

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT TRIAL AND APPEAL BOARD

COMCAST CABLE COMMUNICATIONS, LLC,
Petitioner,

v.

ENTROPIC COMMUNICATIONS, LLC,
Patent Owner.

CASE: IPR2024-00442
U.S. PATENT NO. 9,825,826

PATENT OWNER'S NOTICE OF APPEAL

Notice is hereby given, pursuant to 37 C.F.R. §§ 90.2(a), 90.3, and 35 U.S.C. §§ 141 and 142, that Patent Owner Entropic Communications, LLC (“Patent Owner”) appeals to the United States Court of Appeals for the Federal Circuit from the Final Written Decision of the Patent Trial and Appeal Board in IPR2024-00442, entered on August 15, 2025 (Paper 30), the Decision Granting-in-Part Petitioner’s Request on Rehearing of the Final Written Decision, entered on December 8, 2025 (Paper 32), and from all underlying orders, decisions, rulings, and opinions. A copy of the Final Written Decision is attached hereto as Exhibit A, and a copy of the Decision on Petitioner’s Request for Rehearing is attached hereto as Exhibit B. This Notice of Appeal is timely under 37 C.F.R. §§ 90.3(a)(1) and (b)(1), having been filed within 63 days of the Decision Granting-in-Part Petitioner’s Request on Rehearing.

In accordance with 37 C.F.R. § 90.2(a)(3)(ii), Patent Owner states that the issues on appeal include, but are not limited to, the following:

(1) the Board’s determination that claims 1 to 4, 8 to 13, 17, and 18 of U.S. Patent No. 9,825,826 are unpatentable;

(2) whether the Board abused its discretion and violated the Administrative Procedure Act and America Invents Act by failing to provide Patent Owner an opportunity to respond to Petitioner’s Request for Rehearing, entered on September 15, 2025 (Paper 31), before issuing its Decision on Petitioner’s Request for

Rehearing and finding two additional claims (8 and 17) unpatentable;

(3) the Board's determination in its Decision Granting-in-Part Petitioner's Request on Rehearing that Konstantinos's "Signal to Noise" satisfies "signal-to-noise ratio" recited in claims 8 and 17 of U.S. Patent No. 9,825,826; and

(4) and any related issues, findings, or determinations, leading thereto or underlying these decisions.

Patent Owner is filing a copy of this Notice of Appeal with the Director of the United States Patent and Trademark Office, and a copy of this Notice of Appeal is being filed electronically with the Board. In addition, a copy of this Notice of Appeal is being electronically filed with the United States Court of Appeals for the Federal Circuit, along with the required docketing fee.

Dated: February 6, 2026

Respectfully submitted,

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 90.2(a)(1), on February 6, 2026, the foregoing Notice of Appeal was electronically filed with the Patent Trial and Appeal Board via the P-TACTS System in accordance with 37 C.F.R. § 42.6(b)(1), and submitted electronically to the Director via email at efileSO@uspto.gov, in accordance with 37 C.F.R. § 90.2(a)(1)(i).

Pursuant to 37 C.F.R. § 90.2(a)(2) on February 6, 2026, the foregoing Notice of Appeal was electronically filed with the Court of Appeals for the Federal Circuit via CM/ECF with requisite fees paid via pay.gov.

Pursuant to 37 C.F.R. § 42.6(e) and the parties' agreement to accept electronic service, on February 6, 2026, the foregoing Notice of Appeal was served via email on the following counsel of record for Petitioner:

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EXHIBIT A

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 JON M. JURGOVAN, SCOTT. B. HOWARD, and
AARON W. MOORE, *Administrative Patent Judges*.

JURGOVAN, *Administrative Patent Judge*.

DECISION
Final Written Decision
Determining Some Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

A. *Background and Summary*

On February 15, 2024, 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 on May 22, 2024. Paper 6. We instituted *inter partes* review on August 20, 2024. Paper 8 (“Institution Decision” or “Inst. Dec.”).

On December 6, 2024, Patent Owner filed a Response. Paper 15 (“PO Resp.”). On March 7, 2025, Petitioner filed a Reply. Paper 18 (“Pet. Reply”). On April 18, 2025, Patent Owner filed a Sur-Reply. Paper 25 (“PO Sur-Reply”). An oral hearing was held on May 15, 2025, and the transcript is in the record. Paper 29.

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a). Having reviewed the complete trial record, we determine that Petitioner has shown, by a preponderance of the evidence, that the challenged claims 1–4, 9–13, and 18 are unpatentable, but not claims 5–8 and 14–17.

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”) indicate that the ’826 patent is currently involved in the following matters:

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

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

Entropic Communications, LLC v. Vantiva SA,
2:24-cv00912 (E.D. Tex.)

Pet. vi, vii; Paper 4, 1, Paper 14, 1.

Patent Owner indicates that the ’826 patent was previously involved in the following matters:

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

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

Paper 14, 1–2.

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 14, 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 14, 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.

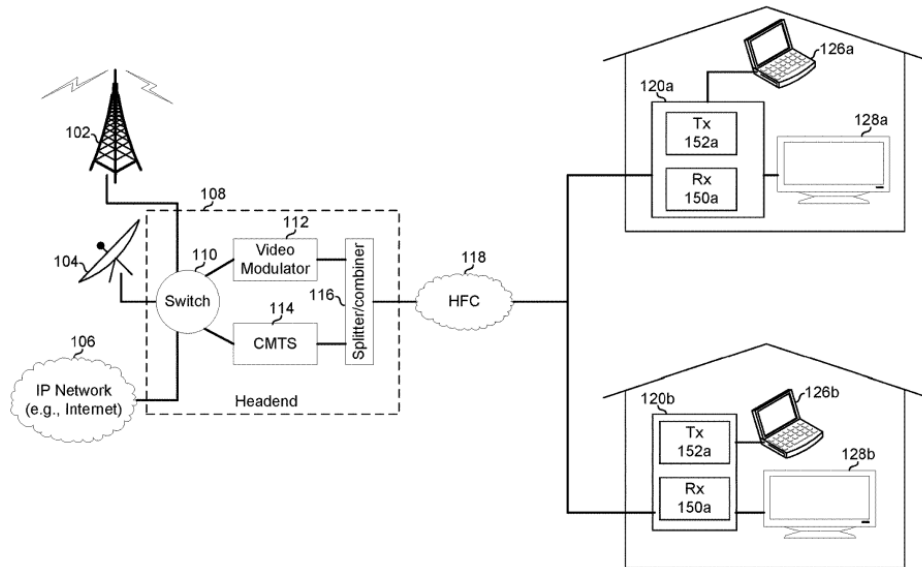


Figure 1A shows communication system headend 108 connected to receiving gateways 120a, 120b via hybrid fiber-coaxial (HFC) network 118. *Id.* at 2:45–3:15. Each gateway 120a, 120b may comprise a receive module 150 and a transmit module 152. *Id.* at 3:1–6.

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

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

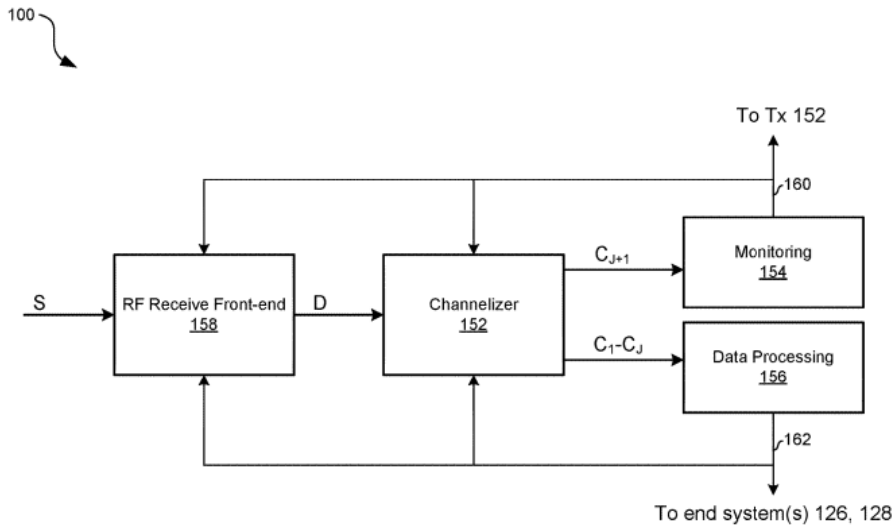


Figure 1B shows an example receiver operable to perform spectrum monitoring. *Id.* at 3:16–18. The receiver comprises circuit 100 including RF receive front-end module 158, channelizer module 102, monitoring module 154, and data processing module 156. *Id.* at 3:16–21. RF receive front-end module 158 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 (C₁–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 declarations from David B. Lett. Ex. 1002; Ex. 1032. Patent Owner supports its arguments with a declaration from Dr. Samuel H. Russ. Ex. 2013. Depositions of the parties' experts are in the record, as well as other evidence. Ex. 1033; Ex. 2014.

