

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COMCAST CABLE COMMUNICATIONS, LLC,
Petitioner,

v.

ENTROPIC COMMUNICATIONS, LLC,
Patent Owner.

IPR2024-00442
Patent 9,825,826 B2

Before PATRICK R. SCANLON, BARBARA A. PARVIS, and
JON M. JURGOVAN, *Administrative Patent Judges*.

JURGOVAN, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. *Background and Summary*

Comcast Cable Communications, LLC (“Petitioner”) filed a Petition requesting *inter partes* review (“IPR”) of claims 1–18 of U.S. Patent No. 9,825,826 B2 (Ex. 1001, the “’826 patent”). Paper 2 (“Petition” or “Pet.”). Patent Owner, Entropic Communications, LLC, filed a Preliminary Response to the Petition. Paper 6 (“Prelim. Resp.”).

Under 35 U.S.C. § 314(a), an *inter partes* review may not be instituted unless the information presented in a petition and the preliminary response “shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” Upon consideration of the Petition and Preliminary Response, and accompanying exhibits and evidence, we determine Petitioner has established a reasonable likelihood that it would prevail with respect to at least one challenged claim in the *inter partes* review. Therefore, we grant institution of an *inter partes* review as to all of the challenged claims of the ’826 patent on all challenges in the Petition.

B. *Real Parties in Interest*

Petitioner identifies itself, Comcast Corporation, and Comcast Cable Communications Management, LLC as real parties-in-interest. Pet. vi (Petitioner’s Mandatory Notices).

Patent Owner identifies itself as the real party-in-interest. Paper 4, 1 (Patent Owner’s Mandatory Notices).

C. *Related Matters*

Petitioner and Patent Owner (“the parties”) identify the following as matters related to this proceeding:

Entropic Communications, LLC v. Cox Communications et al.,
2-23-cv-01049 (C.D. Cal.);

Entropic Communications, LLC v. Comcast Corporation et al.,
2-23-cv-01050 (C.D. Cal.) (“the Comcast case”);

Entropic Communications, Inc. v. Charter Communications, Inc., 2-22-cv-00125 (E.D. Tex.) (“the Charter case”); and

Cox Communications, Inc. et al. v. Entropic Communications, LLC, IPR2024-00578 (PTAB).

Pet. 89; Paper 4, 1.

Patent Owner identifies the following as patents related to this proceeding: U.S. Patent No. 8,792,008; U.S. Patent No. 9,203,653; U.S. Patent No. 10,063,436; and U.S. Patent No. 10,439,911. Paper 4, 1–2.

Patent Owner also identifies several other patents asserted by Patent Owner, and *inter partes* reviews sought by Petitioner against other patents of Patent Owner. Paper 4, 2–3.

D. The '826 Patent

The '826 patent is titled “Method and Apparatus for Spectrum Monitoring.” Ex. 1001, code (54). The '826 patent is directed to a receiver connected to a television and data service headend via a hybrid fiber coaxial (HFC) network. *Id.*, code (57). The receiver measures a characteristic of a received signal from the headend and controls transmission of network management messages back to the headend based on the measured characteristic. *Id.* The network management messages may comprise network status updates indicating whether one or more communication

parameters of received television or DOCSIS¹ channels are outside acceptable bounds. *Id.* at 3:60–67.

Figure 1A of the '826 patent is reproduced below.

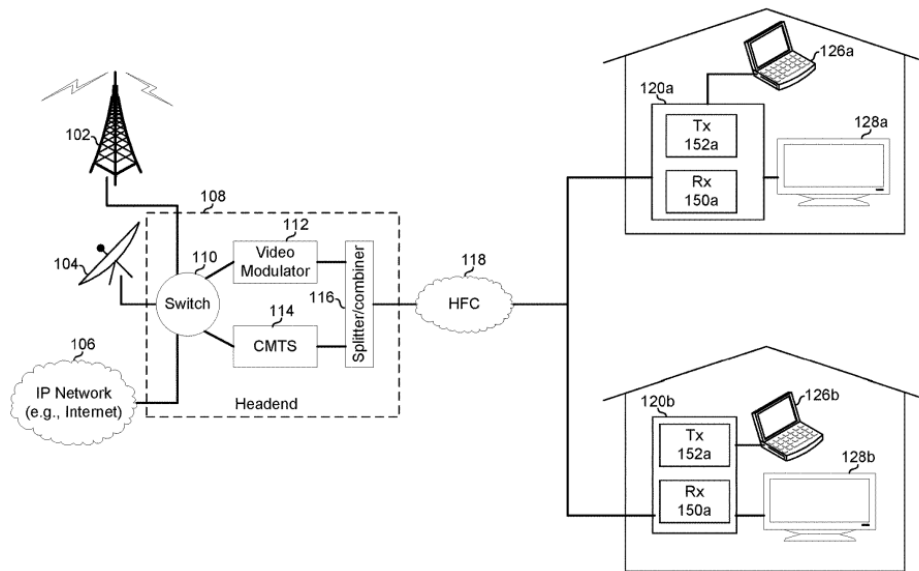


Figure 1A shows communication system headend 108 connected to receiving gateways 120a, 120b via hybrid fiber-coaxial (HFC) network 118. *Id.* at 2:45–3:15. Each gateway 120a, 120b may comprise a receive module 150 and a transmit module 152. *Id.* at 3:1–6.

Figure 1B of the '826 patent is reproduced below.

¹ Data Over Cable Service Interface Specification. Pet. 27.

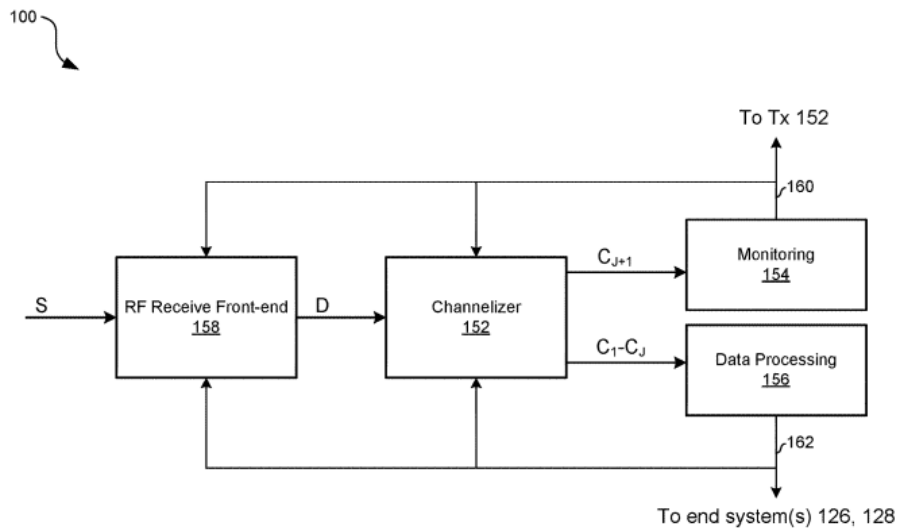


Figure 1B shows an example receiver operable to perform spectrum monitoring. *Id.* at 3:16–18. The receiver comprises circuit 100 including RF receive front-end module 158, channelizer module 102, monitoring module 154, and data processing module 156. *Id.* at 3:16–21. RF receive front-end module 158 receives an RF signal S and processes it to generate a digital signal D. *Id.* at 3:22–23. Channelizer 102 selects J+1 frequency bands (C_1 – C_J) and outputs them to monitoring module 154 and data processing module 156 for output to end systems 126, 128. *Id.* at 3:32–36. Monitoring module 154 analyzes band C_{J+1} from channelizer 102 to measure its characteristics. *Id.* at 3:45–47. The measured characteristic may be signal power level, delay, or phase shift versus frequency, or signal to noise ratio. *Id.* at 3:48–57. Monitoring module 154 may output control signal 160 to configure channelizer 102 or RF front-end receive module 158, or may control the transmission of network management/maintenance messages by the device 150, which may indicate television channels are outside acceptable bounds and/or convey measured/determined characteristics back to the headend. *Id.* at 3:60–4:5.

E. Challenged Claims

Claims 1 and 10 are independent. Claim 1 is a method claim, and claim 10 is a system claim. Claims 2–9 depend from claim 1, and claims 11–18 depend from claim 10.

Claim 1 is set forth below with Petitioner’s limitation identifiers indicated in brackets.

[1A] A method comprising:

[1B] performing by one or more circuits of a receiver coupled to a television and data service provider headend via a hybrid fiber coaxial (HFC) network:

[1C] receiving, via said HFC network, a signal that carries a plurality of channels, wherein said channels comprise one or both of television channels and data channels;

[1D] digitizing said received signal to generate a digitized signal;

[1E] selecting a first portion of said digitized signal; selecting a second portion of said digitized signal;

[1F] processing said selected second portion of said digitized signal to recover information carried in said plurality of channels;

[1G] analyzing said selected first portion of said digitized signal to measure a characteristic of said received signal; and

[1H] controlling the transmission of network management messages back to said headend based on said measured characteristic of said received signal, wherein said measured characteristic is different than said network management messages.

