filter as claimed. *See* Pet. 17–21; Ex. 1009 ¶¶ 25–28. Patent Owner’s arguments regarding rationale are unpersuasive at this stage of the proceeding because they attack the wholesale substitution of the Thomson bandpass filter with the Harris digital decimating filters. *See* Prelim. Resp. 31–40. “The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference.” *In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

For these and additional reasons expressed in the Institution Decision for the ’809 IPR, Petitioner has made a sufficient showing with respect to foundation claim 1.¹⁰ *See Silicon Labs.* at 13–25.

D. Claim 29

Claim 29 depends from claim 1 and 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 that the multistandard receiver can receive each of terrestrial broadcast, satellite broadcast, and

¹⁰ Although our claim construction in this proceeding differs in certain respects from the preliminary claim construction in the ’809 IPR, those differences do not bear on the additional reasoning expressed in the Institution Decision for the ’809 IPR.

cable transmission. Pet. 35 (citing Ex. 1004, 1:55–2:3; Ex. 1009 ¶ 55). Implicit in Petitioner’s assertion is the interpretation that claim 29 requires the frequency conversion circuit to receive each of the three enumerated RF signals (i.e., terrestrial broadcast, satellite broadcast, or a cable transmission) individually, and does not require the frequency conversion circuit to receive a single RF signal that includes each of the three RF signals. Such interpretation is consistent with the Specification of the ’792 patent. *See, e.g.*, Ex. 1001, 4:53–55 (“[t]he input RF signals can be received from terrestrial broadcast or cable transmissions”).

Patent Owner contends that Thomson does not disclose a satellite, terrestrial, or cable receiver; rather, Thomson discloses an apparatus having an IF input.¹¹ Prelim. Resp. 41. As discussed in the analysis of claim 1 above, Petitioner has demonstrated adequately that Thomson discloses a “multi-standard tuner” capable of receiving television signals transmitted in the form of a satellite broadcast, terrestrial, and cable transmissions in the range of 950–1750 MHz. *See* Pet. 35.

E. Claims 24 and 25

Claim 24 depends from claim 1 and adds “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.”

Claim 25 depends from claim 1 and recites, “wherein the signal processor comprises a first computing unit and a second computing unit, the

¹¹ With claim 29 and each of the challenged claims, Patent Owner repeats the arguments made for claim 1. *See* Prelim. Resp. 41–50. These arguments are unpersuasive for the reasons given in the analysis of claim 1 above.

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 that the subject matter of claims 24 and 25 would have been obvious over Thomson, Harris, and Grumman. Pet. 35–42.

Patent Owner argues that Grumman discloses a FIR filter with two parallel processing paths, but fails to teach a plurality of finite impulse filters stored in memory as required by claim 24. Prelim. Resp. 42. Claim 24 requires that the plurality of FIR filters are stored in a memory, and does not preclude the FIR filters being configured in parallel. Consistent with this interpretation, the Specification describes that DSP 131 implements a FIR filter, and may include two computing units to speed up computation with the filtering operations of the real and imaginary parts in the frequency domain carried out in parallel. Ex. 1001, 5:64–6:5. Patent Owner’s contention is unpersuasive because it is not commensurate in scope with claim 24.

Patent Owner also argues that a person of ordinary skill in the art would not have combined Grumman, Harris, and Thomson as proposed by Petitioner because it would not have predictable results. Prelim. Resp. 42–43; Ex. 2003 ¶ 82. Petitioner provides argument and evidence why the technique involved was a well-known approach. Pet. 35–36, 40; Ex. 1009 ¶¶ 56, 59. Given the stage of the proceedings, and that the relevant inquiry is whether there is a reasonable expectation of success, we are persuaded that Petitioner has made a sufficient showing. *See in re O’Farrell*, 853 F.2d 894, 903–904 (Fed. Cir. 1988) (Absolute predictability that the substitution

will be successful is not required; all that is required is a reasonable expectation of success.).

F. Claims 26 and 28

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.”

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.”

Petitioner contends that the subject matter of claims 26 and 28 would have been obvious in view of Thomson, Harris, and Zenith. Pet. 42–48.

Patent Owner contends that Zenith’s microprocessor 22¹² does not generate a select signal indicative of a format of said input RF signal, and does not detect carrier signals in the input RF signal. Prelim. Resp. 44. Patent Owner’s argument is unpersuasive because it does not respond to the ground of unpatentability as asserted by Patent Owner. Specifically, Petitioner does not rely on Zenith alone for the disclosures that Patent Owner addresses; rather, Petitioner relies upon a combination of Thomson, Harris, and Zenith for these limitations. See Pet. 42–48; see also *In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986), citing *In re Keller*, 642 F.2d 413, 425 (CCPA 1981) (one cannot show nonobviousness by attacking

¹² Patent Owner refers to Zenith’s element 22 as “uP 22” and we refer to it as microprocessor 22. See Prelim. Resp. 44; Ex. 1001, 2:37; Fig. 1.

references individually where the rejections are based on combinations of references).

G. Claim 27

Claim 27 depends from claim 26 and recites, “wherein the format/standard selection circuit generates the select signal in response to an input signal from a user.”

Petitioner contends that the subject matter of claim 27 would have been obvious over Thomson, Harris, Zenith, and Birleson. Pet. 49–51.