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.

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, Sadjja
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 demonstrated by a preponderance of the evidence that claims 1–4, 9–13, and 18 are unpatentable as obvious, but not claims 5–8 and 14–17.

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.

A. Legal Standards for Obviousness

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) where present, objective evidence of nonobviousness. *Graham v. John Deere Co. of Kan. City*, 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 “accepts” Petitioner’s proposed level of skill in the art “solely for purposes of responding to the Petition.” PO Resp. 11. We adopt and apply Petitioner’s proposed skill level because it is consistent with the problems and solutions identified in the ’826 patent and the prior art references asserted by Petitioner. In addition, we find the adopted skill level consistent with the education and experience that a POSITA would have

had. *See In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citing *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986)) (citing factors to consider when determining level of ordinary skill in the art).

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 certain terms of the ’826 patent. Pet. 24–25; PO Resp. 11–12. Specifically, Petitioner indicates that the district court 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, 61). Petitioner contends that this construction is consistent with the ordinary and customary meaning of the claim language. Pet. 25. Patent Owner asserts that its arguments “do not turn on a specific construction of any terms; therefore, all claim terms should be given their plain and ordinary meaning as understood in the relevant art.” PO Resp. 11–12.

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).

In addition, Petitioner contends that the '826 patent's claims are not recited in means-plus-function form under § 112 ¶ 6. Pet. 25. Because the word “means” does not appear in the claims of the '826 patent, 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, reasonable expectation of success, claim limitations 1F, 1G, and claims 6 and 15. PO Resp. 18–42. Patent Owner does not argue the remaining claim limitations.

After considering the parties' arguments and evidence, we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 2, 4, 9–11, 13, and 18 are unpatentable as obvious over the combination of Kamieniecki and Konstantinos, but not claims 3, 5–8, 12, and 14–17.

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

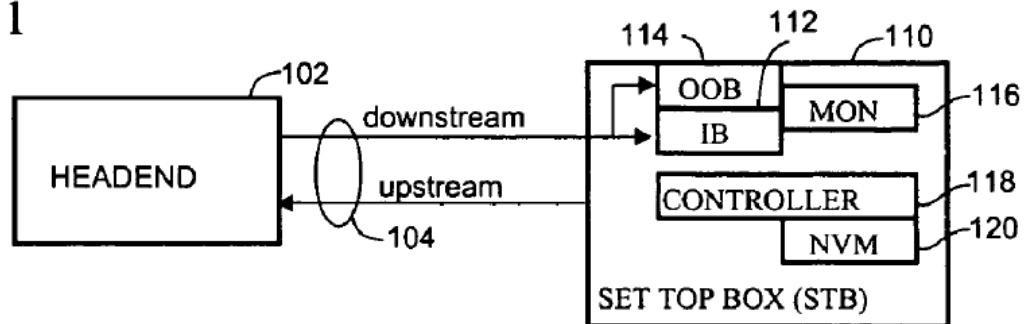


Figure 1 shows a cable system with a headend 102 and network of cables 104 connected to set-top box 110. *Id.* ¶ 13. Set-top box (STB) 110 has an in-band (IB) tuner 112 and out-of-band (OOB) tuner 114 so that it can receive in-band and out-of-band communications simultaneously. *Id.* In-band channels 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.

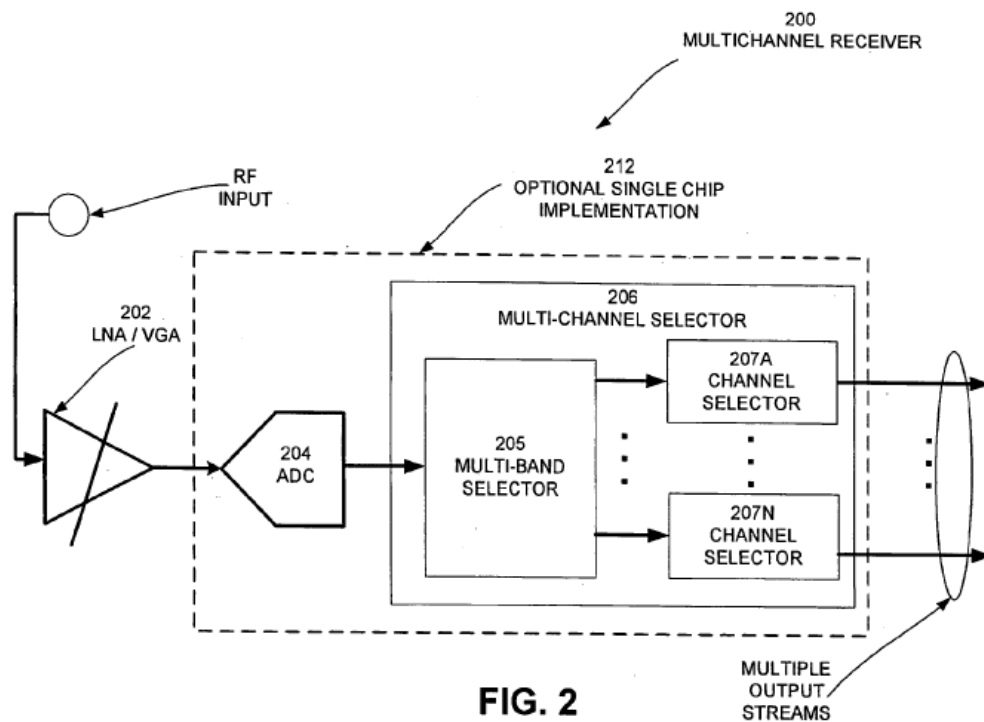


Figure 2 illustrates the logical components of Konstantinos’s multi-channel receiver 200 including low-noise-amplifier and variable gain amplifier (LNA/VGA) 202, analog-to-digital converter (ADC) 204, and multi-channel selector 206 including multi-band selector 205 and channel selectors 207A–207N. *Id.*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

- i. 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);
- ii. Konstantinos offers the improvement of not having to replicate the broadband RF input signal for input to separate tuners, which would cause signal degradation, and instead digitizes the RF input in its entirety and thereby saves cost and complexity. *Id.* at 28 (citing Ex. 1010 ¶¶ 6–7, 43, 45, 49; Ex. 1002 ¶¶ 130–131);
- iii. the combination would enable simultaneous tuning to larger numbers of channels as required by newer cable technologies such as DOCSIS 3.0, and provide for faster channel switching. *Id.* at 28 (citing Ex. 1010 ¶ 11; Ex. 1002 ¶ 149);

- iv. the combination “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); and
- v. using Kamieniecki’s monitoring of channels and reporting back to the headend is merely combining prior art methods according to known methods to yield predictable results. *Id.* at 29–30 (citing Ex. 1002 ¶¶ 131–132).

Against these motivations, Patent Owner argues that the combination would increase costs and complexity due to Konstantinos’s multi-channel functionality and the need for additional power supplies and shielding, as well as the investment that would be required in design and development for such a STB. PO Resp. 25–29 (citing Ex. 2013 ¶¶ 90–97, 105). In addition, Patent Owner argues that Kamieniecki is sufficient for the applications for which it is designed such that a POSITA would not seek to modify it with Konstantinos. PO Sur-Reply 8–11 (citing Ex. 2013 ¶¶ 75–76, 80–84, 108; Ex. 2021, 10:6–24, 12:16–13:6, 14:15–20, 22:1–16).

