

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COMCAST CABLE COMMUNICATIONS, LLC,
Petitioner,

v.

ENTROPIC COMMUNICATIONS, LLC,
Patent Owner.

CASE: IPR2024-00441

U.S. PATENT NO. 8,792,008

PATENT OWNER'S RESPONSE

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Exhibit Number	Description
Ex. 2001	Joint Claim Construction and Pre-Hearing Statement (Case 2:23-cv-01050-JWH-KES)
Ex. 2002	Kishore Seendripu, <i>At MaxLinear, our drive towards excellence shows in all that we do</i> , The Silicon Review
Ex. 2003	U.S. Patent No. 9,210,362 to Reddy et al.
Ex. 2004	K. Scott Helms, et al., Maxlinear White Paper, entitled "Leveraging Wideband and Full Spectrum Receiver Capabilities to Develop and Utilize Software-based Tools for Remote Spectrum Analysis and Troubleshooting"
Ex. 2005	Excerpts from Deposition of Timothy Gallagher, held on July 19, 2023 in <i>Entropic Communications, LLC v. Charter Communications, Inc.</i> , Case 2:22-cv-00125-JRG
Ex. 2006	Broadcom Corporation, "Full-Band Capture Cable Digital Tuning" White Paper, June 2011
Ex. 2007	DOCSIS® Best Practices and Guidelines: PNM Best Practices: HFC Networks (DOCSIS 3.0)
Ex. 2008	DOCSIS® Best Practices and Guidelines: Proactive Network Maintenance Using Pre-equalization (Ver. 2)
Ex. 2009	Jim Walsh, et al., SCTE White Paper, entitled "The Full (Band) Story: How Smart CPE Will Change HFC Maintenance Forever"
Ex. 2010	<i>Reserved</i>
Ex. 2011	<i>Reserved</i>
Ex. 2012	Diagram used at Mr. Lett's Deposition
Ex. 2013	Declaration of Dr. Samuel H. Russ
Ex. 2014	Deposition Transcript for Mr. David Lett
Ex. 2015	SCTE White Paper, entitled "Leveraging Full Band RF Capture to Improve the Customer Experience and Operational Performance"
Ex. 2016	MaxLinear Press Release regarding Remote Spectrum Monitoring
Ex. 2017	<i>Reserved</i>
Ex. 2018	ANSI/SCTE 06 2019 standard
Ex. 2019	DOCSIS 3.0 Standard (CM-SP-PHYv3.0-I09-101008)
Ex. 2020	SCTE White Paper, entitled "Full Band Capture Revisited"

I. INTRODUCTION

Patent Owner, Entropic Communications, LLC (“Entropic”), submits this Patent Owner Response (“POR”) to the *Inter Partes* Review (“IPR”) petition (“Petition”) filed by Comcast Cable Communications, LLC for claims 1-18 of U.S. Patent 8,792,008 (the “’008 Patent”).

To ensure network services operate within acceptable bounds, network service providers need to understand the quality of signals as they are received at customer premises. Traditionally, service providers had to send a technician to the customer’s premises to investigate any issues on site. Later, service providers began deploying equipment that could take measurements of the downstream spectrum and then report that information. But both of these approaches had the same disadvantage: they both interrupted the customer’s service. Given this, there was a need before the ’008 Patent for service providers to obtain an indication of the status of the network based on a measurement without interrupting the customer’s service.

The ’008 Patent discloses systems and methods that enable cable providers to do just this: remotely monitor the signal characteristics at a customer’s premises without interrupting service. To accomplish this, the ’008 Patent discloses that this monitoring functionality is built into the equipment already deployed to the customer premises and that signal analysis is to be performed in parallel with data processing. This parallel processing is achieved through *concurrently outputting* selected

portions of a received signal to both a signal monitor/analyzer and a data processor. By concurrently outputting a received signal in this manner, the system disclosed by the '008 Patent allows a service provider (*i.e.*, the source of the signal) to monitor characteristics of the signal received at a customer's premises without interrupting service to the customer or sending technicians into the field to diagnose issues.

The prior art references at issue take different approaches than the '008 Patent to monitoring the signal received at the customer's premises, resulting in fundamentally different architectures. As a result of these differences, the Petition fails to find prior art that discloses all of the elements of the challenged claims and therefore must resort to altering the prior art references to fill in critical gaps. While the Petition argues that these alterations would be "obvious," objective indicia evidence, contemporaneous with the invention of the '008 Patent, proves that the challenged claims are decidedly *not obvious*. The cable industry, including competitors of the original assignee of the '008 Patent (MaxLinear, Inc.) possessed every incentive to address the very problem MaxLinear solved with its '008 Patent, but they failed to identify a viable solution. It was only after MaxLinear's invention in the '008 Patent that the industry saw the way. After that, the claimed invention received significant industry praise and recognition, and it fundamentally changed how network service providers remotely monitored their networks. The industry's praise underscores the non-obvious nature of the claimed invention and critically,

the extent to which the Petition has to alter the prior art in its failed attempt to support its claims of obviousness.

Separate from the objective indicia evidence, it also would not have been obvious to combine the prior art references in the way proposed by the Petition because the references do not say what Petitioner says they do and do not fit together in the way Petitioner asserts. Patent Owner recognizes that, in its Institution Decision, the Board disagreed with Patent Owner's arguments that Kamieniecki could not be combined with Konstantinos, finding Patent Owner did not sufficiently show that Kamieniecki's "disclosure of gathering signal quality information during idle times is a basic principle of operation" or that changing it as the Petition proposes "would require a substantial reconstruction and redesign" of the two references. Paper 8 at 20. But that decision was made on a limited record, and the full record now before the Board confirms that Patent Owner was correct. Since that decision, Petitioner's expert, Mr. Lett, confirmed under oath during his deposition that Patent Owner was right all along. The system disclosed in Kamieniecki cannot monitor and output television channels concurrently—it *must* wait for idle to monitor and there are good reasons to do so. *See infra* Section V.A.4; *see also* Section V.B.2., *infra*. Patent Owner's expert, Dr. Samuel Russ, whose testimony the Board also did not have the opportunity to consider earlier, confirms Mr. Lett's admissions and conclusively explains why Petitioner's combination does not (and

cannot) render the challenged claims obvious.