Ex. 1001, 7:33–55.

Claim 10 is set forth below with Petitioner's limitation identifiers indicated in brackets.

[10A] A system comprising:

[10B] a receiver configured to be coupled to a television and data service provider headend via a hybrid fiber coaxial (HFC) network, the receiver comprising:

[10C] front-end circuitry operable to:

receive a signal that carries a plurality of channels, wherein said channels comprise one or both of television channels and data channels; and

digitize said received signal to generate a digitized signal;

[10D] channelizer circuitry operable to:

select a first portion of said digitized signal; and

select a second portion of said digitized signal;

[10E] processing circuitry operable to process said selected second portion of said digitized signal to recover information carried in said plurality of channels;

[10F] monitoring circuitry operable to:

analyze said selected first portion of said digitized signal to measure a characteristic of said received signal; and

control the transmission of network management messages back to said headend based on said measured characteristic of said received signal, wherein said measured characteristic is different than said network management messages.

Ex. 1001, 8:15–39.

F. Evidence of Record

Petitioner relies upon the following prior art references²:

Name	Reference	Date	Exhibit No.
Kamieniecki	US 2005/0114879 A1	Published May 26, 2005	1009
Konstantinos	US 2010/0120386 A1	Published May 13, 2010	1010
Renken	US 8,649,421 B2	Issued Feb. 11, 2014	1011
Sadja	US 2005/0183130 A1	Published Aug. 18, 2005	1021
Salinger	US 2010/0299713 A1	Published Nov. 25, 2010	1022
Aggarwal	US 7,573,531 B1	Issued Aug. 11, 2009	1025

Petitioner also supports its challenges with a declaration from David B. Lett. Ex. 1002. Patent Owner does not rely on any declarant to support its contentions at this time.

² Petitioner alleges that all of the prior art references were filed, issued, or published before the '826 patent's earliest alleged priority date of August 30, 2001. Pet. 8, 11, 13, 19–21. Petitioner contends that all of these prior art references are prior art under 35 U.S.C. §§ 102(a), (b), and (e) (pre-Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011)). *Id.* Patent Owner does not refute these assertions at this time.

G. The Asserted Challenges to Patentability

Petitioner asserts the following challenges to patentability:

Ground	Challenged Claims	35 U.S.C. §³	Reference(s)
A	1–18	103(a)	Kamieniecki, Konstantinos
B	3, 12	103(a)	Kamieniecki, Konstantinos, Sadja
C	5, 14	103(a)	Kamieniecki, Konstantinos, Aggarwal
D	7, 16	103(a)	Kamieniecki, Konstantinos, Salinger
E	1–18	103(a)	Renken
F	5, 14	103(a)	Renken, Aggarwal

Pet. 22.

II. ANALYSIS AND DISCUSSION

In this section, we discuss Petitioner’s challenges to claims 1–18 of the ’826 patent and Patent Owner’s arguments for patentability. For the reasons that follow, we determine that Petitioner has presented a reasonable likelihood that at least one claim of the ’826 patent is unpatentable.

A. Legal Standards for Obviousness

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed invention and the prior art are such that

³ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011), amended 35 U.S.C. § 103, effective March 16, 2013. Because the application from which the ’826 patent issued was effectively filed before this date, the pre-AIA version of § 103 applies.

the claimed invention 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 the claimed invention 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) where present, objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

Petitioner contends as follows:

A person of ordinary skill in the art (a “POSITA”) at the time of the alleged invention would have had a degree in electrical engineering or a similar discipline, and three-to-four years of experience working with television signal processing and communication systems. Additional education may substitute for professional experience and significant work experience may substitute for formal education.

Pet. 24 (citing Ex. 1002 ¶¶ 44–46).

Patent Owner does not dispute Petitioner’s proposed level of skill in the art, which is consistent with the prior art references asserted by Petitioner. *Okajima v. Bourdeau*, 261 F.3d 1350, 1354–55 (Fed. Cir. 2001) (the applied prior art may reflect an appropriate level of skill). Accordingly, we agree with and will use Petitioner’s proposed level for this Decision.

C. Claim Construction

We construe the challenged claims under the same standard used by a federal court in a civil action under 35 U.S.C. § 282(b). 37 C.F.R.

§ 42.100(b). This standard is articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc) and its progeny, and includes “construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” 37 C.F.R. § 42.100(b). “Any prior claim construction determination concerning a term of the claim in a civil action . . . that is timely made of record in the *inter partes* review proceeding will be considered.” *Id.*

The parties indicate that the district court in the *Charter* case (2:22-cv-00125) construed “network management messages” in the claims of the ’826 patent to mean “messages which report on the network based on the measured characteristics.” Pet. 24–25 (citing Ex. 1020, 26–29); Prelim. Resp. 11. Petitioner contends this construction is consistent with the ordinary and customary meaning of the claim language. Pet. 25. In the *Comcast* case (2:23-cv-01050), the parties agreed that “network management messages” should be given its plain and ordinary meaning. Prelim. Resp. 11 (citing Ex. 2001, 2). Patent Owner asserts that its arguments “do not turn on the construction of ‘network management messages’ so there is no need to construe that, or any other, term of the ’826 Patent claims at this stage of the proceeding.” *Id.*

As there is no controversy between the parties regarding any claim language that we would need to resolve in order to render our decision in this case, we apply the ordinary and customary meaning of the claim terms without specific construction. *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (only claim terms in controversy

need to be construed, and only to the extent necessary to resolve the controversy).

Petitioner contends that the '826 patent's claims are not recited in means-plus-function form under § 112 ¶ 6. Pet. 25. On a contingent basis, however, in case we were to decide to the contrary, Petitioner identifies functions and structure in the '826 patent corresponding to certain claim language in the claims. *Id.* at 25–26. Patent Owner does not assert that the claims contain any means-plus-function limitations.

The word “means” does not appear in the claims of the '826 patent. When this is the case, there is a presumption that the claims do not recite means-plus-function limitations under § 112 ¶ 6. *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1348 (Fed. Cir. 2015) (en banc in relevant part). Since neither party offers any argument or evidence to contravene this presumption, we do not construe any claim term as means-plus-function in rendering our decision.

D. Ground A: Obviousness over Kamieniecki and Konstantinos

Petitioner contends that claims 1–18 would have been obvious to a POSITA over the combination of Kamieniecki and Konstantinos. Pet. 26–58. Patent Owner presents arguments for patentability concerning Petitioner's proposed motivation to combine, and claim limitations 1D, 1G, 1H, 10C and 10F. Prelim. Resp. 12–33. Patent Owner does not argue the remaining claim limitations.

On the current record, after considering the parties' arguments and evidence, we determine that Petitioner has shown a reasonable likelihood of prevailing to show unpatentability of at least one of the claims challenged in ground A for the following reasons.

1. *Kamieniecki (Ex. 1009)*

Kamieniecki is titled “Monitoring Signal Quality on a Cable Network.” Ex. 1009, code (54). Kamieniecki discloses a set-top box that monitors signal quality in downstream and upstream paths and sends related information to a headend as it is collected or when polled by the headend. *Id.* at code (57).

Kamieniecki’s Figure 1 is reproduced below.

FIG. 1

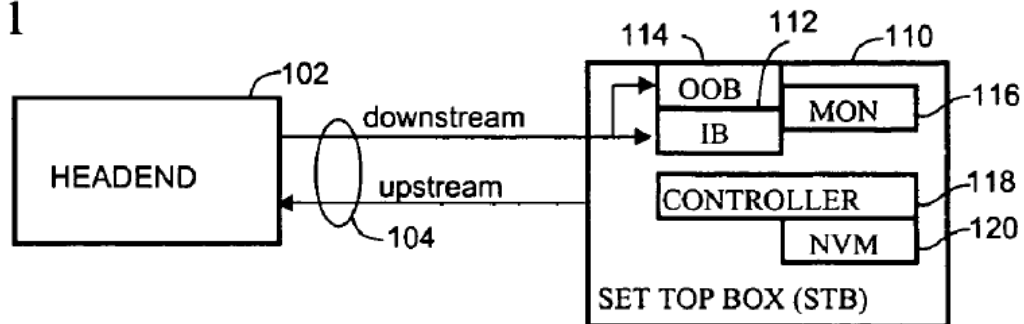


Figure 1 shows a cable system with a headend 102 and network of cables 104 connected to set-top box 110. *Id.* ¶ 13. Set-top box (STB) 110 has an in-band (IB) tuner 112 and out-of-band (OOB) tuner 114 so that it can receive in-band and out-of-band communications simultaneously. *Id.* In-band channels are used for video broadcasts, and out-of-band channels support communication between the set-top box and the headend. *Id.* ¶ 4. Monitor (MON) 116 generates information related to signal quality on the channels (either in-band or out-of-band, or both). *Id.* ¶ 14. Controller 118 controls the overall operation of the set-top box 110. *Id.* Non-volatile memory (NVM) 120 stores information relating to signal quality gathered by monitor 116. *Id.*

Monitor 116 may perform monitoring at periodic intervals, or idle times, and tunes to each channel in its channel map to collect statistics such

as channel absence/presence, error count, signal level estimates, and errors/dropouts, which may be transmitted to headend 102. *Id.* ¶¶ 14, 17.