Patent Owner does not dispute that the addition of Konstantinos’s multi-channel functionality to Kamieniecki would have enabled simultaneous tuning to multiple channels and faster channel switching. Pet. 28 (citing Ex. 1010 ¶ 11; Ex. 1002 ¶ 149). Standing alone, these features would have provided sufficient motivation for Petitioner’s combination because they permit a user to view multiple channels at once, allow channel quality to be monitored while viewing channel programming,

and provide less waiting time for users when switching channels. Ex. 1002 ¶ 149.

Although Patent Owner argues that adding Konstantinos’s multi-channel functionality to Kamieniecki’s single-channel device would increase costs and complexity, Patent Owner overlooks that multi-channel functionality would also increase the STB’s capabilities. In any case, “a given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate a motivation to combine.” *General Elec. Co. v. Raytheon Tech. Corp.*, 983 F.3d 1334, 1351 (Fed. Cir. 2020) (citing *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006)).

Furthermore, Petitioner presents preponderant evidence that the market demand was such that customers would have desired an STB with multi-channel functionality even though it would cost more than a basic STB. Pet. Reply 6–8 (citing Ex. 1010 ¶¶ 1, 11, 16, 102–104; Ex. 1032 ¶¶ 5–6; Ex. 1033, 27:6–29:23; Ex. 2013 ¶¶ 70, 108). Konstantinos expressly teaches that the “evolving market for data and programming services will demand that receivers have the capability of multi-channel tuning.” Ex. 1010 ¶ 1. Petitioner has thus established that there was market demand that would have led a POSITA to improve Kamieniecki with Konstantinos’s multi-carrier capability. See *KSR*, 550 U.S. at 418 (“Often, it will be necessary for a court to look to *interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace*; and the background knowledge of a [POSITA], all in order to determine whether there was an apparent reason to combine the known elements in the manner claimed by the patent at issue.” (emphasis added)).

Moreover, we agree with Petitioner that Konstantinos addresses the cost and complexity issues that Patent Owner asserts are problematic. Pet. 35–36; Pet. Reply 8–9 (citing Ex. 1010 ¶¶ 102, 105–106). For example, Konstantinos teaches that breaking up the original signal into smaller sub-signals decreases the required sampling rate for each band since interleaved lower-rate samplers can be used, which reduces power consumption and interference, and enables conventional digital channel selection methods to be used for fine selection of one channel from a band of channels. Ex. 1010 ¶¶ 102, 104–105. In addition, Konstantinos teaches reducing cost and complexity through a single chip solution. Ex. 1002 ¶ 150; Ex. 1010 ¶ 44. Hence, we do not see the cost or complexity issues that Patent Owner mentions as barriers that would have prevented a POSITA from making the combination.

Similarly unavailing is Patent Owner’s stance that Kamieniecki is satisfactory for the applications for which it is designed such that a POSITA would not seek to improve it with Konstantinos. PO Sur-Reply 8–11. Konstantinos recognizes the market demand for multi-channel functionality, so adding this capability to Kamieniecki’s single-channel device would have been a natural thing for the POSITA to pursue in light of the advantages afforded thereby. Ex. 1010 ¶ 1; *KSR*, 550 U.S. at 420 (“any need or problem known in the field of endeavor at the time of the invention and addressed by the patent can provide a reason for combining the elements in the manner claimed”).

Patent Owner argues that Kamieniecki’s fundamental principle of operation is to wait for idle before gathering signal quality information. PO Resp. 29–35 (citing Ex. 1002 ¶¶ 74, 159; Ex. 2013 ¶¶ 112–113). According

to Patent Owner, Petitioner's combination would alter Kamieniecki's principle of operation by gathering signal quality information while the STB is in use. *Id.* at 30–32 (citing Ex. 1002 ¶¶ 96, 159; Ex. 1009 ¶¶ 15, 17, 22, Fig. 2; Ex. 1011, 4:45–50; Ex. 2013 ¶¶ 114–116; Ex. 2014, 147:3–20).

Petitioner replies that Kamieniecki's waiting for idle is not a fundamental principle of operation, but is instead a *limitation* that is imposed by the fact that Kamieniecki has only one IB tuner and seeks to avoid disturbing a user's channel viewing. Pet. 36–37; Pet. Reply 9–10. We agree with Petitioner that a POSITA would consider monitoring channel quality during viewing as an advantage over waiting for idle times, which would be made possible by adding Konstantinos's multiple tuners. Pet. Reply 10 (citing Ex. 1009 ¶¶ 4, 13); Ex. 1032 ¶¶ 14–15.

Patent Owner further argues that Petitioner fundamentally changes Konstantinos's architecture “by alternating the number of channel selectors or channel decoders.” PO Resp. 32 (citing Ex. 2014, 139:3–19). Specifically, Patent Owner contends that Petitioner's expert, Mr. Lett, stated that a POSITA would either remove a decoder or add an extra channel selector so that the received signal could be monitored, but Konstantinos teaches a 1:1 ratio between channel selectors and decoders. *Id.* at 32–33 (citing Ex. 1010 ¶ 46). Patent Owner argues that removing a decoder would reduce the number of channels simultaneously available to the user, and adding a channel selector that is not required by any standard or consumer demand would increase the STB's price. *Id.* at 33. Patent Owner argues that a POSITA would not pursue either of these options.

We agree with Petitioner, however, that a POSITA considering Konstantinos would have understood that any number of channel selectors

and decoders may be implemented and that it would be obvious to have enough so that viewing and monitoring can both occur. Pet. 33–37; Pet. Reply 10–11 (citing Ex. 1002 ¶¶ 154–160; Ex. 1032 ¶ 7).

Patent Owner further argues that the combination would render Kamieniecki’s reporting functionality inoperable due to removal of its OOB tuner. PO Resp. 33–35 (citing Ex. 1009 ¶¶ 14, 17; Ex. 2013 ¶¶ 57–58, 120–123). Petitioner indicates, however, that the combination does not lose this OOB functionality but simply uses Konstantinos’s receiver to receive OOB data previously received by Kamieniecki’s OOB tuner. Pet. 28–30; Pet. Reply 11. We agree with Petitioner’s analysis.

Patent Owner further argues that it would be a “redesign” to use Konstantinos’s receiver to receive an OOB channel. PO Resp. 34. Petitioner observes, however, that Konstantinos receives both TV and data channels and can select “any combination of the available channels” in the 50–1000 MHz range. Pet. Reply 11 (citing Ex. 1010 ¶¶ 1, 11, 43, 104–105). We agree with Petitioner that Konstantinos teaches reception of OOB channels without requiring a “redesign” in the combination.

We determine that Petitioner has shown by a preponderance of the evidence that a POSITA would have been motivated to combine Kamieniecki and Konstantinos.

4. Reasonable Expectation of Success

Petitioner asserts that a POSITA would have had a reasonable expectation of success in making the combination without undue experimentation because Kamieniecki’s in-band (IB) and out-of-band (OOB) tuners use the same inputs (an RF signal) and outputs (digital signal of desired channel) as those of Konstantinos’s multi-channel receiver.

Owner's assertion was correct, Konstantinos teaches that its "information extraction processor" (IEP) analyses the signal captured by its ADC to make measurements such as bit-error rate. *Id.* at 13–14 (citing Ex. 1010 ¶ 109). Patent Owner's argument isolates Kamieniecki's teachings rather than considering what the combination of Kamieniecki and Konstantinos would have suggested to a POSITA. "Non-obviousness cannot be established by attacking references individually where the [patent challenge] is based upon the teachings of a combination of references." *In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986) (citing *In re Keller*, 642 F.2d 413, 425 (CCPA 1981)).

Patent Owner further argues that Konstantinos discloses a 1:1 ratio between channels selected and channels decoded and therefore cannot output a selected channel to both a data processor and signal monitor as the claims require (*id.* at 13, 20–23) (i.e., simultaneous viewing and monitoring of a channel). However, as Petitioner states, Konstantinos teaches that "[b]y replicating the fine selector, one can realize a multiplicity of digital tuners very efficiently" and that its fine selectors can be implemented using "conventional digital selection methods." Pet. Reply 3 (citing Ex. 1010 ¶ 105). The combination of Konstantinos's replicating selectors and tuners and Kamieniecki's monitoring with a separate OOB tuner suggests the capability of simultaneous tuning and monitoring of channels. Ex. 1002 ¶ 149 (citing Ex. 1009 ¶ 17; Ex. 1010 ¶ 11).