Petitioner's expert, Mr. Lett, helpfully confirmed during his post-Institution Decision deposition other reasons why the proposed combination would not have been obvious to a POSITA. Mr. Lett confirmed that all transmissions to a set top box such as Kamieniecki are, in fact, analog in character; Kamieniecki's disclosure of "digital transmissions" is thus limited only to the digital *content* modulated onto an analog signal. For this reason, the Board's preliminary conclusion that Kamieniecki could analyze a digital signal because of references to "digital transmissions" is no longer viable." *See* Section V.B.1., *infra*. And, in direct contrast to the Petition's characterization of his testimony, Mr. Lett confirmed that he had not thought through *basic details* about his supposed opinions. For example, Mr. Lett did not think through how components of the proposed combination would be arranged to allow for the claimed concurrently output of separate portions of the digitized signal to a signal monitor/analyzer and a data processor. *See* Section V.A.2., *infra*; *see also* Section V.B.2., *infra*. Mr. Lett was given multiple opportunities to clarify some of these basic details at his deposition, but instead he refused to answer straightforward and open-ended questions about his positions. Mr. Lett thus introduced a new reason the challenged claims are not unpatentable: if he, an industry veteran with 35 years' experience could not figure out how to successfully combine Kamieniecki and Konstantinos as Petitioner's lawyers

propose, there is simply no way a POSITA having only 3-4 years of experience could either.

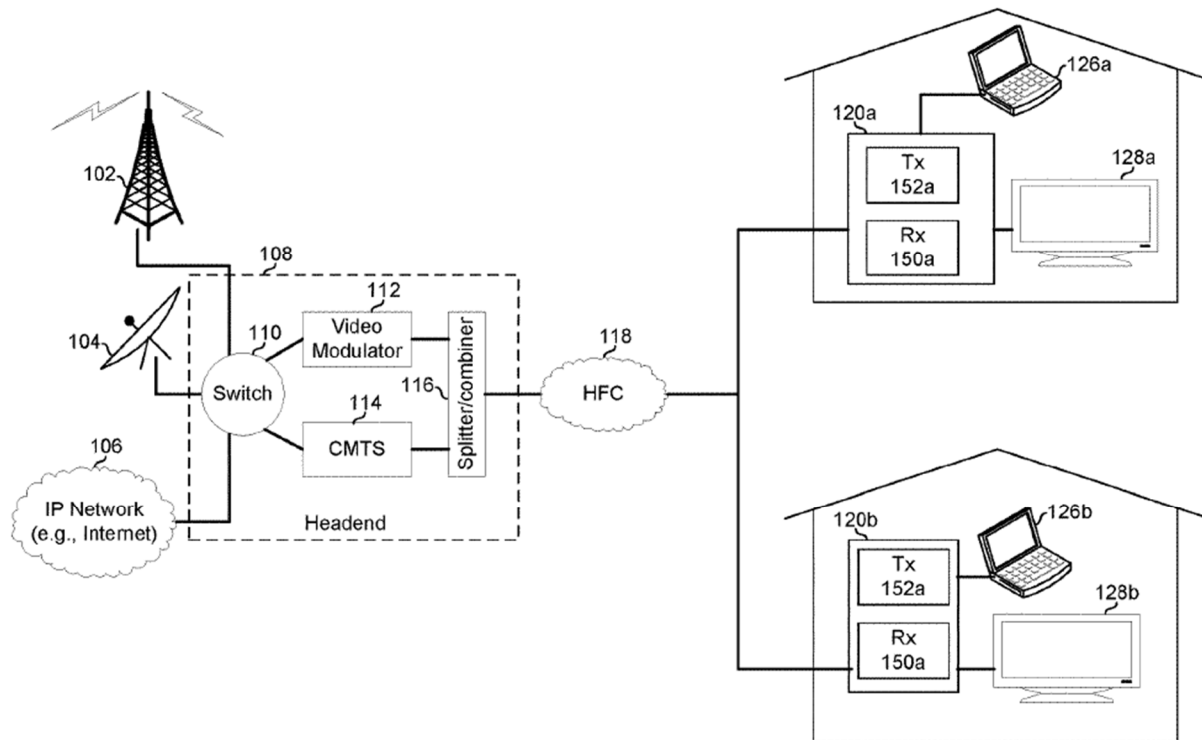
In sum, the Petition cannot help but take a hindsight-biased approach to rearrange the prior art in combinations and alterations that do not make sense, could not be made to make sense by its own expert, Mr. Lett, or are contrary to the references themselves. Moreover, even these flawed combinations fail to disclose the entire claimed invention, because each Ground fails to render obvious the claimed “concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor.” Ex. 1001, cl. [1E]; *also id.*, cls. [3D], [11D]. Accordingly, the Petition fails to articulate a *prima facie* case of obviousness for all challenged claims of the '008 Patent.

Because all Grounds fail to render obvious the independent claims of the '008 Patent, the entirety of the Petition should be rejected. *See Hartness Int'l Inc. v. Simplimatic Eng'g Co.*, 819 F.2d 1100, 1108 (Fed. Cir. 1987) (prior art that fails to demonstrate an independent claim as unpatentable similarly fails to demonstrate a dependent claim as unpatentable).

II. SUMMARY OF THE '008 PATENT

The '008 Patent describes systems and methods for spectrum monitoring of a network-based service, such as cable television, using equipment located at the customer's premises. Ex. 1001, 1:54-2:17, 2:34-3:4, 4:51-5:11. As shown in Figure

1A, an embodiment of the '008 Patent exists within a hybrid fiber-coaxial (HFC) network 118, which includes a headend 108 on one end of the network and a customer's premises on the other end. Located at the customer's premises would be equipment such as a set-top box, gateway, and/or cable modem, all of which are examples of customer premises equipment (CPE).