2. *Konstantinos (Ex. 1010)*

Konstantinos is titled “Multi-Channel Receiver Architecture and Reception Method.” Ex. 1010, code (54). As background, Konstantinos discloses that television receivers of the time had a single tuner for a single channel, but recognized that the “evolving market for data and programming services will demand that receivers have the capability of multi-channel tuning.” *Id.* ¶ 1.

Konstantinos’s Figure 2 is reproduced below.

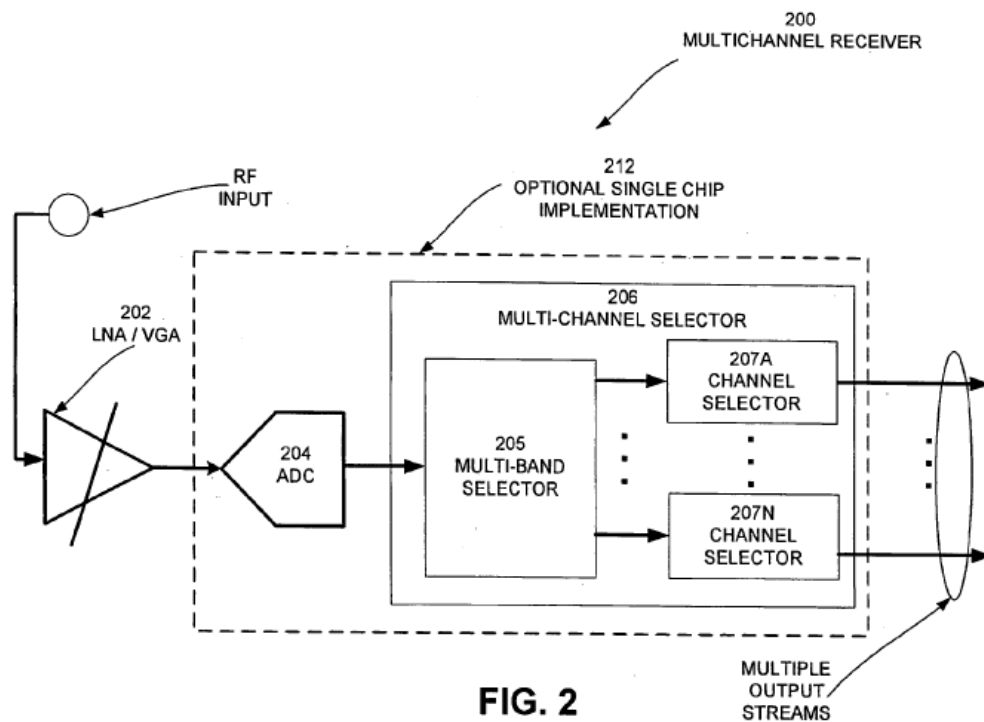


Figure 2 illustrates the logical components of Konstantinos’s multi-channel receiver 200 including low-noise-amplifier and variable gain amplifier (LNA/VGA) 202, analog-to-digital converter (ADC) 204, and multi-channel selector 206 including multi-band selector 205 and channel selectors 207A–207N. *Id.* ¶¶ 2, 42–43.

LNA/VGA 202 receives a composite broadband RF input signal (e.g., a cable TV signal with bundled channels) from an RF input. *Id.* ¶ 43. The output of the LNA/VGA is digitized by ADC 204 and output to multi-channel selector 206. *Id.*

Multi-channel selector 205 performs coarse channel selection by splitting the ADC output into sub-bands. *Id.* ¶ 45. Fine channel selection is performed by channel selectors 207 for delivery to the receiver output. *Id.* ¶ 46.

3. *Motivation to Combine*

Petitioner contends that a POSITA would have been motivated to replace the IB and OOB tuners in Kamieniecki's monitoring STB with Konstantinos's multi-channel receiver because Konstantinos recognized the demand for multi-channel tuning, and its single-chip solution would meet that demand. Pet. 27 (citing Ex. 1010, code (57), ¶¶ 1, 6, 8, 11, 16, 17, 42, 44, 107; Ex. 1002 ¶¶ 127–130, 150).

Petitioner also contends that a POSITA would have understood that Konstantinos offers the improvement of not having to replicate the broadband RF input signal for input to separate tuners, which would cause signal degradation. *Id.* at 28 (citing Ex. 1010 ¶¶ 6, 7, 43, 45, 49; Ex. 1002 ¶¶ 130–131). Instead, Konstantinos digitizes the RF input in its entirety, which purportedly saves cost and complexity. *Id.*

Petitioner further contends that a POSITA would have made the combination to enable simultaneous tuning of larger numbers of channels as required by newer cable technologies, and to provide for faster channel switching. Pet. 28 (citing Ex. 1010 ¶ 11; Ex. 1002 ¶ 149).

Petitioner asserts that combining Kamieniecki and Konstantinos “would be merely using known techniques (a multi-channel digital receiver) to improve similar devices (Kamieniecki’s STB having multiple TV tuners) to yield a predictable result (converting a received RF signal into multiple digital outputs).” *Id.* at 29 (citing Ex. 1002 ¶ 151).

Petitioner asserts that the problem addressed by Kamieniecki’s remote monitoring solution would still remain even when using Konstantinos’s receiver in the combined system. *Id.* (citing Ex. 1002 ¶ 132). According to Petitioner, a POSITA would have used Kamieniecki’s monitoring of channels and reporting back to the headend as merely combining prior art methods according to known methods to yield predictable results. *Id.* at 29–30 (citing Ex. 1002 ¶¶ 131–132).

Petitioner further asserts that a POSITA would have had a reasonable expectation of success in making the combination without undue experimentation because Kamieniecki’s in-band and out-of-band tuners use the same inputs (an RF signal) and outputs (digital signal of desired channel) as those of Konstantinos’s multi-channel receiver. *Id.* at 30. Petitioner adds that the POSITA would also be familiar with the design of RF receivers. *Id.*

Patent Owner argues that Petitioner’s proposed combination is based on hindsight because it alters Kamieniecki’s principle of operation such that a POSITA would not have pursued it. Prelim. Resp. 25–28. Specifically, Patent Owner asserts that Kamieniecki has a principle of operation that requires only gathering signal quality information when its STB 110 is idle. *Id.* at 25–26 (citing Ex. 1009 ¶¶ 8, 15, 17–18, 22, Fig. 2; Ex. 1012, 4). Thus, Patent Owner argues, Petitioner’s proposal to add Konstantinos’s multiple tuners so that signal quality information could be gathered at non-idle times

would destroy Kamieniecki's principle of operation because it has multiple tuners and yet teaches to gather signal quality information only during idle times. *Id.* at 26 (citing Pet. 36; Ex. 1002 ¶ 159).

On this record, Patent Owner has not shown that Kamieniecki's gathering signal quality information during idle times is a "basic principle of operation" or "would require a substantial reconstruction and redesign" of Kamieniecki and Konstantinos. *See In re Ratti*, 270 F.2d 810, 813 (CCPA 1959). Kamieniecki states that "information *may*, for example, be collected when the STB is in an idle state." Ex. 1009 ¶ 8 (emphasis added); *see also id.*, code (57), ¶¶ 17–18 (similar). Thus, Kamieniecki does not *require* collection of information only during idle times, but instead just mentions that it is a possibility. Patent Owner does not explain how this feature would constitute a "basic principle of operation" when Kamieniecki states it is optional. Furthermore, Patent Owner does not explain why Petitioner's proposed combination of Kamieniecki and Konstantinos would have required "substantial reconstruction and redesign" as discussed in *Ratti*. *Ratti*, 270 F.2d at 813.

Accordingly, Patent Owner's argument is unavailing. Petitioner has shown a reasonable likelihood that a POSITA would have combined Kamieniecki and Konstantinos with a reasonable expectation of success in making the combination.

4. *Claim 1*

We now address Petitioner's contentions that the combination of Kamieniecki and Konstantinos shows each limitation of claim 1, and Patent Owner's arguments for patentability concerning the motivation to combine and limitations 1D, 1G, and 1H. Pet. 30–40; Prelim. Resp. 28–33. Patent

Owner does not dispute Petitioner’s contentions for the remaining limitations.

a) Preamble 1A: Method

The preamble of claim 1 recites a “a method comprising.”

Petitioner’s undisputed contention is that the preamble is not limiting, but even if it were, the Kamieniecki-Konstantinos combination teaches the claimed system.⁴ Pet. 30 (citing Ex. 1002 ¶¶ 133–134).