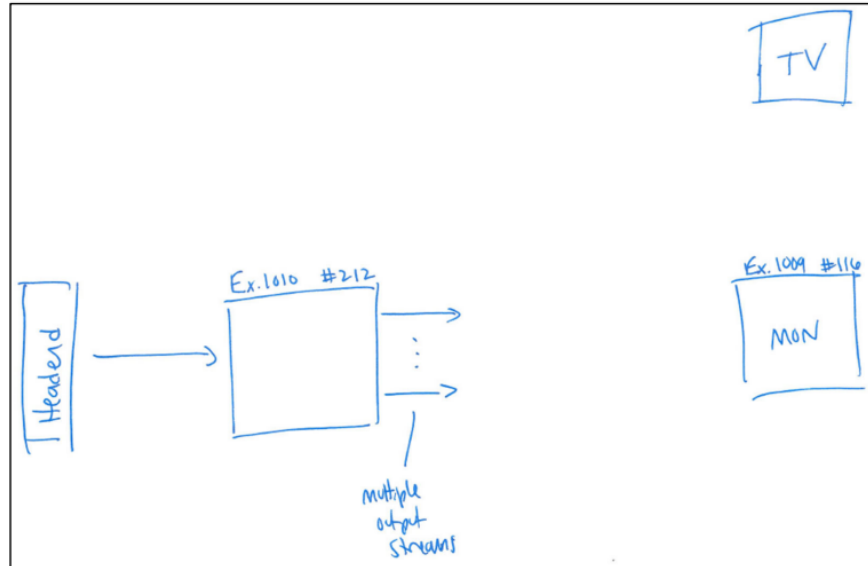
Patent Owner further argues that a POSITA lacked the knowledge and experience needed to design circuits that implement complex functionality that would be required for the combination, such as high-speed analog-to-digital conversion (as Petitioner's expert Mr. Lett allegedly admitted).

PO Resp. 18–19. However, we agree with Petitioner that the combination would not have been too complex for a POSITA to implement considering Konstantinos’s teachings. Pet. Reply 2–3. As explained, Konstantinos decreases complexity with interleaved ADCs with reduced sampling rates, and divides the received wideband signal into sub-bands with channels selected by fine selectors of digital tuners using conventional methods. *Id.* at 2–3 (citing Ex. 1010 ¶¶ 12–13, 22–23, 56–61, 102, 104–105; Ex. 1032 ¶¶ 8–9). Guided by these and other teachings, we agree with Petitioner that a POSITA would have been able to implement the combination.

In addition, Patent Owner argues that Petitioner did not explain how a POSITA would handle the bandwidth disparity between Konstantinos’s 6 MHz DOCSIS channels and Kamieniecki’s 1.8 MHz OOB channel, which allegedly would require reprogramming that was beyond a POSITA’s skill. PO Resp. 23–24; PO Sur-Reply 4–5. We agree with Petitioner, however, that neither reference is limited to these bandwidths and that a POSITA would have understood that other bandwidths could be used. Pet. Reply 5–6 (citing Ex. 1010 ¶¶ 13, 51, 104, 114; Ex. 1032 ¶ 10).

Patent Owner argues that the integration of a high-speed ADC would require additional power supplies and other components to be added and thus would require a “complete redesign” of Kamieniecki’s STB. PO Resp. 19 (citing Ex. 2013 ¶ 97). However, Konstantinos’s interleaved ADC decreases the necessary sampling rate, thereby reducing power consumption and interference issues. Pet. Reply 2–3 (citing Ex. 1010 ¶¶ 12–13, 22–23, 56–61, 102, 104–105; Ex. 1032 ¶¶ 8–9).

During his deposition, Patent Owner presented Petitioner's expert, Mr. Lett, with the following figure and asked him to fill in the missing components (PO Resp. 22):



The above figure shows blank space between the output streams of Konstantinos's multi-channel receiver (left side) and a TV and monitor (right side). Ex. 2012. Patent Owner asserts that Mr. Lett was given the opportunity to explain how Konstantinos's multi-channel receiver connects to Kamieniecki's monitor and TV, and that Mr. Lett refused to fill in the gap, stating that it would require a new opinion and he would need more time to think about those details. Ex. 2014, 174:21–176:16. Patent Owner argues that if it requires a new opinion to explain the combination, then he has no opinion for Petitioner to rely on and we should discredit his testimony. PO Resp. 22–23.

We do not agree with Patent Owner's argument. As Petitioner points out, the '826 patent's claims are not directed toward to the connection between the receiver and TV, so part of Patent Owner's questioning of Mr. Lett was outside the scope of the claims. Accordingly, it is

understandable why Mr. Lett stated that answering Patent Owner’s query would require a new opinion. In addition, we find understandable Mr. Lett’s refusal to provide an off-the-cuff drawing during his deposition without careful consideration aforehand. Hence, we do not discredit Mr. Lett’s testimony.

We determine that Petitioner has shown by a preponderance of the evidence that a POSITA would have had a reasonable expectation of success in making the combination of Kamieniecki and Konstantinos.

5. *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 concerning limitations 1F and 1G. Pet. 30–40; PO Resp. 35–42. 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 by a preponderance of the evidence that the Kamieniecki-Konstantinos combination discloses a method so we do not need to decide whether the preamble is limiting.

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.

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 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 by a preponderance of the evidence 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).

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.

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 by a preponderance of the evidence that the Kamieniecki-Konstantinos combination discloses limitation 1C.

d) Limitation 1D: Digitizing

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

Petitioner undisputedly 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).

Petitioner shows by a preponderance of the evidence 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. 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 by a preponderance of the evidence 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. Pet. 37–38 (citing Ex. 1002 ¶¶ 162–166). Specifically, Petitioner asserts that Kamieniecki discloses that the IB channels include MPEG-2 transport 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 also 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).

Patent Owner presents several arguments against Petitioner’s contentions. Patent Owner argues that Petitioner failed to explain how Konstantinos’s multi-channel receiver connects to decoders or a monitor in Kamieniecki’s STB, or where or how the decoders would be located to receive and process the second portion of the digitized signal. PO Resp. 39–42 (citing Ex. 2014, 159:6–20, 170:2–171:18). Patent Owner asserts even if Kamieniecki did disclose a decoder, it would be superfluous to Konstantinos’s decoders, and a POSITA thus would not be motivated to combine them. *Id.* at 41. Patent Owner also argues that Konstantinos discloses two embodiments of decoders (one single-channel, the other multiple-channel) and Petitioner allegedly did not indicate which it relied upon in its combination. *Id.*

Petitioner replies that both Kamieniecki and Konstantinos would be useless if they could not recover the TV channels a user wants to watch, and

Patent Owner admits that Konstantinos discloses multiple embodiments capable of doing this. Pet. Reply 14–15. Petitioner states that the Petition identified several examples from Konstantinos, including the channel and source decoders as well as the “information extraction digital signal processor (IEP).” *Id.* at 15. Petitioner further asserts that it is obvious that Kamieniecki includes a decoder which Patent Owner’s expert admits is “typical” in a STB, and which would be required to recover the MPEG-2 stream that Kamieniecki mentions. *Id.* at 15–16 (citing Ex. 1009 ¶ 14; Ex. 2013 ¶ 74; Ex. 1033, 33:2–7). Petitioner asserts that any of the decoders disclosed by Kamieniecki and Konstantinos could be used in the combination. *Id.* at 16. Regarding Patent Owner’s assertion of superfluous decoders, Petitioner asserts that Konstantinos’s teaching of the evolving market demanding multi-channel tuning would motivate the POSITA to use the decoders of both references. *Id.* at 16–17.

Patent Owner replies that the cases and legal theories that Petitioner cites are irrelevant because Petitioner proposed a physical substitution of elements. Pet. Reply 18. Patent Owner reiterates that the Petition did not explain how the proposed combination outputs the second portion of the digitized signal to a decoder. PO Sur-Reply 18–19 (citing Ex. 2014, 170:2–171:18; Ex. 2021, 12:14–15).