Patent Owner argues that Birleson does not teach the standard selection circuit of claim 27. Prelim. Resp. 46. In particular, Patent Owner contends that Petitioner’s assertion that a user could initiate signal testing by changing the input source is incorrect because Birleson discloses that signal testing may be initiated by a channel change. Prelim. Resp. 46 (citing Ex. 1015, 11:20).

Patent Owner’s contention is not supported by the reference. Birleson does not disclose that a channel change is the only technique for initiating signal testing. To the contrary, signal testing in Automatic Carrier Detection (ACD) 30 depends on a number of factors. For example, if an operator switches the input (e.g., from antenna to videotape player), signal testing could be initiated. Ex. 1015, 10:52–56; 11:20, 27–34. For this reason Patent Owner’s argument is unpersuasive.

Patent Owner also argues that a person of ordinary skill in the art would not have combined the references as proposed by Petitioner because ACD 30 is used for determining when an analog signal has a suppressed carrier or a scramble signal and not for the purpose of allowing the user to determine the format of an RF signal. Prelim. Resp. 47. Although ACD 30

has the use alleged by Patent Owner (*see* Ex. 1015, 10:52–56), Patent Owner does not sufficiently address that ACD 30 is also used in signal testing as described above. For that reason, this argument is not persuasive.

H. Claims 18 and 19

Claim 19 depends from claim 18, which depends in turn from claim 1. Claim 18 requires that the first and second output terminals provide differential output signals indicative of video and audio information, both for an input RF signal in digital television format and for an input RF signal in analog television format.

Petitioner contends that the subject matter of claims 18 and 19 would have been obvious over Thomson, Harris, Oku, Ericsson, and Nguyen. Pet. 47–50.

Patent Owner argues that the references do not disclose differential output signals (video and audio) as claimed. Prelim. Resp. 47–49. This contention is inapposite because Petitioner acknowledges that the references do not explicitly disclose this limitation, but contends that such a multiplexing scheme would have been an obvious design choice because the outputs are normally mutually exclusive. *See* Pet. 56; Ex. 1009 ¶ 86.

Patent Owner contends that a person of ordinary skill in the art would not have combined the references as proposed by Petitioner. Prelim. Resp. 49. According to Petitioner, Thomson’s absence of a digital-to analog converter coupled between the signal processor and a demodulator and the objective to use a common A/D converter would have deterred investigation into the proposed combination. Prelim. Resp. 49–50 (citing Ex. 1004, 1:29–33; Ex. 2003 ¶ 105).

Patent Owner overstates the disclosure of Thomson. Although Thomson discloses use of a common A/D converter, Thomson does not disclose that any solution involving an increase in the number of electronic components is unlikely to be productive. *See* Ex. 1004, 1:29–33; *Cf. Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006)). At most, Thomson’s disclosure could be characterized as a disclosure that increasing the number of electronic components is an inferior solution. Even when so characterized, it does not amount to a teaching away. *See, e.g., In re Gurley*, 27 F.3d 551, 554 (Fed. Cir. 1994) (“[a] known or obvious composition does not become patentable simply because it has been described as somewhat inferior to some other product for the same use”).

The desire to reduce the number of electronic components is better characterized as a design tradeoff. *See Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006) (“a given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine.”). Patent Owner’s argument is unpersuasive because it does not balance the negative aspects of increasing the number of electronic components against the positive aspects of the combination asserted by Petitioner. *See Winner Int’l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 n.8 (Fed. Cir. 2000) (“The fact that the motivating benefit comes at the expense of another benefit, however, should not nullify its use as a basis to modify the disclosure of one reference with the teachings of another. Instead, the benefits, both lost and gained, should be weighed against one another.”).

Patent Owner argues that the references do not disclose a low pass filter as required by claim 19, and insertion of one would not have been a

matter of design choice because reducing the number of electronic components would have deterred a person of ordinary skill in the art from doing so. Prelim. Resp. 50. Our analysis of Patent Owner's previous argument is applicable here. At most, Patent Owner has identified a tradeoff and such a contention is not persuasive as Patent Owner has not weighed the positive and negative aspects of the proposed modification.

I. Conclusion

We conclude that Petitioner has demonstrated a reasonable likelihood of prevailing on its contention that claims 18, 19, and 24–29 are unpatentable under 35 U.S.C. § 103(a).

VI. ORDER

For the reasons given, it is:

ORDERED that *inter partes* review is *instituted* with respect to the following grounds of unpatentability:

- (1) claim 29 as unpatentable under 35 U.S.C. § 103(a) over Thomson and Harris;
- (2) claims 24 and 25 as unpatentable under 35 U.S.C. § 103(a) over Thomson, Harris, and Grumman;
- (3) claims 26 and 28 as unpatentable under 35 U.S.C. § 103(a) over Thomson, Harris, and Zenith;
- (4) claim 27 as unpatentable under 35 U.S.C. § 103(a) over Thomson, Harris, Zenith, and Birleson; and
- (5) claims 18 and 19 as unpatentable under 35 U.S.C. § 103(a) over Thomson, Harris, Oku, Ericsson, and Nguyen;

FURTHER ORDERED that no other ground of unpatentability is authorized for this *inter partes* review; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(a), *inter partes* review of the '792 patent is hereby instituted commencing on the entry date of this Order, and pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial.

IPR2015-00626
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