Ex. 1001, Fig. 1A.

Traditionally, network-based service providers had limited options to provide support to customers and troubleshoot quality-of-service and other issues at a customer's premises. *See id.*, 1:42-45. For example, when network parameters fell outside acceptable ranges such that the quality of service suffered, a provider would

need to both investigate and fix the issue. *See id.*, 1:34-42. For identifying network issues, there are two main approaches: (1) send out a technician to investigate using specialized equipment such as a spectrum analyzer, or (2) use CPE to measure the spectrum received from the headend. Both of these approaches had the same drawbacks: they interrupted the customer's service. For (1), technicians would usually only become aware of a problem in the network when a customer calls to complain after having already experienced unacceptable quality or complete failure of their service. Ex. 2013, ¶ 40. Thus, a customer, who is already frustrated by service issues, would be forced to wait for a technician in order to permit them access. Thus, on-site visits are disruptive. *Id.*

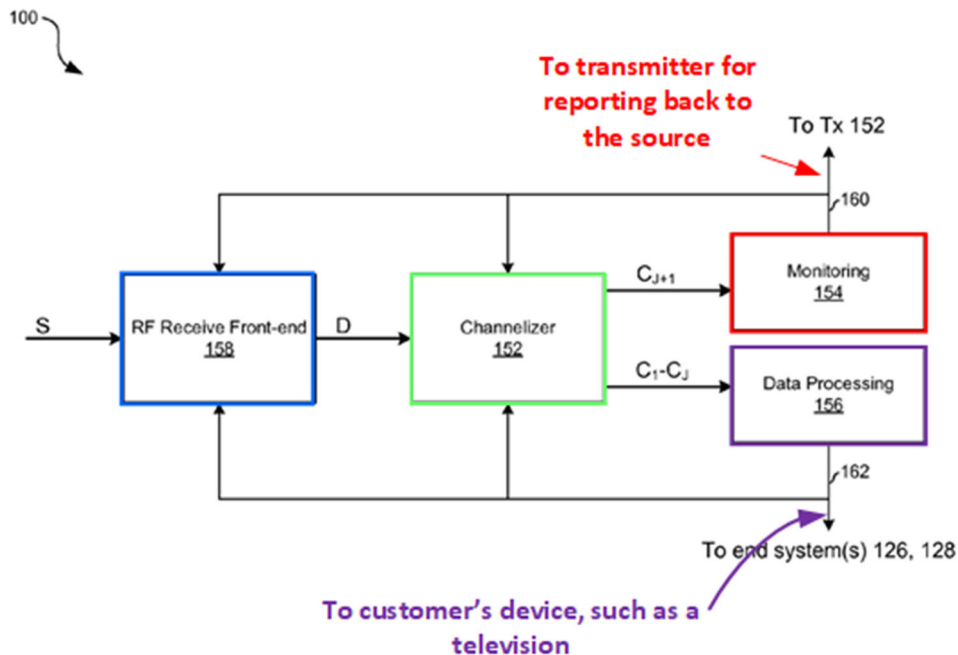
For (2), CPE in the prior art had limited processing resources that were tailored to providing services (e.g., TV, Internet) to the customer. *Id.*, ¶ 41. Because of this, if a network operator wanted the CPE to monitor the customer's signal, the network operator would have to interrupt the customer's service because the CPE did not have the ability to both monitor and provide services to the customer in parallel. *Id.* This is why network operators would often wait until CPE was not in use (i.e., idle) to conduct signal monitoring. *Id.* Accordingly, there was a need for a method by which network service providers could monitor the quality of service provided to a customer's premises without interrupting service. *See* Ex. 1001, 1:53-55.

The '008 Patent met this need. The '008 Patent disclosed systems and methods for monitoring signals that can be implemented in CPE deployed at the customer's premises. *Id.*, Abstract. Moreover, the '008 Patent discloses systems and methods that implement a concurrent output on parallel processing paths to avoid interrupting the customer's service. *Id.*, 4:7-10, cls. 1, 3, 11. These systems and methods allow service providers to remotely monitor the condition of the signal that is received by the customer equipment, without the need for a disruptive and costly service visit to the premises. *Id.*, 3:5-60. The receiver's front-end circuitry is designed to receive and digitize a received signal, determine a characteristic of the digitized signal, and then report that measured characteristic back to the source. *Id.*

Specifically, the '008 Patent discloses a solution capable of performing spectrum monitoring. *See, e.g., id.*, Abstract, Figs. 1B and 1C. The solution includes an apparatus which (1) receives and digitizes a signal spanning a full spectrum signal inside an RF front-end 158; (2) selects specific portions of the outputs of the front-end 158, using a channelizer 152; and (3) concurrently outputs one portion to a monitoring device 154 and another portion to a data processing device 156. *Id.*, 2:5-3:10. The provider is thus able to monitor actual signal conditions at the customer's premises (sent to the monitoring path) without interrupting service to the customer because signal continues to be provided to the data processor (along another path). *Id.*, 4:7-10.

First, the front-end 158 (shown in blue below) receives an analog signal that spans an entire television spectrum (*e.g.*, signal S in Fig. 1B below, which includes the entire signal from the lowest frequency “F_{lo}” to the highest frequency “F_{hi}”). *Id.*, 3:15-16, 5:41-47, 5:60-62. The signal is digitized using one or more analog-to-digital converters (ADCs) located in the front-end 158, resulting in digital signal “D” depicted in Figure 1B below. *Id.*, 3:16-19, 5:41-47, 5:58-65, cls. 1, 3, 11.

A channelizer 152 (shown in green below) then selects a portion of the digitized signal for output to a signal monitor or analyzer 154 (shown in red below) and a portion of the digitized signal for output to a data processor 156 (shown in purple below), which are output concurrently. *Id.*, 3:20-28, 4:7-10, Fig. 1B, cls. 1, 3, 11. The channelizer 152 may select for outputting to either or both of the parallel monitoring and data processing modules (1) all of signal D (*e.g.*, a signal spanning an entire television spectrum), or (2) any portion or portions of the signal D. *Id.*, 6:1-18.