After review of the parties’ contentions and evidence, we agree with Petitioner that both Kamieniecki and Konstantinos teach limitation 1F.

As Petitioner states, Kamieniecki discloses that a basic set-top box (STB) includes an in-band tuner that receives, e.g., MPEG-2 transport streams. Ex. 1009 ¶ 4. Kamieniecki further teaches

The set-top box 110 has more than one tuner (112, 114) so that it can receive out-of-band (OOB) communications simultaneously with in-band (IB) communications. This means that *subscribers can be tuned to a channel receiving audio and video content* while, at the same time, the STB 110 is receiving instructions in an OOB channel.

Id. ¶ 13 (emphasis added). As Petitioner’s expert Mr. Lett undisputedly testifies, “MPEG decoders were well-known to a POSITA, and would have been necessary for decoding the MPEG stream that Kamieniecki and Konstantinos describe.” Ex. 1002 ¶ 163.

Konstantinos expressly teaches channel and source decoders receiving channel signals from a channel selector. Ex. 1010 ¶¶ 30, 42. Konstantinos further teaches “a multi-channel channel decoder 208 processes 16 TV streams simultaneously and delivers 16 transport streams for video. These can be further processed with channel and source decoders.” Ex. 1010 ¶ 106; *see also id.* ¶¶ 107, 118–120.

Patent Owner criticizes Petitioner’s combination for not showing details concerning the location and various connections that would be needed between the output of the channel selector on one side and a TV and monitor on the other side. We have already addressed this argument and found it unpersuasive. *See* § II.D.3, *supra*. Specifically, Petitioner has shown that MPEG decoders and their use were well known in the art and would perform limitation 1F.

Patent Owner quibbles with the details of how decoders would be incorporated between selectors and the TV and monitor but “[a] person of ordinary skill in the art is also a person of ordinary creativity, not an automaton.” *KSR*, 550 U.S. at 421. Patent Owner has not shown what would have been difficult in accomplishing this task.

Further, Patent Owner insists that Petitioner shows a physical combination of the components of Kamieniecki and Konstantinos when the test is what the combination would have suggested to a person of ordinary skill in the art. *Merck*, 800 F.2d at 1097 (citing *Keller*, 642 F.2d at 425).

Petitioner has shown by a preponderance of the evidence that the combination of Kamieniecki and Konstantinos teaches or at least suggests 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 only analyzes analog signals, not digital signals as limitation 1G requires. PO Resp. 36–39. In fact, Patent Owner asserts that Kamieniecki does not disclose any ADC for generating a digitized signal. *Id.* at 36–37 (citing Ex. 1009 ¶¶ 4, 14, 22; Ex. 2013 ¶¶ 126–131). Patent Owner notes that Petitioner’s expert,

Mr. Lett, does not refute that Kamieniecki's monitor receives an analog signal. *Id.* at 36–38 (citing Ex. 2014, 57:3–13, 68:3–9, 102:22–103:9, 104:14–19, 105:5–8). Patent Owner further argues that the Petition did not propose modifying Kamieniecki's monitor to analyze digital signals. *Id.* at 38–39.

Petitioner replies that while carrier signals are analog, they carry digital information that is recovered by the STB, and Kamieniecki states that even a basic STB (such as Scientific-Atlanta's Explorer 4200 released in 2002, years before the 2011 priority date of the '826 patent) receives digital information, such as MPEG-2 transport streams. Pet. Reply 12 (citing Ex. 1009 ¶ 4). Petitioner asserts that Patent Owner's expert, Dr. Russ, never stated that Kamieniecki's STB lacks an ADC, and admitted it is a typical component of an STB and that "[t]here would have to be analog to digital conversion in there somewhere" if an STB is to output an MPEG stream for viewing, as Kamieniecki teaches. *Id.* at 13 (citing Ex. 1009 ¶ 4; Ex. 1033, 32:12–34:21; Ex. 2013 ¶ 62). According to Petitioner, a POSITA would understand that Kamieniecki's STB includes an ADC. *Id.* (citing Ex. 1032 ¶ 18). Petitioner asserts that while Dr. Russ stated that Kamieniecki's IB/OOB tuners would output an analog signal for "further processing" a POSITA would understand that additional processing would include conversion by an ADC, and "would not have limited Kamieniecki's monitoring to only analog signals." *Id.*

Petitioner further asserts that Patent Owner errs by attacking Kamieniecki alone, instead of the combination. Pet. Reply 13 (citing *Bradium Techs., LLC v. Iancu*, 923 F.3d 1032, 1050 (Fed. Cir. 2019)). Petitioner states that Konstantinos discloses an "information extraction

processor” that analyzes the signal “captured by the ADC” (i.e., digitized signal) to make measurements such as bit-error-rate. *Id.* at 13–14 (citing Ex. 1010 ¶ 109). Petitioner contends that a “POSITA would have found it obvious to include such measurements in Kamieniecki’s monitor.” *Id.* at 14.

Patent Owner replies that Mr. Lett’s testimony regarding Scientific-Atlanta’s Explorer 4200 should be disregarded. PO Sur-Reply 15–16 (citing Ex. 2013 ¶ 61). Patent Owner further argues that including an ADC in the “further processing” after Kamieniecki’s tuners would result in two ADCs. *Id.* at 16–17 (citing Ex. 2013 ¶ 128; Ex. 1032 ¶ 18). Patent Owner alleges that Petitioner presented an improper new argument by relying on a Kamieniecki and Konstantinos to disclose the signal monitor, rather than Kamieniecki alone. *Id.* at 17 (citing Pet. 38; Pet. Reply 13–14).

We agree with Petitioner that Patent Owner’s arguments attack Kamieniecki alone and do not properly consider what the combination of Kamieniecki and Konstantinos would have suggested to a POSITA. *See Bradium Techs, supra*. The Petition stated that Konstantinos’s ADC digitizes the received RF signal, and that Kamieniecki’s monitor would analyze digital signals from the IB/OOB tuners and determine signal quality information such as error count and signal level estimates. Pet. 32–33, 38. The Petition thus implies, contrary to Patent Owner’s argument (PO Resp. 38–39), that Kamieniecki’s monitor analyzes digitized signals operating in the digital domain (Pet. 38). Patent Owner does not explain why it would have been beyond a POSITA’s skill to modify Kamieniecki’s monitor to operate in the digital, rather than analog, domain to analyze the digitized signal for signal quality, as the Petition suggests. Pet. 38; Pet. Reply 12–14; Ex. 1032 ¶¶ 16–19.

Although the parties debate about whether there is “further processing” involving an additional ADC after tuning or monitoring (Pet. Reply 13; PO Sur-Reply 16–17), we do not read the Petition to suggest this, and the Petition sets forth Petitioner’s stance for the remainder of the proceeding. *SAS Institute, Inc. v. Iancu*, 584 U.S. 357, 366 (2018). Accordingly, we will not consider these arguments further.

We determine that Petitioner has shown by a preponderance of the evidence that the combination of Kamieniecki’s monitor with Konstantinos’s digitization teaches limitation 1G.

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 undisputedly 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 absence/presence” 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).

We determine that Petitioner has shown by a preponderance of the evidence that Kamieniecki teaches limitation 1H.

i) Conclusion for Claim 1

We determine that Petitioner has shown by a preponderance of the evidence that a POSITA would have been motivated to combine Kamieniecki and Konstantinos with reasonable expectation of success, notwithstanding Patent Owner’s arguments to the contrary. Petitioner also demonstrates that each limitation of claim 1 is disclosed or suggested by the combination of Kamieniecki and Konstantinos, notwithstanding Patent Owner’s arguments. Accordingly, Petitioner has shown by preponderant evidence that claim 1 would have been obvious over the combination of Kamieniecki and Konstantinos.

6. 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; PO Resp. 12–42. 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 ¶ 219). 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.

We find that Petitioner has shown by a preponderance of the evidence 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 *id.* § VI.A.2.b; Ex. 1002 ¶¶ 220–221).

Patent Owner does not dispute Petitioner’s contention.