Petitioner has shown a reasonable likelihood that the Kamieniecki-Konstantinos combination discloses a method so we do not need to decide whether the preamble is limiting.

b) Limitation 1B: Performing

Limitation 1B recites “performing by one or more circuits of a receiver coupled to a television and data service provider headend via a hybrid fiber coaxial (HFC) network.”

Petitioner undisputedly contends that the Kamieniecki-Konstantinos combination shows limitation 1B. Pet. 30–31 (citing Ex. 1002 ¶¶ 135–140). Specifically, Petitioner asserts that Kamieniecki describes a STB 110 (“receiver”) coupled to headend 102 (“headend”) by a combination of coaxial cable and fiber optic cable (“hybrid fiber coaxial (HFC) network”). *Id.* at 30 (citing Ex. 1009 ¶¶ 5, 13–22, Fig. 1; Ex. 1002 ¶¶ 135–137).

Petitioner argues that a POSITA would have understood that set-top-boxes are “coupled to a television and data service provider headend” so that

⁴ Claim 1 is directed to a method, not a system. However, Petitioner cites the testimony of its declarant, Mr. Lett, who states that the combination discloses a method. Ex. 1002 ¶ 134.

television channels may be watched and data may be received. *Id.* at 30–31 (citing Ex. 1009 ¶¶ 1–2, 13; Ex. 1002 ¶ 138).⁵

Petitioner has shown a reasonable likelihood that the Kamieniecki-Konstantinos combination discloses limitation 1B.

c) Limitation 1C: Receiving

Limitation 1C recites “receiving, via said HFC network, a signal that carries a plurality of channels, wherein said channels comprise one or both of television channels and data channels.”

Petitioner undisputedly contends that the Kamieniecki-Konstantinos combination shows limitation 1C. Pet. 31 (citing Ex. 1002 ¶¶ 141–143). Specifically, Petitioner asserts that Kamieniecki’s STB receives IB and OOB channels (“signal”) from headend 102, and the IB channels comprise audio and video content of television programs (“television channels”), and the OOB channels comprise program guide tuning data and polling instructions (“data channels”). Pet. 31 (citing Ex. 1009 ¶¶ 1–5, 8–9, 13–14, 17, 23–25; Ex. 1002 ¶ 142). Petitioner refers back to its showing for limitation 1B apparently for the part of limitation 1C stating that the signal carries the television and data channels, and is received at the STB via the HFC network. Pet. 31 (citing Pet. § VI.A.2.b).

Petitioner has shown a reasonable likelihood that the Kamieniecki-Konstantinos combination discloses limitation 1C.

⁵ Petitioner does not specifically indicate that Kamieniecki’s receiver includes “one or more circuits,” but Petitioner’s declarant indicates that the combination includes this feature. Ex. 1002 ¶¶ 135–136, 140.

d) Limitation 1D: Digitizing

Limitation 1D recites “digitizing said received signal to generate a digitized signal.”

Petitioner contends that Konstantinos discloses limitation 1D. Pet. 32–33 (citing Ex. 1002 ¶¶ 144—148, 152). Specifically, Petitioner contends that Konstantinos discloses an ADC converter 204 that is part of its multi-channel receiver 200, which digitizes the RF input signal in its entirety, including the IB and OOB channels, and outputs a digitized equivalent. *Id.* at 32–33 (citing Ex. 1010 ¶¶ 11, 43, 48–49, 104–105, 114–116).

Patent Owner argues that Kamieniecki’s monitor 116 is “analog-only” and thus does not process digital output streams from its receiver, as allegedly required by limitation 1D. Prelim. Resp. 28–33. Patent Owner does not identify sufficient evidence, however, to support its argument. Moreover, Patent Owner’s argument is contradicted by Kamieniecki disclosing “digital cable systems” as background for its disclosure, which would imply that Kamieniecki’s monitor is not “analog-only.” Ex. 1009 ¶ 2. On this record, Patent Owner’s argument does not undermine Petitioner’s showing for this limitation.

Petitioner shows a reasonable likelihood that the Kamieniecki-Konstantinos combination discloses limitation 1D.

e) Limitation 1E: Selecting

Limitation 1E recites “selecting a first portion of said digitized signal; selecting a second portion of said digitized signal.”

Petitioner contends that Konstantinos discloses limitation 1E, a contention that Patent Owner does not dispute.⁶ Pet. 33–37 (citing Ex. 1002 ¶¶ 153–161). Specifically, Petitioner contends that Konstantinos discloses a multi-channel selector 206 which includes a multi-band selector 205 and multiple channel selectors 207A–N, which select channels from the digitized broadband input signal and output them concurrently. Pet. 33–34 (citing Ex. 1010 ¶¶ 44–51, 117, Figs. 2, 3; Ex. 1002 ¶¶ 153–158). Petitioner asserts that Konstantinos states that “any combination of the available channels in the original composite signal can be selected and delivered to the output.” *Id.* at 35–36 (citing Ex. 1010 ¶¶ 105–106). In the proposed combination, Petitioner argues that some channels (“first portion”) are selected for monitoring, while some channels (“second portion”) are selected for viewing by a user. *Id.* at 36 (citing Ex. 1002 ¶ 158).

Petitioner shows a reasonable likelihood that Konstantinos discloses limitation 1E.

f) Limitation 1F: Processing

Limitation 1F recites “processing said selected second portion of said digitized signal to recover information carried in said plurality of channels.”

Petitioner contends that Kamieniecki and Konstantinos both disclose limitation 1F, and Patent Owner does not dispute Petitioner’s assertion. Pet. 37–38 (citing Ex. 1002 ¶¶ 162–166). Specifically, Petitioner asserts that Kamieniecki discloses that the IB channels include MPEG-2 transport

⁶ Patent Owner argues that Petitioner’s reason to combine the prior art references, presented in relation to this limitation, would change Kamieniecki’s principle of operation by ignoring its teaching to monitor channels only during idle times. Prelim. Resp. 17–18, 25–28. We addressed this argument in § II.D.3 and found it unavailing.

streams, which contain content of the television channel. *Id.* at 37 (citing Ex. 1009 ¶ 4). Petitioner argues that Kamieniecki’s STB “obviously would have a decoder to process the MPEG-2 stream (‘recover information carried in said plurality of channels’) in order for the subscriber to view the content.” *Id.* (citing Ex. 1009 ¶ 13; Ex. 1002 ¶¶ 163–164). Petitioner further states that Kamieniecki discloses processing OOB communications to receive instructions (“recover information carried in said plurality of channels”). *Id.* (citing Ex. 1009 ¶ 13; Ex. 1002 ¶ 164).

Petitioner further contends that Konstantinos discloses channel and source decoders used to process a TV channel, such as an MPEG stream, and recover its content for viewing by a user (“recover information carried in said plurality of channels”). *Id.* at 37–38 (citing Ex. 1010 ¶¶ 30, 42, 106–107, 117–119; Ex. 1002 ¶ 165). Petitioner asserts that Konstantinos further discloses an “information extraction digital signal processor (IEP)” which processes information from received channel(s) to improve reception quality (“recover information carried in said plurality of channels”). *Id.* at 38 (citing Ex. 1010 ¶¶ 108–111, 120; Ex. 1002 ¶ 165).

Petitioner shows a reasonable likelihood that the Kamieniecki-Konstantinos combination discloses limitation 1F.

g) Limitation 1G: Analyzing

Limitation 1G recites “analyzing said selected first portion of said digitized signal to measure a characteristic of said received signal.”

Petitioner asserts that Kamieniecki discloses a monitor 116, which monitors signal quality of the channels that it receives (“analyzing said selected first portion of said digitized signal”). Pet. 38 (citing Ex. 1009 ¶¶ 6–7, 14–16, 24, Fig. 1; Ex. 1002 ¶¶ 167–169). Petitioner asserts that

monitor 116 analyzes the digital signal it receives from the IB and/or OOB tuners and determines signal quality information (“measure a characteristic of said received signal”) such as error count and signal level estimates. *Id.* (citing Ex. 1009 ¶¶ 7, 14, 22, Fig. 1; Ex. 1002 ¶ 168). In the Kamieniecki-Konstantinos combination, Petitioner contends that monitor 116 would receive for analysis one or more digital output streams from Konstantinos’s receiver 200. *Id.* (citing Ex. 1002 ¶ 170).

Patent Owner argues that Kamieniecki’s monitor 116 is “analog only” and does not disclose analyzing a digitized signal. Prelim. Resp. 28–32. As explained for the “digitizing” of limitation 1D (*see* § II.D.4.d), on this record, Patent Owner provides insufficient evidence to support its argument that Kamieniecki’s monitor 116 is “analog only.” In addition, Kamieniecki discloses “digital cable systems” as background for its disclosure, which would imply that Kamieniecki’s monitor is not “analog-only.” Ex. 1009 ¶ 2. Patent Owner’s argument is unavailing.

h) Limitation 1H: Controlling

Limitation 1H recites “controlling the transmission of network management messages back to said headend based on said measured characteristic of said received signal, wherein said measured characteristic is different than said network management messages.”