Id., Fig. 1B (annotated).

The signal monitor/analyzer 154 receives the portion of the digitized signal output to its branch and determines one or more characteristics related to the performance of the communication system, such as the quality of the signal being received from the source. *Id.*, 3:33-45. For example, the signal monitor may determine the signal to noise ratio, signal strength vs. frequency, or any other quality that may help assess characteristics of the channel over which the signal was received. *Id.* After determining such characteristic(s), that information is reported back to a source of the signal (*e.g.*, cable provider of the signal). *See, e.g., id.*, 3:45-60 (specifically providing the example of a “cable headend” 108), cls. 1, 3, 11, Fig. 1A.

Claim 1 recites:

1. A system comprising:
an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum comprising a plurality of television channels, said digitization resulting in a digitized signal;
a signal monitor operable to:
analyze said digitized signal to determine a characteristic of said digitized signal; and
report said determined characteristic to a source of said received signal;
a data processor operable to process a television channel to recover content carried on the television channel; and
a channelizer operable to:
select a first portion of said digitized signal;
select a second portion of said digitized signal; and
concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor.

Ex. 1001, cl. 1. Broadly, this claim recites a system that digitizes a received signal spanning an entire television spectrum to create a digitized signal, *id.*, cl. [1A]-[1B], and then selects two portions of this digitized signal. *Id.*, cl. [1E]. The selected portions of the digitized signal are concurrently output, with a first portion going to a signal monitor and a second portion going to a data processor. *Id.* Claims 3 and 11, the other two independent claims, recite similar elements. *See id.*, cl. [3C] (“digitizing said received signal from F_{lo} to F_{hi} to generate a digitized signal”), [3D] (selecting and then concurrently outputting a selected first portion to a signal analyzer and a selected second portion to a data processor); *see also id.*, [11C] (“digitize said received signal from F_{lo} to F_{hi} to generate a digitized signal”), [11D] (reciting similar element as claim [3D]).

III. THE LEVEL OF ORDINARY SKILL IN THE ART

The Petition asserts that a person of ordinary skill in the art (“POSITA”) would have “a bachelor’s degree in electrical engineering, or a related field, and at a minimum three-to-four years of experience in development and design of broadband networks over coaxial cables.” Petition, 30. Patent Owner accepts the Petition’s POSITA solely for purposes of responding to the Petition in this proceeding, but as described below, Patent Owner asserts that the Petition has failed to carry its burden to demonstrate that the POSITA identified by Petitioner possesses the necessary skills to successfully combine the references as asserted in the Petition. Ex. 2013, ¶¶ 34-35. Dr. Russ satisfies the Petitioner’s proposed POSITA. *Id.*, ¶¶ 7-12, 36.

IV. CLAIM CONSTRUCTION

The Petition identifies terms from the ’008 Patent that were construed by the district court in the *Charter* case. Petition, 31. Patent Owner’s arguments below 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.

V. THE PETITION RELIES ON ART THAT IS FUNDAMENTALLY DIFFERENT FROM THE CLAIMED INVENTION AND THUS FAILS TO MEET ITS BURDEN

A. GROUND A-C FAIL BECAUSE THERE IS NO REASONABLE EXPECTATION OF SUCCESS OR MOTIVATION TO COMBINE THE REFERENCES IN THE MANNER PROPOSED

An obviousness determination requires finding both (1) that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and (2) that the skilled artisan would have had a reasonable expectation of success in doing so. *CRFD Rsch., Inc. v. Matal*, 876 F.3d 1330, 1340 (Fed. Cir. 2017) (quoting *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367-68 (Fed. Cir. 2016)). Grounds A-C fail because there is no reasonable expectation that the Petition's POSITA would be able to successfully combine Kamieniecki and Konstantinos in a manner that renders obvious the claimed invention and because the Petition fails to provide a sufficient motivation to combine the references in the manner proposed.

1. Overview of Kamieniecki, Konstantinos, and the Proposed Combination

The Petition omits from its discussion of the prior art references critical features of both Kamieniecki and Konstantinos. For Kamieniecki, the Petition fails to explain that Kamieniecki's monitor operates solely in the *analog* domain—and therefore cannot analyze a digitized signal as required by the claims. For Konstantinos, the Petition fails to explain that the reference discloses a 1:1 ratio

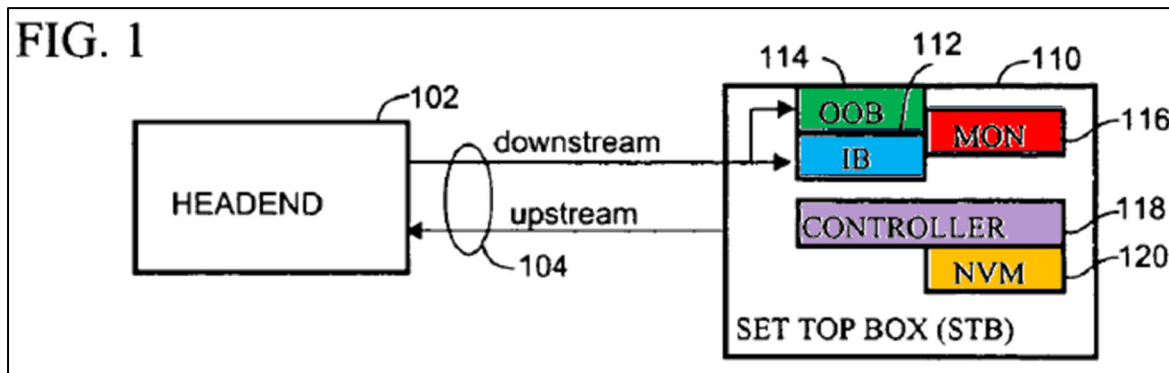
between channels selected and channels decoded and therefore cannot output a selected channel to both a data processor and a signal monitor. The Petition's failure to address these points, and others, reveals the weaknesses in the proposed combination. To better put into context the Petition's hindsight reconstruction of the prior art, a brief overview of the individual references and the proposed combination is provided.