We find that Petitioner has shown by a preponderance of the evidence that limitation 10B is taught by Kamieniecki.

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 does not dispute Petitioner’s contentions for limitation 10C.

We determine that Petitioner shows by a preponderance of the evidence that the combination of Kamieniecki and Konstantinos teaches limitation 10C.

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.

We find that Petitioner has shown by a preponderance of the evidence that Konstantinos discloses limitation 10D.

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 disputes that the references disclose limitation 10E (PO Resp. 39–42), which we find unavailing for the reasons stated for limitation 1F.

We find that Petitioner has shown by a preponderance of the evidence that limitation 1F is taught by Kamieniecki’s and Konstantinos’s decoders and IEP.

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 undisputedly 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).

We find that Petitioner has shown by a preponderance of the evidence that limitation 10F is taught by the combination of Kamieniecki and Konstantinos.

g) Conclusion for Claim 10

We determine that Petitioner has shown by a preponderance of the evidence 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 has shown by a preponderance of the evidence that claim 10 would have been obvious over the combination of Kamieniecki and Konstantinos notwithstanding Patent Owner's arguments.

7. 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 undisputedly contends that Kamieniecki reports “channel absence/presence” 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 that Kamieniecki’s “channel absence” amounts to a parameter that indicates the channel is outside of acceptable bounds. Petitioner shows by preponderant evidence 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 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 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 undisputedly 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 has shown that Kamieniecki’s STB “channel absence/presence” may be based on “signal level estimates” sent to the headend. *See, e.g.*, Ex. 1009 ¶ 14. We determine that Petitioner has shown by a preponderance of the evidence that claims 4 and 13 would have been obvious over the combination.

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 absence/presence” 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 has not shown 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”) of the channels it monitors, and that each channel has its

own frequency, such that reporting “channel absence/presence” to the headend would include whether signal power is out of bounds such that the channel cannot be displayed properly. Pet. 46–47 (citing Pet. §§ VI.A.2.g–h; Ex. 1009 ¶¶ 14–15, 22–23; Ex. 1002 ¶¶ 198–200), 57.

We agree with Patent Owner (PO Resp. 42) that controlling transmission of network management messages to the headend based on “channel absence/presence” or “signal level estimates” is not equivalent to reporting “signal power vs. frequency.” Although “channel absence/presence” may reflect whether signal level is “outside of acceptable bounds” it is not per se “signal power vs. frequency” which implies a graph, array or relationship with multiple pairs of power and frequency values, not just a single power-frequency data point. Petitioner has not shown 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 by preponderant evidence 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 absence/presence” 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 49–50 (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 absence/presence” 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 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 undisputedly 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 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.

8. *Conclusion for Claims 2–5, 7–9, 11–14, and 16–18*

For the foregoing reasons, we determine that Petitioner has shown by a preponderance of the evidence 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 that claims 3, 5–8, 12, and 14–17 would have been obvious.

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

We address below the disclosure of Sadjja, and Petitioner's contention that claims 3 and 12 would have been obvious to a POSITA considering Sadjja 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. *Sadja (Ex. 1021)*

Sadja is titled “Cable Diagnostic and Monitoring System.” Ex. 1021, code (54). Sadja 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). Sadja 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 Sadja’s teaching of monitoring modulation parameters to the system of Kamieniecki-Konstantinos “because it would improve the ability of Kamieniecki-Konstantinos 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 Sadja with Kamieniecki-Konstantinos would be merely using known techniques (Sadja’s STB monitoring of modulation parameters) to improve similar devices (devices with signal monitoring capability) to yield 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 Sadja’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).

We determine that Petition has shown by a preponderance of the evidence that a POSITA would have combined Kamieniecki, Konstantinos, and Sadjia 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 undisputedly contends that “Sadjia 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.

We determine that Petitioner has shown by preponderant evidence that the parameters reported in Sadjia pertain to modulation such that claims 3 and 12 would have been obvious over the combination of Kamieniecki, Konstantinos, and Sadjia.

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).

We determine that Petitioner has shown by a preponderance of the evidence 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.

We determine that Petitioner has not shown why a POSITA would have considered it obvious to send Aggarwal’s “frequency offset” as a parameter to the headend, as claimed. Aggarwal uses frequency offset in its receiver for various purposes, including to determine whether a frequency has a receivable signal and to set the modulation mode (*id.* at 4:64–5:4), and to correct drifts in its tuner using its pilot recovery device (*id.* at 11:17–21). Hence, a POSITA considering Aggarwal would not recognize any need to report frequency offset to the headend. Accordingly, Petitioner has not shown by preponderant evidence 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).

We determine that Petitioner has shown by a preponderance of the evidence 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 that Salinger’s MER or phase noise are equivalent to “signal phase vs. frequency” as claimed. Nor does Petitioner show that Kamieniecki’s “channel absence/presence” would be based on Salinger’s MER or phase noise. Accordingly, we determine that Petitioner has not shown by preponderant evidence 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 that claims 1–18 would have been obvious over Renken.

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.

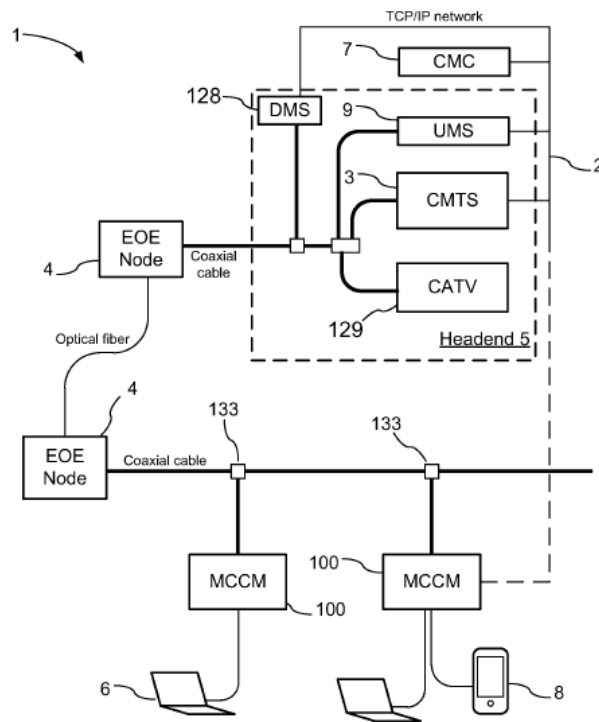


Fig. 1

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 1H of claim 1 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.”

Limitation 10F recites a similar limitation.

In asserting obviousness of claims 1–18, Petitioner reads the claimed “receiver” on Renken’s MCCM, and contends that the MCCM would transmit “network management messages” different from measured characteristics to the headend. Pet. 65–67. Petitioner contends that, since the MCCM’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 MCCM, collects, evaluates, and stores measurements from the MCCM which does not generate error reports or alarms corresponding to the claimed “network management messages.” PO Resp. 46 (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.” *Id.* at 46–47 (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 47–49.

Patent Owner’s arguments overcome Petitioner’s contentions that the claims would have been obvious. PO Resp. 44–49. Petitioner has not

shown that Renken’s MCCM as the claimed “receiver” sends anything equivalent to the claimed “network management messages” to the headend. Pet. 65–67; Ex. 1002 ¶ 277. Specifically, Renken teaches that error thresholds are sent in a measurement plan from the CMC to the MCCM, which trigger the MCCM to take measurements and report them to the CMC (or DAAP). Ex. 1011, 22:22–39, 22:67–23:4. As Patent Owner contends, however, the claims require that “said measured characteristic is different than said network management messages,” so Renken’s error thresholds would not satisfy the claims. PO Resp. 45–47; Ex. 2013 ¶¶ 138–139.

Alternatively, Petitioner asserts that the CMC’s error reports or alarms “could just as easily be generated at the MCCM.” Pet. 66; Ex. 1002 ¶ 280. But there is nothing to suggest this in Renken or elsewhere, and this would be contrary to Renken’s centralized architecture where the CMC requests MCCMs to perform measurements and return them to the CMC for collection, evaluation, and storage. PO Resp. 46–49; Ex. 1011, 8:35–50, 9:5–18; Ex. 2013 ¶¶ 135, 140.