Petitioner contends that Kamieniecki discloses that it efficiently detects and diagnoses plant faults and issues, and that it may send information back to the headend as it is collected. Pet. 39 (citing Ex. 1009 ¶¶ 6–8, 14, 17; Ex. 1002 ¶¶ 172–173). Petitioner asserts that Kamieniecki discloses sending back to the headend “channel presence/absence” information (“network management messages”). *Id.* (citing Ex. 1009

¶¶ 14–24; Ex. 1002 ¶ 173). Petitioner argues that Kamieniecki discloses measuring “signal level” and “error count” (“characteristics”) and alleges that it would have been obvious to a POSITA to use these measured characteristics as a basis for the determination of “channel absence/presence” information. *Id.* (citing Ex. 1009 ¶¶ 7, 14, 22; Ex. 1002 ¶ 173). Petitioner further contends that the “channel absence/presence” information is different from the measured characteristic (“wherein said measured characteristic is different than said network management messages”). *Id.* (citing Ex. 1002 ¶ 173).

Patent Owner argues that the Kamieniecki-Konstantinos combination fails to disclose limitation 1H. Prelim. Resp. 32–33. Specifically, Patent Owner asserts that Petitioner’s combination removes Kamieniecki’s OOB tuner, which is what provides a return cable path from the STB to the headend. *Id.* at 32 (citing Ex. 1009 ¶¶ 2, 4, 17). Thus, according to Patent Owner, Petitioner’s combination could not report any messages back to the headend.

We do not agree with Patent Owner’s argument. Kamieniecki’s Figure 1 shows that IB tuner 112 and OOB tuner 114 are connected to receive the *downstream* signal from the headend, but it does not show internal specifics regarding how *upstream* signal 104 is generated. Although Patent Owner cites various paragraphs of Kamieniecki as supporting its contention that replacing Kamieniecki’s IB and OOB tuners with Konstantinos’s multi-channel receiver would eliminate the capability of the STB to report back messages to the headend (Ex. 1009 ¶¶ 2, 4, 17), we find no evidence in those paragraphs that replacing Kamieniecki’s *tuners* of the *receiver* used to receive the *downstream* signal would have any effect on

transmitters and other components of the receiver generating the *upstream* signal. Thus, Patent Owner’s argument does not undermine Petitioner’s showing.

i) Objective Evidence

Patent Owner argues that objective evidence of nonobviousness supports patentability of the ’826 patent’s claims. Prelim. Resp. 12–17. Specifically, Patent Owner contends that the ’826 patent was built on a technology called “Full-Spectrum Capture” (FSC), which captures the entire usable frequency range (around 1GHz) that is received at the customer’s premises. *Id.* at 12 (citing Ex. 1001, 5:56–62; Ex. 2002; Ex. 2003; Ex. 2004, 2; Ex. 2005, 20:20–21:3). Patent Owner contends that the inventors “had an elegant, but simple, ‘Eureka!’ moment” when they realized that FSC-enabled integrated circuits already incorporated in equipment at customer’s premises could be leveraged to capture and report local cable-plant spectra, enabling operators to monitor, manage, and troubleshoot their networks. *Id.* at 14 (citing Ex. 2004, 2). According to Patent Owner, with the FSC-enabled integrated circuits incorporated into customer-premises equipment, they could use a channelizer and have a dedicated path to circuits to measure spectrum, power, and channel quality. *Id.* at 13–14 (citing Ex. 2005, 18:25–20:2).

Patent Owner further contends that the invention’s dedicated path to the monitoring circuit permitted signal analysis to happen in parallel with a user watching a particular television channel. *Id.* at 14 (citing Ex. 2005, 20:6–13). Patent Owner argues that “[i]n addition to monitoring the signal, the inventors realized that, if signal processing was happening in parallel, the customer premises equipment could be sending information to the network

all the time” and that if this technology was employed in many cable modems, operators would get real-time information about their distributed cable systems, reducing costs and the number of “truck rolls” needed to investigate network issues. *Id.* (citing Ex. 2004, 1–3; Ex. 2005, 20:6–19). Patent Owner asserts that MaxLinear, the company that employed the inventors of the ’826 patent, “referred to this inventive use of Full-Spectrum Capture as Remote Spectrum Analysis.” *Id.*

Patent Owner argues that FSC had been in existence since at least 2010 but the industry did not recognize it could be used for proactive network maintenance by June 2011, which is “around the alleged priority date of the ’826 patent.” *Id.* at 14–15. According to Patent Owner, Broadcom Corporation developed its own version of FSC called “Full-Band Capture” but did not mention that this technology could be used to support network maintenance in a 2011 paper describing its benefits to operators. *Id.* at 15 (citing Ex. 2006, 3, 5; Ex. 2007, 17 n.1). Patent Owner further argues that Cable Television Laboratories, Inc. (“CableLabs”), the research company that puts out the DOCSIS standards, indicated two years after MaxLinear’s FSC that the best practice for proactive network maintenance was to use “pre-equalization coefficients” to potentially isolate network issues. *Id.* at 15–16 (citing Ex. 2008, 1).

Patent Owner contends “[i]t was only *after* MaxLinear made the novel and non-obvious invention of the ’826 [patent] . . . that . . . the rest of the cable industry caught up and made a fundamental shift in how network service providers maintained their networks.” *Id.* at 16 (citing Ex. 2007, 18) (emphasis in original). Specifically, Patent Owner contends that, in 2016, CableLabs released a best-practices document lauding FSC to support

remote spectrum monitoring and its “significant operational advantages not to mention operational cost savings” to network service providers. *Id.* (citing Ex. 2007, 18).

Patent Owner contends that the Petition’s characterization of the challenged claims and their differences from the Petition’s asserted prior art may seem simple now, but only because “[m]any things . . . seem obvious after they have been done.” *Id.* (alterations in original) (citing *Diamond Rubber Co. of New York v. Consol. Rubber Tire Co.*, 220 U.S. 428, 434–35 (1911)). Patent Owner asserts that “[t]he objective evidence above proves that out.” *Id.* Patent Owner argues that “the Petition fails to meet its burden because it fails to understand that the reasons the prior art and challenged claims are different is not because of obvious extension, but because of invention,” and “[t]he Petition’s hindsight cannot overcome that fact.” *Id.* at 16–17.

In order to accord substantial weight to objective evidence of non-obviousness, the evidence must have a nexus to the claims. *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1373 (Fed. Cir. 2019). Beyond general assertions, Patent Owner does not demonstrate nexus of the alleged objective evidence of nonobviousness to the claims of the ’826 patent. For example, Patent Owner does not explain how the claims embody FSC, simultaneous viewing and monitoring, remote system monitoring and analysis, provision of real-time information of distributed cable systems, etc. Accordingly, on the present record, we do not accord substantial weight to Patent Owner’s objective evidence.

j) Conclusion for Claim 1

On the current record, Petitioner demonstrates a reasonable likelihood that a POSITA would have been motivated to combine Kamieniecki and Konstantinos, notwithstanding Patent Owner's arguments to the contrary. Petitioner also demonstrates sufficiently that a POSITA would have had a reasonable expectation of success in making the combination, which Patent Owner does not dispute. Petitioner further shows sufficiently that each limitation of claim 1 is disclosed or suggested by the combination of Kamieniecki and Konstantinos, notwithstanding Patent Owner's arguments. Patent Owner's proffer of objective evidence of nonobviousness does not overcome Petitioner's contentions on this record. Accordingly, Petitioner presents a reasonable likelihood that claim 1 would have been obvious over the combination of Kamieniecki and Konstantinos.

5. Claim 10

We now address Petitioner's contentions that the combination of Kamieniecki and Konstantinos shows each limitation of claim 10, and Patent Owner's arguments for patentability concerning limitations 10C and 10F. Pet. 54–56; Prelim. Resp. 17–33. The parties' contentions for claim 10 are similar to those presented for claim 1.

a) Limitation 10A: System

Limitation 10A is a preamble reciting “[a] system comprising.”

Petitioner contends that claim 10 is a system claim that is a counterpart of method claim 1. Pet. 54 (citing Ex. 1002 ¶ 218). Petitioner asserts that the preamble is not limiting, but argues, in any case, the claimed elements are rendered obvious by the Kamieniecki-Konstantinos combination. *Id.* (citing Ex. 1002 ¶ 219).

Patent Owner does not dispute Petitioner's contention concerning preamble limitation 10A.

As the elements Petitioner identifies in the combination of Kamieniecki and Konstantinos as disclosing the limitations of claim 10 together comprise a system, we do not decide whether the preamble is limiting.

Petitioner shows sufficiently that preamble limitation 10A is disclosed by the combination.

b) Limitation 10B: Receiver

Limitation 10B recites “a receiver configured to be coupled to a television and data service provider headend via a hybrid fiber coaxial (HFC) network, the receiver comprising.”

Petitioner contends that the “receiver” reads on Kamieniecki's set-top box 110 performing as discussed for limitation 1B. Pet. 54 (citing Pet. § VI.A.2.b; Ex. 1002 ¶¶ 220–221).