a. Overview of U.S. Patent Publication 2005/0114879
(Kamieniecki)

Kamieniecki discloses a set-top box (STB) 110 which monitors and collects information about the quality of a received analog signal by iteratively tuning to each channel in the received signal when the STB is in an idle or "off" state. Ex. 1009, Abstract, Fig. 2, ¶¶ [0008], [0015], [0017], [0018]. As shown in Figure 1, STB 110 comprises:

an in-band (IB) tuner 112 for receiving first signals from the cable operator, an out-of-band (OOB) tuner 114 for receiving second signals from the cable operator, a monitor (MON) 116 for generating information related to signal quality on the channels (either or both IB and OOB), a controller (CONTROLLER) 118 for controlling the overall operation of the STB, and non-volatile memory (NVM) 120 for storing information

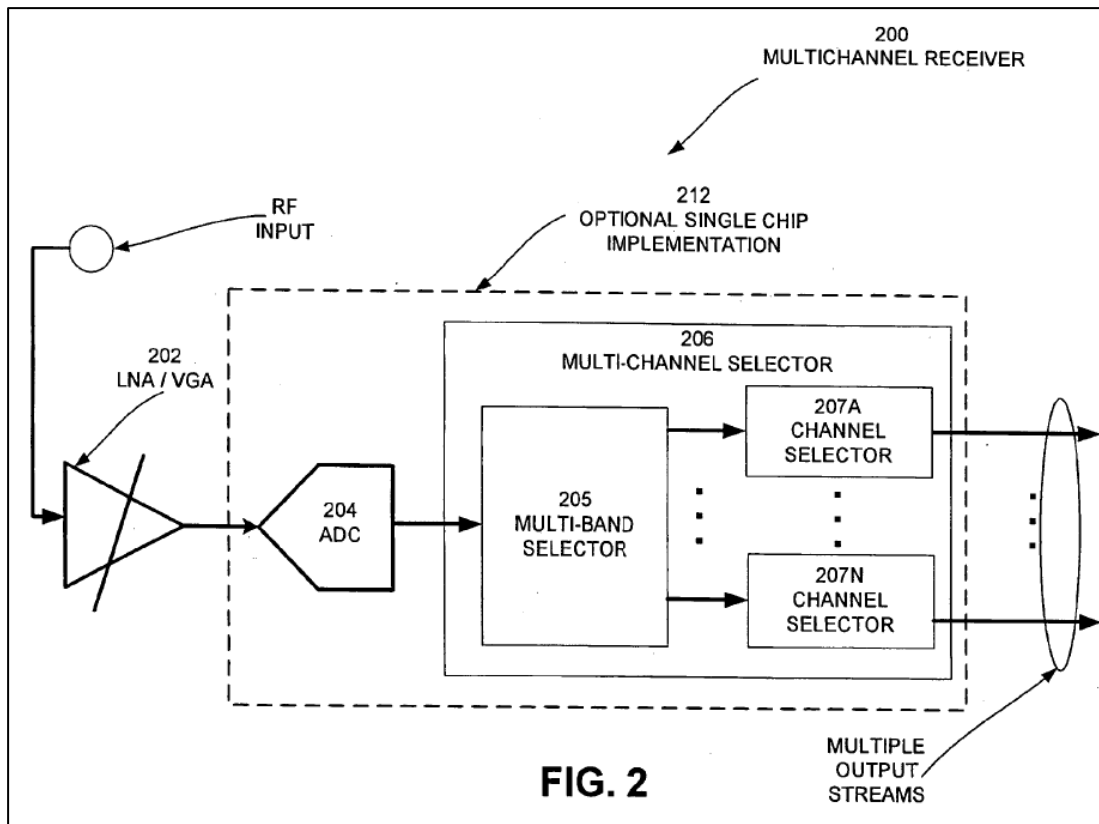
Id., ¶ [0014] (color annotations added).



Id., Fig. 1. Monitor 116 is responsible for gathering information relating to signal quality by tuning through each channel in the channel list and applying a time stamp to the information. *Id.*, ¶¶ [0008], [0015], [0017], [0018], Fig. 2. Although Kamieniecki discloses that it “may” wait for idle before gathering signal quality information, both experts agree that a POSITA would understand that Kamieniecki must wait for idle before it can gather signal quality information because of the single IB and OOB tuners. Ex. 1002, ¶¶ 145, 68 (“Kamieniecki described waiting until the STB 110 was idle before performing its monitoring, but this was only needed because Kamieniecki’s STB 110 had only one IB tuner 112 and only one OOB tuner 114”); Ex. 2013, ¶ 112. Monitor 116 waits for an idle or “off” state “so as not to disturb any viewer experiences” Ex. 1009, ¶ [0017]. Once monitor 116 has gathered signal quality information, STB 110 is capable of sending this information back to the headend 102, typically in response to a “poll” from the headend. *Id.*, ¶¶ [0017], [0024].

b. Overview of U.S. Patent Publication 2010/0120386
(Konstantinos)

Konstantinos is not about, and does not disclose any means of, monitoring a signal and reporting information upstream to any components outside the receiver, let alone to the headend. Konstantinos only discloses downstream signal processing. Konstantinos discloses a multi-channel receiver comprising an analog-to-digital converter (ADC) and a multi-band, multi-channel selector that is capable of selecting channels from an input signal. Ex. 1010, Abstract, ¶¶ [0043]-[0044]. In the embodiment illustrated in Figure 2, the ADC 204 of the multi-channel receiver is capable of digitizing a downstream composite broadband RF input signal that spans from 50-1000 MHz. *Id.*, ¶ [0043]. The output of the ADC is then presented to a multi-channel selector 206, which comprises a multi-band selector 205 and a series of channel selectors 207A-N. *Id.*, ¶¶ [0044]-[0045].