Accordingly, we determine that Petitioner has not shown by a preponderance of the evidence 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 the 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 by preponderant evidence 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, we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 2, 4, 9–11, 13, and 18, but not claims 3, 5–8, 12, and 14–17, would have been obvious over the combination of Kamieniecki and Konstantinos (Ground A); and that claims 3 and 12 would have been obvious over the combination of Kamieniecki, Konstantinos, and Sadjia (Ground B). We further determine that claims 5 and 14 have not been shown obvious over the combination of Kamieniecki, Konstantinos, and Aggarwal (Ground C); that claims 7 and 16 have not been shown obvious over the combination of Kamieniecki, Konstantinos, and Salinger (Ground D); that claims 1–18 have not been shown obvious over Renken (Ground E); and that claims 5 and 14 have not been shown obvious over the combination of Renken and Aggarwal (Ground F).

IV. ORDER

For the foregoing reasons, it is

ORDERED that pursuant to 35 U.S.C. § 318(a), an *inter partes* review of claims 1–4, 9–13, and 18 of the '826 patent have been shown to be unpatentable but not claims 5–8, and 14–17; and

FURTHER ORDERED that any party seeking judicial review must comply with the notice and service requirements of 37 C.F.R. § 90.2.⁶

⁶ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this Decision, we draw Patent Owner's attention to the April 2019 Notice

Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claim(s) Shown Unpatentable	Claim(s) Not shown Unpatentable
1–18	103	Kamieniecki, Konstantinos	1, 2, 4, 9–11, 13, 18	3, 5–8, 12, 14–17
3, 12	103	Kamieniecki, Konstantinos, Sadjja	3, 12	
5, 14	103	Kamieniecki, Konstantinos, Aggarwal		5, 14
7, 16	103	Kamieniecki, Konstantinos, Salinger		7, 16
1–18	103	Renken		1–18
5, 14	103	Renken, Aggarwal		5, 14
Overall Outcome			1–4, 9–13, 18	5–8, 14–17

IPR2024-00442
Patent 9,825,826 B2

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EXHIBIT B

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 JON M. JURGOVAN, SCOTT. B. HOWARD, and
AARON W. MOORE, *Administrative Patent Judges*.

JURGOVAN, *Administrative Patent Judge*.

DECISION

Granting-in-Part Petitioner's Request on Rehearing
of the Final Written Decision
37 C.F.R. § 42.71(d)

I. INTRODUCTION

On September 15, 2025, Comcast Cable Communications, LLC (“Petitioner”) filed a Request for Rehearing (Paper 31, “Req. Reh’g”) of our Final Written Decision (Paper 30, “Decision” or “Dec.”) entered on August 15, 2025.

In our Decision, we determined that Petitioner had demonstrated that claims 1–4, 9–13, and 18 of U.S. Patent No. 9,825,826 B2 (“the ’826 patent,” Ex. 1001) are unpatentable, but had not demonstrated that claims 5–8 and 14–17 are unpatentable. Dec. 55.

In the Request for Rehearing, Petitioner contends that the Board’s finding for claims 6 and 15 of the ’826 patent relied on erroneous claim constructions in determining these claims not unpatentable as obvious over the combination of Kamieniecki and Konstantinos. Req. Reh’g 1–7. Regarding claims 8 and 17, Petitioner asserts that the Board overlooked disclosure of the signal-to-noise ratio in Konstantinos, rendering these claims unpatentable over the combination of Kamieniecki and Konstantinos. *Id.* at 7–9. In addition, Petitioner asserts that the Board overlooked disclosure in Renken’s provisional application stating that problems could be detected by the cable modem, such that the ’826 patent’s claims would be obvious over Renken alone, and in combination with Aggarwal. *Id.* at 9–12.

After review, for the following reasons, we grant-in-part Petitioner’s Request for Rehearing limited to claims 8 and 17 and modify the Final Written Decision accordingly.

II. STANDARD OF REVIEW

A party requesting rehearing bears the burden of showing that the decision should be modified. 37 C.F.R. § 42.71(d). Under 37 C.F.R.

§ 42.71(d), a party requesting rehearing of a decision must identify specifically all matters we misapprehended or overlooked, and the place where each matter was previously addressed. *Id.* When rehearing a decision on petition, the Board “review[s] the decision for an abuse of discretion.” 37 C.F.R. § 42.71(c) (2021). An abuse of discretion may be determined if a decision is based on an erroneous interpretation of law, if a factual finding is not supported by substantial evidence, or if the decision represents an unreasonable judgment in weighing relevant factors. *Star Fruits S.N.C. v. U.S.*, 393 F.3d 1277, 1281 (Fed. Cir. 2005).

III. ANALYSIS

We address Petitioner’s contentions below in the order presented in the Request for Rehearing.

A. Alleged Erroneous Claim Constructions Relating to Claims 6 and 15

For context in understanding Petitioner’s contentions, we reproduce excerpts of claims 1 and 6 below. Claim 15 is similar to claim 6.

Claim 1 of the ’826 patent recites in part:

controlling the transmission of network management messages
back to said headend based on said measured characteristic of
said received signal.

Ex. 1001, 7:51–53.

Claim 6 recites:

6. The method of claim 1, wherein said characteristic is
signal power vs. frequency.

Id. at 8:5–6.

Petitioner contends that the Final Written Decision errs in the construction of this claim language. Req. Reh’g 2–3. Specifically,

Petitioner asserts that the claim language does not require reporting a measured characteristic back to the headend. *Id.*

We agree with Petitioner that the claim language does not require reporting a measured characteristic to the headend. However, we disagree with Petitioner that we construed the claim language in this way. In the Final Written Decision, we stated the following:

Petitioner contends that Kamieniecki describes measuring signal level (“signal power”) of the channels it monitors, and that each channel has its own frequency, such that reporting “channel absence/presence” to the headend would include whether signal power is out of bounds such that the channel cannot be displayed properly. Pet. 46–47 (citing Pet. §§ VI.A.2.g–h; Ex. 1009 ¶¶ 14–15, 22–23; Ex. 1002 ¶¶ 198–200), 57.

We agree with Patent Owner (PO Resp. 42) that controlling transmission of network management messages to the headend based on “channel absence/presence” or “signal level estimates” is not equivalent to reporting “signal power vs. frequency.”

Dec. 42–43. This was not claim construction but merely restating what Petitioner contended (and we agreed) that Kamieniecki disclosed. *See, e.g.*, Pet. 46 (“Kamieniecki reports ‘channel presence/absence’ for a monitored channel to the headend”); Ex. 1009 ¶ 14. Accordingly, we did not engage in erroneous claim construction, as Petitioner asserts.

Petitioner further contends that we adopted an erroneous construction of “signal power vs. frequency” recited in claim 6 and claim 15.

Req. Reh’g 3–7. Specifically, Petitioner disagrees with our understanding of the ordinary and customary meaning of “signal power vs. frequency” as implying “a graph, array or relationship with multiple pairs of power and frequency values, not just a single power-frequency data point.” Dec. 43. Petitioner argues that we did not set forth this construction in our Institution

Decision (Paper 8) nor did Patent Owner or Petitioner propose it.

Req. Reh’g 3–4. Petitioner asserts that the ’826 patent’s specification mentions “signal power vs. frequency” only once and does not describe it as a graph, array, or multiple data points. *Id.* at 4–5. According to Petitioner, “signal power vs. frequency” may be met through measurement of power level at a single frequency. *Id.* at 6.

We are not persuaded by Petitioner’s arguments and hold to our understanding of “signal power vs. frequency” as “a graph, array or relationship with multiple pairs of power and frequency values, not just a single power-frequency data point.” Dec. 43. We think that those of ordinary skill in the art at the time would have been very familiar with functions of the form “y vs. x” or, in this case, “signal power vs. frequency.” Thus, our understanding is consistent with the ordinary and customary meaning of this claim language.

Petitioner also takes the view that that “*a* characteristic” in the ’826 patent’s claim 1 must be construed to mean “one or more.” *Id.* at 4. In addition, Petitioner contends that “signal power vs. frequency” is described in the ’826 patent with respect to “band C_{J+1} ” which “may comprise any portion or portions” of the signal. *Id.* at 4–5. We do not see how these assertions support Petitioner’s arguments. To the contrary, they support our understanding that “signal power vs. frequency” relates to multiple pairs of power and frequency values, i.e., a function.