Patent Owner does not dispute Petitioner's contention.

c) Limitation 10C: Front-End Circuitry

Limitation 10C recites “front-end circuitry operable to: receive a signal that carries a plurality of channels, wherein said channels comprise one or both of television channels and data channels; and digitize said received signal to generate a digitized signal.”

Petitioner asserts that “receive” and “digitize” limitations were discussed regarding limitations 1C and 1D, and the “front-end circuitry” reads on Konstantinos's LNA/VGA 202 and ADC 204, which would perform those operations when combination with the Kamieniecki STB.

Pet. 54 (citing Ex. 1002 ¶¶ 222–223; Ex. 1010 ¶¶ 43, 116, Fig. 2; Pet. § VI.A.2.c–d).

Patent Owner disputes the “digitize” limitation (Prelim. Resp. 28–33), which we find unavailing for the reasons explained for limitation 1D in § II.D.4.d.

d) Limitation 10D: Channelizer Circuitry

Limitation 10D recites “channelizer circuitry operable to: select a first portion of said digitized signal; and select a second portion of said digitized signal.”

Petitioner contends that the “select” limitation is shown as discussed for limitation 1E, and that the “channelizer circuitry” reads on Konstantinos’s multi-channel selector 206, which performs the recited operations. Pet. 55 (citing Ex. 1002 ¶¶ 224–225; Pet. § VI.A.2.e).

Patent Owner does not dispute these contentions.

e) Limitation 10E: Processing Circuitry

Limitation 10E recites “processing circuitry operable to process said selected second portion of said digitized signal to recover information carried in said plurality of channels.”

Petitioner contends that the “process” limitation is shown as discussed for limitation 1F, and the “processing circuitry” reads on Kamieniecki’s decoders, Konstantinos’s channel and source decoders, or Konstantinos’s IEP, which perform the recited operations as discussed for limitation 1F. Pet. 55 (citing Ex. 1002 ¶¶ 226–227; Pet. § VI.A.2.f).

Patent Owner does not dispute Petitioner’s contentions.

f) Limitation 10F: Monitoring Circuitry

Limitation 10F recites “monitoring circuitry operable to: analyze said selected first portion of said digitized signal to measure a characteristic of said received signal; and control the transmission of network management messages back to said headend based on said measured characteristic of said received signal, wherein said measured characteristic is different than said network management messages.”

Petitioner contends that the “analyze” limitation is shown as discussed for limitation 1G, and the “control transmission” step as discussed for limitation 1H. Pet. 55. Petitioner further asserts that the “monitoring circuitry” reads on Kamieniecki’s monitor 116 and controller 118, which perform those operations. *Id.* at 55–56 (citing Ex. 1009 ¶¶ 6–8, 14–16, 24; Ex. 1002 ¶¶ 228–229; Pet. § VI.A.2.g–h).

Patent Owner disputes the “analyze” limitation (Prelim. Resp. 28–33) but for the reasons discussed for limitation 1G in § II.D.4.g, we find those arguments unavailing. Patent Owner also disputes the “control transmission” limitation (Prelim. Resp. 32–33), which we find unavailing for reasons explained in § II.D.4.h.

g) Conclusion for Claim 10

Petitioner shows a reasonable likelihood that a POSITA would have combined Kamieniecki and Konstantinos with a reasonable expectation of success, and that each limitation of claim 10 is shown by the combination. Accordingly, Petitioner presents a reasonable likelihood that claim 10 would have been obvious over the combination of Kamieniecki and Konstantinos notwithstanding Patent Owner’s arguments.

6. *Claims 2–9 and 11–18*

We now address Petitioner’s contentions that the limitations of dependent claims 2–9 and 11–18 are disclosed by the combination of Kamieniecki and Konstantinos. Patent Owner does not present any arguments specific to the dependent claims, and we have already addressed Patent Owner’s arguments with respect to the independent claims.

Claims 2–9 depend from claim 1 of the ’826 patent, and claims 11–18 depend from claim 10. Claims 2–9 are method claims that recite parallel limitations to system claims 11–18, respectively.

Claims 2 and 11 recite “wherein said network management messages indicate whether a parameter is outside of acceptable bounds.”

Petitioner contends that Kamieniecki reports “channel presence/absence” for a monitored channel to the headend, and a POSITA would have understood that this would include whether the channel’s signal level or error count was outside acceptable bounds. Pet. 40–41 (citing Pet. § VI.A.2.h; Ex. 1002 ¶¶ 176–178), 56.

Petitioner’s evidence shows sufficiently that Kamieniecki’s “channel absence” amounts to a parameter that indicates the channel is outside of acceptable bounds. Petitioner shows a reasonable likelihood that claims 2 and 11 would have been obvious over the combination of Kamieniecki and Konstantinos.

Claims 3 and 12 depend from claims 2 and 11, respectively, and recite “wherein said parameter is a modulation parameter of said received signal.”

Petitioner contends that the ’826 patent describes that a “modulation parameter” relates to the “type and/or amount of modulation.” Pet. 41 (citing Ex. 1001, 3:45–49; Ex. 1002 ¶¶ 179–180), 56. Petitioner asserts that

a POSITA would have understood that the Kamieniecki-Konstantinos combination would need to determine the type of modulation in the channel in order to process digital television content. *Id.* at 41 (citing Ex. 1009 ¶¶ 13–14; Ex. 1002 ¶ 180). Petitioner also argues that “error count” and “errors/dropouts” of Kamieniecki would include errors occurring in the modulation (or demodulation) of that channel. *Id.* (citing Ex. 1009 ¶¶ 13–15, 20, 22; Ex. 1002 ¶ 180).

Petitioner does not explain sufficiently why the combination’s receiver would send a modulation parameter indicating the type or amount of modulation back to the headend that modulated and transmitted the “received signal” in the first place, and thus would already know what the modulation parameter was. Petitioner does not show a reasonable likelihood that claims 3 and 12 would have been obvious to a POSITA.

Claims 4 and 13 recite “wherein said parameter is a transmit power of said received signal.”

Petitioner contends that Kamieniecki-Konstantinos’s sending “channel absence/presence” to the headend based on measuring signal level at the monitor 116 discloses these claims. Pet. 43–44 (citing Pet. §§ VI.A.2.h, VI.A.3; Ex. 1009 ¶¶ 14, 22–23; Ex. 1002 ¶¶ 186–189), 56.

Petitioner shows sufficiently on this record that Kamieniecki’s STB “channel absence/presence” may be based on “signal level estimates” sent to the headend. *See, e.g.*, Ex. 1009 ¶ 14. Petitioner shows a reasonable likelihood that claims 4 and 13 would have been obvious.

Claims 5 and 14 recite “wherein said parameter is a frequency offset of said received signal.”

Petitioner again relies on the Kamieniecki-Konstantinos combination’s “channel presence/absence” as disclosing these claims because of its dependence on frequency offset. Pet. 44–45 (citing Ex. 1001, 3:11–15; Ex. 1009 ¶¶ 13–14; Ex. 1010 ¶¶ 42–46; Ex. 1002 ¶¶ 191–192), 56.

Neither reference mentions frequency offset, however, and Petitioner does not sufficiently explain why a POSITA would have considered it desirable to send frequency offset information to the headend. Petitioner does not show a reasonable likelihood that claims 5 and 14 would have been obvious over the Kamieniecki-Konstantinos combination.

Claims 6 and 15 recite “wherein said characteristic is signal power vs. frequency.”

Petitioner contends that Kamieniecki describes measuring signal level (“signal power”) for each of the channels it monitors, and that reporting “channel presence/absence” to the headend would include whether signal power is out of bounds. Pet. 46–47 (citing Pet. §§ VI.A.2.g–h; Ex. 1009 ¶¶ 14–15, 22–23; Ex. 1002 ¶¶ 198–200), 57.

We do not agree that reporting “channel presence/absence” or “signal level estimates” to the headend is equivalent to reporting “signal power vs. frequency.” Although “channel presence/absence” may reflect whether signal level is “outside of acceptable bounds” it is not per se “signal power vs. frequency.” Petitioner does not show a reasonable likelihood that claims 6 and 15 would have been obvious.

Claims 7 and 16 recite “wherein said characteristics is signal phase vs. frequency.”

Petitioner contends that Kamieniecki’s STB measures signal quality information but does not explicitly mention “signal phase.” Pet. 47–48

(citing Ex. 1009 ¶¶ 4–5, 14–23; Ex. 1002 ¶¶ 201–202), 57. Petitioner asserts that Konstantinos indicates that “phase noise” is one of the “dominant noise contaminating mechanisms” and argues it would have been obvious to report “signal phase v. frequency” to the headend. *Id.* at 47 (citing Ex. 1002 ¶ 202).

Petitioner’s evidence does not show that Konstantinos’s “phase noise” is equivalent to “signal phase vs. frequency.” Petitioner’s evidence does not show a reasonable likelihood that this feature would have been obvious.