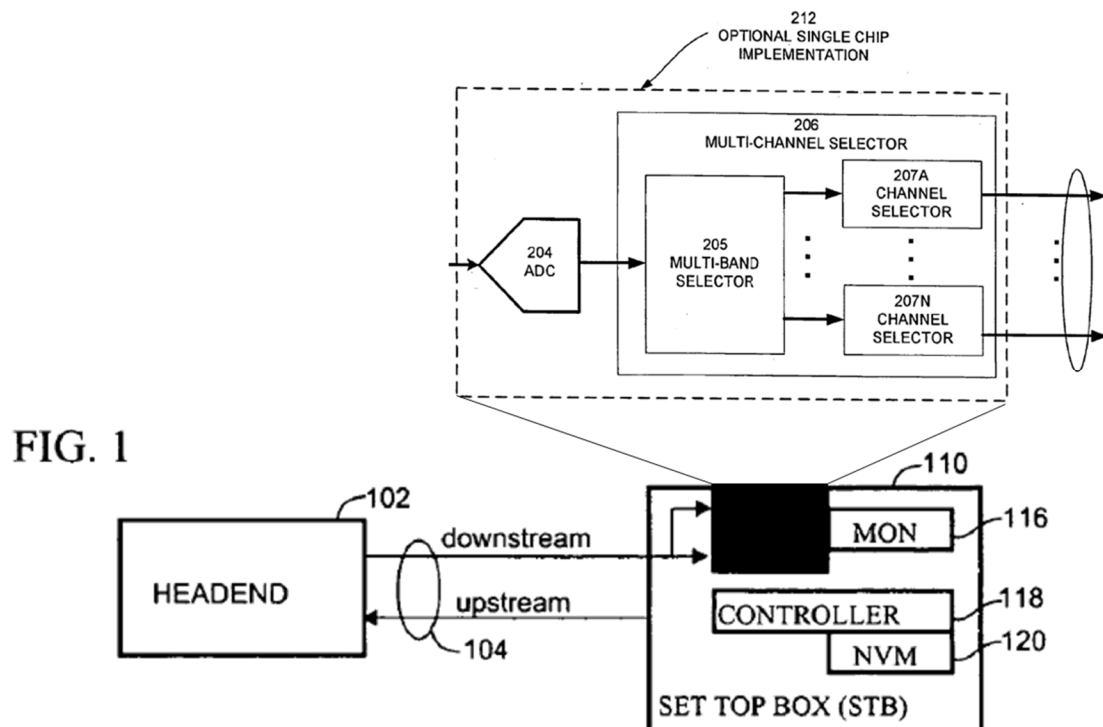
Id., Fig. 2.

The multi-band selector 205 and channel selectors 207A-207N may be configured to perform a two-step channel selection process. *Id.*, ¶ [0045]. In the first step, the multi-band selector 205 receives the ADC output and “realizes a coarse ‘channel’ selection” by splitting the signal into portions, or “bands,” of the original received TV band. *Id.* In the second step, the channel selectors 20A-207N realize a fine channel selection by selecting one channel only and delivering it at the output. *Id.*, ¶ [0046]. Ultimately, the number of channel selectors 207A-N “determines the number of simultaneously received TV channels at the output.” *Id.*; Ex. 2013, ¶¶ 88-89.

In sum, Konstantinos is simply a receiver architecture concerned with how to effectively process multiple television channels contained within the downstream RF signal. It has no disclosure—and indeed no awareness—of the problem of on-premises signal monitoring for an operator. Unsurprisingly it therefore has no mechanism for upstream reporting of anything, let alone signal quality.

c. Overview of the Proposed Combination

The Petition's proposed combination “replaces the IB and OOB tuners in Kamieniecki's STB with Konstantinos' multi-channel receiver.” Petition, 32. Thus, the Petition proposes a physical substitution of elements as illustrated below:



Ex. 1009, Fig. 1 & Ex. 1010, Fig. 2 (modified).

The Petition asserts that a POSITA would be able to make the proposed substitution because “Kamieniecki’s IB and OOB tuners use the same inputs (an RF signal) and same outputs (digital signal of the desired channel) as those of Konstantinos’ multi-channel receiver” Petition, 34-35. Thus, the Petition represents that these references are compatible and that components from Konstantinos could simply be substituted into Kamieniecki’s STB 110. This substitution appears simple only because the Petition misunderstands Kamieniecki’s and Konstantinos’s disclosures, as described below.

2. The POSITA Proposed by the Petition Would Not Have a Reasonable Expectation of Success in Combining Kamieniecki and Konstantinos as Proposed

The Petition asserts that a POSITA 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.” Petition, 30 (Ex. 1002, ¶¶ 40-42). The Petition also asserts that the proposed combination is a simple, physical substitution of elements with support from its expert, Mr. Lett. Petition, 32 (citing Ex. 1002, ¶¶ 112-15). But, as became apparent during Mr. Lett’s deposition, and as Patent Owner’s expert, Dr. Russ, testifies in support of this Response, a POSITA with that low level of skill and expertise would not be motivated to make the combination proposed by Petitioner, nor would that POSITA have any expectation of success in doing so.

Petitioner's expert, Mr. Lett, made two admissions during his deposition that undercut any motivation to combine or reasonable expectation of success that Petitioner's defined POSITA would have relating to Kamieniecki and Konstantinos. The first admission is a general admission, and confirms that a POSITA at the low level of skill identified by Petitioner and Mr. Lett would not be able to make the changes to the art they propose. The second admission is specific, that even though Mr. Lett himself has far greater skill than Petitioner's POSITA, even he could not explain how a POSITA would successfully make the physical substitution of Konstantinos into Kamieniecki that Petitioner proposes. If he cannot explain how the combination could be achieved, how could a low-level POSITA as proposed?