Petitioner further contends that we overlooked Petitioner’s argument that Kamieniecki monitors multiple channels, not just one, and describes tuning to each of its monitored channels and measuring the signal level for reporting presence or absence of channels, which would involve multiple

pairs of power and frequency values. *Id.* at 5–6 (citing Pet. 46–47; Pet. Reply 18). Although Petitioner’s contention in this regard is correct (see Ex. 1009 ¶¶ 15, 22, Fig. 2), Petitioner has not shown that the combination of Kamieniecki and Konstantinos controls the transmission of network management messages to the headend based on “signal power v. frequency” as claimed.

Petitioner’s arguments concerning claim 6 and claim 15 do not demonstrate that we misconstrued the ordinary and customary meaning of the claim language, nor overlooked Kamieniecki’s teachings.

B. Overlooking of Konstantinos’s Disclosure of Signal-to-Noise Ratio as Recited in Claims 8 and 17

Claim 8 recites as follows:

8. The method of claim 1, wherein said characteristic is one of: signal-to-noise ratio, peak-to-average ratio, noise levels, bit error rate, and symbol error rate.

Ex. 1001, 8:9–11. Claim 17 recites a similar limitation.

Petitioner contends that we did not address in the Final Written Decision whether Konstantinos’s “Signal to Noise” satisfied the “signal-to-noise ratio” of claim 8 which when outside acceptable bounds would be a basis for Kamieniecki reporting channel absence to the headend. Req. Reh’g 7–9.

We agree with Petitioner that we overlooked considering Konstantinos’s “Signal-to-Noise” in relation to claim 8’s “signal-to-noise ratio” and grant rehearing on this issue. Ex. 1009 ¶ 109. After review, we determine that Konstantinos’s “Signal-to-Noise” is equivalent to claim 8’s “signal-to-noise ratio.” *Id.* at 8–9 (citing

Pet. 49–50; Ex. 1009 ¶¶ 14, 22–23; Ex. 1010 ¶ 109; Ex. 1002 ¶¶ 207–211).

Accordingly, we grant Petitioner’s rehearing request limited to this issue and modify the Final Written Decision to indicate that claim 8 and claim 17 are unpatentable as obvious over the combination of Kamieniecki and Konstantinos.

C. Alleged Overlooking Disclosure in Renken Provisional that Problems Could Be Detected by the Cable Modem

Petitioner challenged the ’826 patent’s claims as obvious over Renken (Ground E) and the combination of Renken and Aggarwal (Ground F). *See* Pet. 22, 58–76 (“the Renken grounds”). We determined that Petitioner had not demonstrated unpatentability of the ’826 patent’s claims on these grounds because Renken’s measurement-cable modems (MCCM) only reported measurements for centralized “collection, evaluation, and storage” by the central management controller (CMC), and sending only measurements would not meet the claimed “network management messages” since they are required to be “different than” measured characteristics according to the claims. Dec. 52–54.

Although Petitioner asserted that a CMC’s error reports or alarms “could just as easily be generated at the MCCM” (Pet. 66; Ex. 1002 ¶ 280), we determined that there was “nothing to suggest this in Renken or elsewhere, and this would be contrary to Renken’s centralized architecture where the CMC requests MCCMs to perform measurements and return them to the CMC for collection, evaluation, and storage.” Dec. 54.

Petitioner contends that we overlooked disclosure in Renken’s provisional (Ex. 1012), which was incorporated by reference in Renken (Ex. 1010), highlighted in blue below:

Some things enabled by this invention that do not exist in prior art:

1. An MCCM could detect that there is a problem with a non-DOCSIS channel within the customer premise. This problem could be addressed before the customer has a chance to complain about it.
2. Multiple MCCMs working together, as directed by the CMC, could detect that there is a problem with one or more non-DOCSIS channels in one part of the cable network. This would allow technicians to diagnose problems with network equipment outside a customer premise. The problem could be addressed before a customer complains about it.
3. An MCCM could use an upstream transmitter to transmit signals in the upstream frequency band to check frequency response of the upstream. Some other piece of network test equipment could reside at the headend and monitor these signals and determine if there problems in the upstream portion of the network.
4. An MCCM could detect that given the measurement results at its location, that a neighbor on the network without an MCCM might have a problem that needs to be investigated. This problem could be addressed before the customer complains about it.

Req. Reh’g 11 (citing Ex. 1012, 15).

We hold to our determination in the Final Written Decision that the Petition did not explain sufficiently how Renken and its provisional would teach or suggest the claimed “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” as recited in the claims of the ’826 patent. For example, Petitioner does not identify any equivalent, either in Renken or its provisional, to the “network management messages” whose transmission to the headend are based on “measured characteristics” at the MCCM.

Petitioner’s argument overlooks that the ’826 patent’s claims require that the signal to be analyzed has multiple channels and is received via the hybrid fiber coaxial (HFC) network, not from “a non-DOCSIS channel within a customer premise” or “a neighbor on the network” who lacks an MCCM. See above blue-highlighted portions of Renken’s provisional.

Accordingly, we are not persuaded by Petitioner’s argument that we overlooked disclosure in Renken’s provisional.

Petitioner further argues that we did not address Petitioner’s argument that even if the MCCM used its “error threshold” as a trigger for sending a

problematic measurement, prompt correction of the detected problem would have rendered obvious at least “including some information with the measurement to indicate that this is not just an ordinary measurement report, but rather indicative of a problem.” Req. Reh’g 12 (citing Pet. Reply 22). According to Petitioner, “marking a measurement urgent” or a “message saying my neighbor might have a problem” would qualify as a “network management message” as either would be different than the measurement and sent based on the measurement. *Id.* (citing Pet. Reply 19, 22).

Again, Petitioner has not demonstrated that the problems mentioned in Renken’s provisional have anything to do with the signal received by the MCCM over the HFC network as recited in the claims of the ’826 patent. For instance, the problem could be with the upstream signal or could be wholly unrelated to signal transmission or reception. Although Petitioner mentions that a message marked urgent or indicating a problem would constitute “network management messages,” we find no mention of any such messages in Renken or its provisional.

Accordingly, Petitioner’s arguments with respect to the Renken grounds do not establish that we overlooked or misapprehended any argument or evidence in the Final Written Decision.

IV. CONCLUSION

For the foregoing reasons, Petitioner has not shown that we overlooked or misapprehended Petitioner’s arguments and evidence with respect to claims 6 and 15 of the ’826 patent or the Renken grounds. However, Petitioner has shown that the Final Written Decision overlooked or misapprehended Petitioner’s arguments and evidence regarding claim 8 and claim 17 and we determine they are obvious over the combination of

Kamieniecki and Konstantinos. Accordingly, Petitioner's Request for Rehearing is granted-in-part as summarized below.

Outcome of Decision on Rehearing:

Claims	35 U.S.C. §	Reference(s)/Basis	Denied	Granted
6, 8, 15, 17	103	Kamieniecki, Konstantinos	6, 15	8, 17
1–18	103	Renken	1–18	
5, 14	103	Renken, Aggarwal	5, 14	
Overall Outcome			1–7, 9–16, 18	8, 17

Final Outcome after Rehearing:

Claims	35 U.S.C. §	Reference(s)/Basis	Claim(s) Shown Unpatentable	Claim(s) Not shown Unpatentable
1–18	103	Kamieniecki, Konstantinos	1, 2, 4, 8–11, 13, 17, 18	3, 5–7, 12, 14–16
3, 12	103	Kamieniecki, Konstantinos, Sadjja	3, 12	
5, 14	103	Kamieniecki, Konstantinos, Aggarwal		5, 14
7, 16	103	Kamieniecki, Konstantinos, Salinger		7, 16
1–18	103	Renken		1–18
5, 14	103	Renken, Aggarwal		5, 14
Overall Outcome			1–4, 8–13, 17, 18	5–7, 14–16

V. ORDER

For the foregoing reasons, it is

ORDERED that Petitioner's Request for Rehearing is granted-in-part.

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