Claims 8 and 17 recite “wherein said characteristic is one of: signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate.”

Petitioner contends that Kamieniecki monitors signal qualities including error count of each monitored channel, and a POSITA would have understood that bit error rate and symbol error rate were well-known examples of error counts. Pet. 49 (citing Ex. 1009 ¶¶ 14, 22–23; Ex. 1002 ¶¶ 207–208), 57. Petitioner further contends that Konstantinos monitors bit-error-rate and signal-to-noise ratio, which requires measurement of noise levels. *Id.* (citing Ex. 1010 ¶ 109; Ex. 1002 ¶ 209). Petitioner contends, as explained for limitation 1H, that Kamieniecki reports “channel presence/absence” and that a POSITA would have understood that this would include a channel’s error rate, noise level, or signal-to-noise ratio was outside acceptable bounds and could not be displayed properly. *Id.* at 50 (citing Pet. § VI.A.2.h; Ex. 1002 ¶ 210).

Petitioner has not shown sufficiently that Kamieniecki’s “error count” is equivalent to the claimed “bit error rate” or “symbol error rate.” Measurement of Konstantinos’s “bit-error-rate” has not been shown to be

the basis for controlling transmission of Kamieniecki's "channel presence/absence" from the receiver to the headend. Konstantinos's "signal-to-noise level" has not been shown to be equivalent to the claimed "noise levels" though it may be related. Accordingly, Petitioner has not shown a reasonable likelihood that claims 8 and 17 would have been obvious.

Claims 9 and 18 recite "configuring, by said one or more circuits, a bandwidth and/or center frequency of said selected first portion of said digitized signal."

Petitioner contends that Konstantinos's Figure 2 shows that its multi-channel selector 206 includes channel selectors 207A–N that are each configured to select a particular channel. Pet. 50–53 (citing Ex. 1010 ¶¶ 45–48, 62, 105; Ex. 1002 ¶ 214), 58. Petitioner asserts that Konstantinos's Figure 3 shows that desired sub-bands A–H and channels C1–C4 are identified by their bandwidths and center frequencies. *Id.* at 52 (citing Ex. 1010, Fig. 3; Ex. 1002 ¶ 215). Petitioner argues that when the channel selectors 207A–N are configured to select desired channels C1–C4, they are configured with the center frequency of those desired channels. *Id.* at 53 (citing Ex. 1010 ¶¶ 45–48, 62, 105; Ex. 1002 ¶¶ 216–217).

Petitioner shows a reasonable likelihood that Konstantinos discloses to configure channel bandwidth and center frequency as claimed, and that claims 9 and 18 would have been obvious to a POSITA considering the Kamieniecki-Konstantinos combination.

7. *Conclusion for Claims 2–9 and 11–18*

For the foregoing reasons, on the current record, Petitioner has shown a reasonable likelihood that claims 2, 4, 9, 11, 13, and 18 would have been obvious to a POSITA over the combination of Kamieniecki and

Konstantinos. Petitioner has not shown a reasonable likelihood that claims 3, 5–8, 10, 12, and 14–17 would have been obvious.

E. Ground B: Obviousness over Kamieniecki, Konstantinos, and Sadj

We address below the disclosure of Sadj, and Petitioner’s contention that claims 3 and 12 would have been obvious to a POSITA considering Sadj in combination with Kamieniecki and Konstantinos. Pet. 22, 26, 41–43, 56. Patent Owner does not present any arguments specific to claims 3 and 12.

1. Sadj (Ex. 1021)

Sadj is titled “Cable Diagnostic and Monitoring System.” Ex. 1021, code (54). Sadj discloses a diagnostic method for a cable network in which the headend polls set top boxes for operational parameters, and determines from response messages whether their operational parameters are outside of a specified range of values. *Id.* at code (57). Sadj discloses that the operational parameters reported may include Modulation Error Ratio (*id.* ¶¶ 49, 81) and Quadrature Amplitude Modulation (QAM) data (*id.* ¶ 49, claims 2, 8).

2. Motivation to Combine

Petitioner contends that a POSITA would have been motivated to apply Sadj’s teaching of monitoring modulation parameters to the system of Kamieniecki-Konstantinos “because it would improve the ability to monitor signal quality and diagnose problems with the cable plant” and “provide enhanced capabilities.” Pet. 42 (citing Ex. 1009 ¶¶ 6–7; Ex. 1021 ¶ 84; Ex. 1002 ¶ 182).

Petitioner further asserts that “[c]ombining Sadj with Kamieniecki-Konstantinos would be merely using known techniques (Sadj’s STB

monitoring of modulation parameters) to improve similar devices (devices with signal monitoring capability) to yield a predictable results (a device capable of monitoring additional signal quality parameters).” *Id.* (citing Ex. 1002 ¶ 183).

Petitioner asserts that a POSITA would have had the skill to implement Sadjja’s monitoring of additional signal quality characteristics because they “would merely require similar programming as already used by Kamieniecki-Konstantinos’s monitor 116 and controller 118 to monitor the signal quality characteristics discussed in Kamieniecki.” *Id.* (citing Ex. 1002 ¶ 183).

Patent Owner does not dispute Petitioner’s contentions.

Petitioner presents a reasonable likelihood that a POSITA would have combined Kamieniecki, Konstantinos, and Sadjja with a reasonable expectation of success.

3. *Claims 3 and 12*

Claims 3 and 12 recite “wherein said parameter is a modulation parameter of said received signal.”

Petitioner contends that “Sadjja describes a set top box that is instructed by a headend to monitor various aspects of a received signal, including Quadrature Amplitude Modulation (QAM) modulation error ratio (MER), QAM Automatic Gain Control, QAM SNR, and QAM CNR, and report them when polled by the headend.” Pet. 41 (citing Ex. 1021, code (57), ¶¶ 49, 59, 81–84; Ex. 1002 ¶ 181), 56.

Petitioner’s evidence shows sufficiently that the parameters reported in Sadjja pertain to modulation. We agree that Petitioner has shown a

reasonable likelihood that claims 3 and 12 are obvious over the combination of Kamieniecki, Konstantinos, and Sadja.

F. Ground C: Obviousness over Kamieniecki, Konstantinos, and Aggarwal

We address below the disclosure of Aggarwal, and Petitioner’s contention that claims 5 and 14 would have been obvious to a POSITA considering Aggarwal in combination with Kamieniecki and Konstantinos. Pet. 22, 26, 44–46. Patent Owner does not present any arguments specific to claims 5 and 14.

1. Aggarwal (Ex. 1025)

Aggarwal is titled “Rapid Channel Signal Identification.” Ex. 1025, code (54). Aggarwal discloses an apparatus for use in a receiver that determines frequency offset of a transmitted signal, and an analyzer that determines whether the frequency offset of the incoming signal is within an acceptable range and thus is available for reception. *Id.* at 3:32–47.

2. Motivation to Combine

Petitioner contends that a POSITA would have been motivated to apply Aggarwal’s teaching of monitoring frequency offset to Kamieniecki-Konstantinos “because it would improve the ability . . . to monitor signal quality and diagnose problems by determining whether a channel is missing” and “provide enhanced capabilities.” Pet. 45 (citing Ex. 1009 ¶¶ 6–7; Ex. 1002 ¶ 194), 56.

Petitioner asserts that “[c]ombining Aggarwal with Kamieniecki-Konstantinos would be merely using known techniques (monitoring frequency offset) to improve similar devices (devices with signal monitoring capability) to yield a predictable result (a device capable of monitoring additional signal quality parameters).” *Id.* (citing Ex. 1002 ¶ 195).

Petitioner argues that a POSITA would have had the skill to implement Aggarwal’s monitoring of frequency offset in the system of Kamieniecki-Konstantinos because this “would merely require similar programming already being used in Kamieniecki-Konstantinos’ monitor 116 and controller 118” and would not require undue experimentation. *Id.* at 45–46 (citing Ex. 102 ¶ 195).

Patent Owner does not dispute Petitioner’s contentions.

Petitioner shows a reasonable likelihood that a POSITA would have been motivated to combine Kamieniecki, Konstantinos, and Aggarwal with a reasonable expectation of success.

3. *Claims 5 and 14*

Claims 5 and 14 recite “wherein said parameter is a frequency offset of said received signal.”

Petitioner contends that Aggarwal discloses this feature. Pet. 44–46 (citing Ex. 1002 ¶¶ 193–197). Specifically, Petitioner asserts that “Aggarwal describes a system where a television receiver may measure whether the frequency offset is within an acceptable range in order to determine if a signal is available for reception.” *Id.* at 44–45 (citing Ex. 1025, 2:32–47, 3:6–14, 4:53–5:14, 9:33–10:41; Ex. 1002 ¶ 193), 56.

Petitioner does not explain sufficiently why a POSITA would have considered it obvious to send Aggarwal’s “frequency offset” as a parameter to the headend, as claimed. Accordingly, Petitioner has not shown a reasonable likelihood that claims 5 and 14 would have been obvious.