As to Mr. Lett's first admission, around the critical date, he managed a large team of engineers at a well-known developer of set-top boxes, Scientific Atlanta. *See* Ex. 2014, 30:11-31:14; *see also* Ex. 1003. That team involved many individuals who possessed a range of industry experience and often included individuals with a Ph.D. or master's degree. Ex. 2014, 33:1-12, 34:21-35:1, 35:5-11; Ex. 2013, ¶ 99. It would be these individuals with more advanced degrees that would be responsible for designing complicated or complex functionality as would be necessary to make the proposed combination here. Ex. 2013, ¶¶ 99-100. In particular, the proposed combination would require integration of the high-speed ADC of Konstantinos, which would require a significantly larger sampling rate in order to digitize the

received signal. Ex. 2013, ¶¶ 91-92; *see also* Ex. 2018, p. 4. To support this sampling rate, additional power supplies and other components would be added to Kamieniecki's STB. Ex. 1009, ¶¶ 91-92. The complexity involved in this would effectively result in a complete redesign of Kamieniecki's STB. *Id.*, ¶ 97.

As Mr. Lett testified, tasks when designing a STB would be assigned to team members based on their skill: “the more complicated or complex functionality”—like determining the power consumption of a high speed analog to digital converter as would be required by Petitioner's combination—would be given to a more experienced engineer; whereas, the “simpler tasks” would be given to an engineer with a similar skill level as the Petition's POSITA. Ex. 2014, 35:12-22; Ex. 2013, ¶¶ 100-01. As Dr. Russ notes, these individuals would not have been trusted with the more complicated functionalities because they lacked the skills to make it work. Ex. 2013, ¶¶ 100-01. Thus, both experts agree an individual with experience commiserate with the Petition's POSITA lacked the knowledge and experience needed to design circuits that implement more complex functionality such as high speed analog to digital conversion—which would be necessary if the POSITA integrated Konstantinos's multi-channel receiver into Kamieniecki's STB.

Mr. Lett's second set of admissions is even more disruptive to Petitioner's case here. Even though Mr. Lett has more experience than Petitioner's POSITA, even he had to admit that he had not figured out how one would supposedly combine

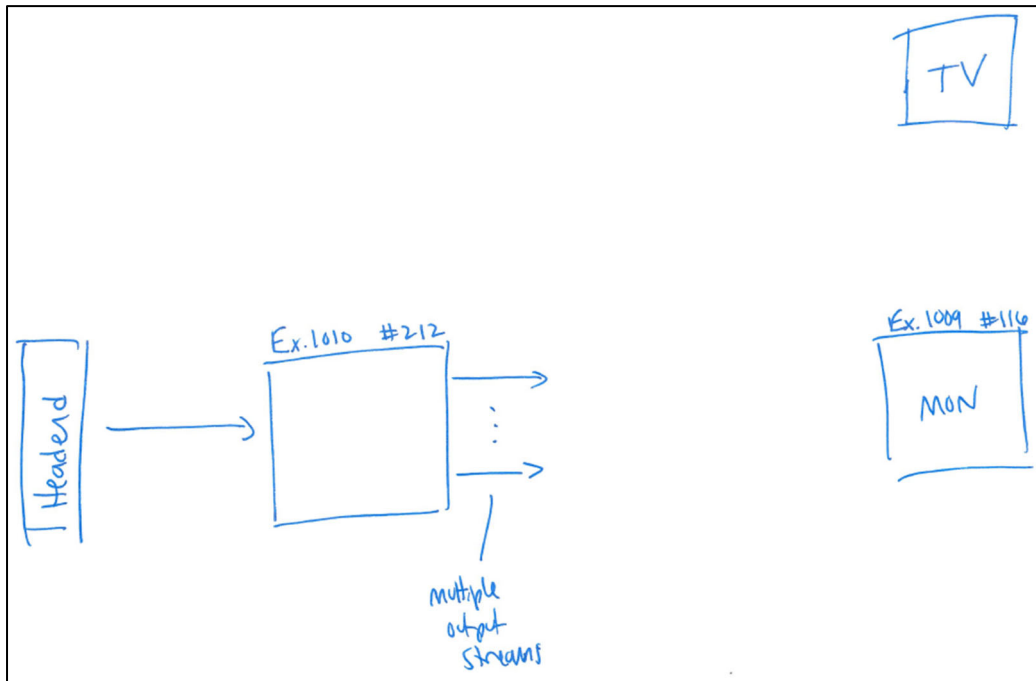
Konstantinos and Kamieniecki as Petitioner's attorneys argue would be done in the Petition. Specifically, he could not:

- (1) explain how Konstantinos's multi-channel receiver would output to both a decoder (the claimed data processor) and the monitor of Kamieniecki (the claimed signal monitor/analyzer) as required by the '008 Patent claims (Ex. 2014, 174:3-10, 175:6-16, 175:21-176:16);
- (2) identify how many tuners (i.e., channel selectors) there would have to be in his resulting combination of Kamieniecki and Konstantinos (Ex. 2014, 150:7-20); or
- (3) even identify which reference—Kamieniecki or Konstantinos—he was relying on as disclosing the required “data processor” of the challenged claims (Ex. 2014, 159:6-20).

Mr. Lett's first failure is quite significant and demonstrates that the Petition's POSITA would be unable to combine the references in a manner that would render the challenged claims obvious. The independent claims of the '008 Patent require that two portions of the digitized input signal be concurrently output to the data processor and the signal monitor/analyzer. Ex. 1001, cls. 1, 3, 11. Because Mr. Lett opines that the physical-substitution combination of Kamieniecki and Konstantinos renders this portion of the challenged claims obvious, the law presumes that he had

thought through how a POSITA would combine the references and concluded that the POSITA would have a reasonable expectation of success in so doing.