G. Ground D: Obviousness over Kamieniecki, Konstantinos, and Salinger

We address below the disclosure of Salinger, and Petitioner’s contention that claims 7 and 16 would have been obvious to a POSITA

considering Salinger in combination with Kamieniecki and Konstantinos. Pet. 22, 26–27, 47–48. Patent Owner does not present any arguments specific to claims 7 and 16.

1. *Salinger (Ex. 1022)*

Salinger is titled “Distributed Network Performance Monitoring.” Ex. 1022, code (54). Salinger discloses a probe installed in a coaxial cable plant. *Id.* ¶ 5. The probe is configured to monitor communication parameters on downstream frequency channels and stores the results which are transmitted upstream either periodically or when a parameter exceeds predefined limits. *Id.* Salinger lists modulation error ratio (MER) and phase noise as parameters monitored by its probe. *Id.* ¶ 36.

2. *Motivation to Combine*

Petitioner contends that “[a] POSITA would have considered it obvious to have Kamieniecki-Konstantinos’ monitor include MER and phase noise as among the various measured signal quality parameters.” Pet. 48 (citing Ex. 1002 ¶ 203). According to Petitioner, “[t]his modification would have involved using a known technique (measuring phase noise via MER) to improve a similar device (Kamieniecki-Konstantinos’ signal quality monitor) to achieve predictable results.” *Id.* (citing Ex. 1002 ¶ 204). Petitioner further asserts that “[t]he modification also would not have required undue experimentation, as the measurement of MER and signal phase would simply use similar components/programming as those already used by the Kamieniecki-Konstantinos monitor.” *Id.* (citing Ex. 1002 ¶ 204).

Petitioner shows a reasonable likelihood that a POSITA would have combined Salinger together with Kamieniecki and Konstantinos.

3. *Claims 7 and 16*

Claims 7 and 16 recite “wherein said characteristics is signal phase vs. frequency.”

Petitioner contends that it would have been obvious for Kamieniecki-Konstantinos’s monitor to include Salinger’s MER and phase noise. Pet. 48 (citing Ex. 1002 ¶ 203), 57. However, Petitioner has not shown sufficiently that Salinger’s MER or phase noise are equivalent to “signal phase vs. frequency” as claimed. Nor does Petitioner show sufficiently that Kamieniecki’s “channel presence/absence” would be based on Salinger’s MER or phase noise. Petitioner does not show a reasonable likelihood that claims 7 and 16 would have been obvious over the combination of Kamieniecki, Konstantinos, and Salinger.

H. Ground E: Obviousness over Renken

Petitioner asserts that claims 1–18 would have been obvious over Renken. Pet. 22. We consider below the disclosure of Renken, Petitioner’s contentions that claims 1–18 would have been obvious, and Patent Owner’s arguments for patentability. We determine that Petitioner has not shown a reasonable likelihood to prevail on this ground.

1. *Renken (Ex. 1011)*

Renken is titled “Cable Modem for Network Measurements.” Ex. 1011, code (54). Renken relates to measurement-capable cable modems (MCCMs) for cable networks. *Id.* at code (57). Renken discloses that idle transmitters and receivers of MCCMs perform upstream and downstream measurements when directed by a central measurement controller (CMC), which may be located at the headend. *Id.*

Renken’s Figure 1 is reproduced below.

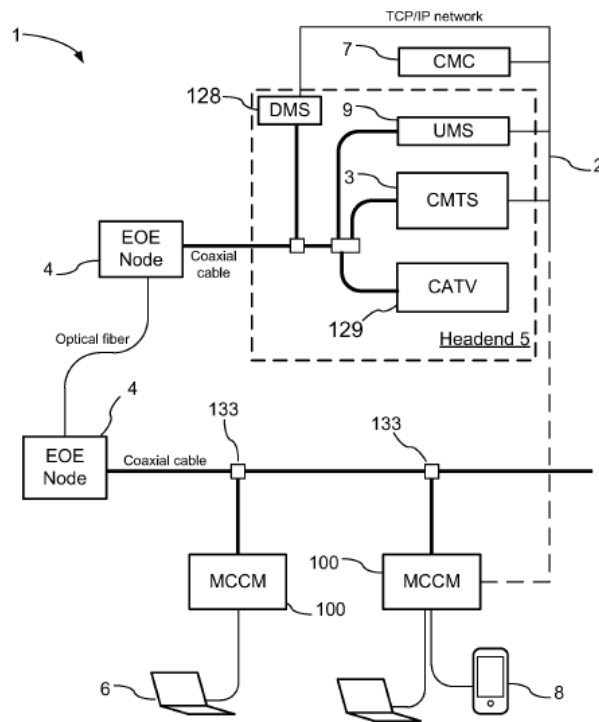


Fig. 1

Renken's Figure 1 above shows central measurement controller (CMC) 7 located in the headend, and measurement-cable modems (MCCMs) 100 connected to the headend via hybrid fiber coaxial (HFC) network 1. Ex. 1011, 7:42–8:12. The MCCMs 100 are also connected to customer premises equipment (CPE) 6 and local measurement controller (LMC) 8. *Id.* The CMC instructs the MCCMs to perform measurements and collects, evaluates, and stores the measurement results received from the MCCMs. *Id.* at 8:35–50.

2. Claims 1–18

Limitation 1B of claim 1 recites “performing by one or more circuits of a receiver coupled to a television and data service provider headend via a hybrid fiber coaxial (HFC) network.” Limitation 1H recites “controlling the transmission of network management messages back to said headend based on said measured characteristic of said received signal, wherein said

measured characteristic is different than said network management messages.” Limitations 10C and 10F recite similar limitations.

In asserting obviousness of claims 1–18, Petitioner reads the claimed “receiver” on Renken’s MCCM, and contends the MCCM would transmit “network management messages” different from measured characteristics to the headend. Pet. 65–67. Petitioner contends that, since the MCCMs’s measurement plan received from the CMC could include error thresholds, it would have been obvious to detect that an error occurred in a channel based on a threshold and send a message to the CMC indicating the error. Pet. 66 (citing Ex. 1011, 22:67–23:4, 23:29–33; Ex. 1012, 4, 12–13, 15; Ex. 1002 ¶¶ 277–281).

Patent Owner argues that modifying Renken in this manner would be contrary to what Renken teaches because the CMC, not the MCCMs, collects, evaluates, and stores measurements from the MCCMs which do not generate error reports or alarms corresponding to the claimed “network management messages.” Prelim. Resp. 37–38 (citing Ex. 1011, 8:35–50, 9:5–18, 16:47–50, 18:18–52, Fig. 9). Patent Owner asserts that, in Renken, “[a]t all times, the CMC is in control and is the component that generates error reports and alarms” and that Petitioner’s “proposed modification would divest the CMC of control and put processing and alerting capabilities into the MCCM, turning Renken’s centralized model into a distributed one.” Prelim. Resp. 38 (citing Ex. 1011, 22:32–39). Patent Owner further contends that the “error thresholds” sent in a measurement plan from the CMC to the MCCMs are merely a trigger for the MCCM to measure and report a measured characteristic, which, according to the language of the claims, cannot be a “network management message.” *Id.* at 37–39.

Patent Owner’s arguments overcome Petitioner’s contentions that the claims would have been obvious. *Id.* at 36–40. Petitioner has not shown a reasonable likelihood that Renken’s MCCM as the claimed “receiver” sends anything equivalent to the claimed “network management messages” to the headend. Accordingly, Petitioner does not show a reasonable likelihood that claims 1–18 would have been obvious over Renken.

I. Ground F: Obviousness over Renken and Aggarwal

In this ground concerning claims 5 and 14, Petitioner relies on Aggarwal to disclose “a television receiver that may measure whether frequency offset is within an acceptable range in order to determine if a signal is available for reception.” Pet. 69.

As Petitioner does not rely on Aggarwal to disclose a receiver transmitting “network management messages” from a receiver to headend, Petitioner does not demonstrate a reasonable likelihood that claims 5 and 14 would have been obvious over the combination of Renken and Aggarwal for the reasons just explained in § II.H.2.

III. CONCLUSION

In light of the foregoing, based on the current record and at this stage of the proceeding, we are persuaded that Petitioner has demonstrated a reasonable likelihood of prevailing on its assertions that at least one of claims 1–18 of the ’826 patent would have been obvious under 35 U.S.C. § 103 based on the grounds set forth in the Petition. Accordingly, we institute trial for all challenged claims on all grounds asserted by Petitioner. 37 C.F.R. § 42.108(a) (“When instituting . . . review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.”).

Our factual findings, conclusions of law, and determinations at this stage of the proceeding are preliminary, and based on the evidentiary record developed thus far. At this stage of the proceeding, we have not made a final determination with respect to the patentability of the challenged claims or to the construction of any claim term.

IV. ORDER

For the foregoing reasons, it is

ORDERED that pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–18 of the '826 patent is hereby instituted on all challenges to patentability set forth in the Petition; and

FURTHER ORDERED that 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 and that the trial will commence on the entry date of this decision.

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