But when asked to explain his rationale as to how he (or his POSITA) would arrange the combination, he could not say. Specifically, Mr. Lett was asked to identify how the decoders would be arranged with respect to the multi-channel receiver of Konstantinos and the monitor of Kamieniecki to allow for concurrent output. After Mr. Lett resisted question-and-answer on that topic (*see generally* Ex. 2014, 155:7-161:13), Mr. Lett was given the opportunity to explain by drawing what his opinion was: how do the multiple output streams of Konstantinos's multi-channel receiver connect to either/both of Kamieniecki's monitor and the "TV" for the user to view a channel vis-à-vis one or more decoders. Ex. 2014, 158:7-161:13, 168:20-169:19. A blank space on a hand drawing was left for him to fill in:



Ex. 2012. Mr. Lett refused to fill in the gap. Mr. Lett testified that, if he were to identify the location of the decoders, it would be a “new opinion” and he would “need more time to think about those details.” Ex. 2014, 174:21-176:16. But if it is a new opinion to explain how his combination is arranged, then he has no opinion for Petitioner to rely on or the Board to credit with any weight at all.

Ultimately, if Mr. Lett as an “industry veteran” with over 35 years of experience designing set-top boxes cannot figure out the details (Ex. 1002, ¶ 4; Ex. 1003), it would be unreasonable to find that the inexperienced POSITA with only three to four years of experience would have any expectation of success in combining the references. In other words, if Petitioner’s expert cannot explain how

he himself would make the proposed combination, Petitioner has no way of showing that a POSITA having far less skill and experience would be motivated to do so too.

To further undercut the Petition's basis for concluding there is a reasonable expectation of success is that Kamieniecki and Konstantinos receive differently formatted RF signals. Ex. 2013, ¶ 95. The Petition assumes that the signal received by Kamieniecki's STB is the same as the signal received by Konstantinos. *See* Petition, 34-35 ("Kamieniecki's IB and OOB tuners use the same inputs (an RF signal) and same outputs (digital signal of the desired channel) as those of Konstantinos' multi-channel receiver chip"). But although both devices receive an RF signal, they are formatted differently: because Kamieniecki recites an OOB tuner, Kamieniecki's STB receives a downstream signal that contains both IB and OOB channels. Ex. 2013, ¶ 95. This means that the OOB channels would have a bandwidth of 1.8 MHz or between 1-2 MHz, whereas the bandwidth of the IB channels would be 6 MHz. Ex. 2013, ¶ 96. In contrast, Konstantinos would receive a downstream signal formatted based on the DOCSIS standard, which requires a standard 6 MHz bandwidth across the entire downstream spectrum. *Id.*

This disparity between DOCSIS and OOB would force the POSITA to reprogram the channel selectors of the multi-channel receiver to handle the different bandwidths of the IB/OOB downstream signal, which is what the Petition relies on for disclosing the claimed "received signal." Petition, 36 (citing Ex. 1009, [0013]).

Failure to do so would render the channel selectors of Konstantinos incapable of selecting OOB channels. This is yet another detail the Petition omits in an effort to disguise its proposed combination as a simple substitution of elements. And, as Dr. Russ explains, a POSITA at the low level of skill proposed by Petitioner would have no expectation of success in making such a change. Ex. 2013, ¶¶ 100-101.

In sum, Mr. Lett's admissions make two things clear: (1) the Petition's POSITA would lack the experience needed to design STBs that incorporate complex functionality like Konstantinos's multi-channel receiver in 2011, and (2) combining the references as proposed by the Petition includes a series of complicated, important details that are beyond the skill of the Petition's POSITA for they were beyond the skill of Mr. Lett's extensive experience. Mr. Lett's admissions also undercut his declaration, which is the only evidence the Petition relied upon to support its assertion that its POSITA would have had a reasonable expectation of success. Petition, 35 (citing Ex. 1002, ¶ 127). Therefore, the Petitioner has failed to carry its burden of demonstrating a reasonable expectation of success. *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367 (Fed. Cir. 2016).

3. A POSITA Would Not Be Motivated to Add a Multi-Channel Receiver Like Konstantinos Discloses to Kamieniecki

The Petition asserts that a POSITA would have been motivated to replace Kamieniecki's IB and OOB tuners with Konstantinos's multi-channel receiver "to

enable simultaneous tuning and monitoring of larger numbers of channels (e.g., four or more) as required by new cable technologies such as DOCSIS 3.0.” Petition, 34. Additionally, the Petition asserts that replacing the IB and OOB tuners of Kamieniecki would reduce “cost and complexity through a single chip solution.” Petition, 34. Petitioner is wrong on both counts.

The Petition provides no support for the assertion that DOCSIS 3.0 required “simultaneous tuning *and monitoring*.” Petition, 34 (emphasis added). Mr. Lett is wrong about what DOCSIS 3.0 discloses. DOCSIS 3.0 does not require the simultaneous tuning and monitoring of different channels. *See, generally*, Ex. 2019; Ex. 2013, ¶ 103. Thus, in 2011, there is no basis to conclude that DOCSIS 3.0 would motivate a POSITA to make the proposed combination because *there is nothing about DOCSIS 3.0 to say what Mr. Lett and Petitioner claim it says*. Remarkably, neither the Petition nor Mr. Lett cite or include DOCSIS 3.0 with their papers to support such a claim because it would not support Mr. Lett’s opinions. Although the Petition cites to Konstantinos and Mr. Lett’s declaration, the cited portion of Konstantinos does not mention monitoring channels (*see* Ex. 1010, ¶ [0011]), and the cited paragraph of Mr. Lett’s declaration provides no additional reasoning as to why simultaneous monitoring would be required. *See* Ex. 1002, ¶ 125. Mr. Lett also admitted he had not reviewed DOCSIS when preparing his declaration and did not remember whether DOCSIS currently required simultaneous monitoring and

processing or if it was required in 2011. Ex. 2014, 52:14-19, 53:9-12, 53:15-54:1. How can Mr. Lett opine about DOCSIS 3.0 and whether a POSITA would be motivated in light of its disclosures if Mr. Lett did not review the document in preparing his opinions and was not familiar enough with it to explain what it disclosed? Mr. Lett and Petitioner do not say, and thus Mr. Lett's testimony should be given little weight.

Petitioner is also wrong to argue that the IB and OOB tuners of Kamieniecki would reduce "cost and complexity through a single chip solution," Petition, 34, and the opinions of both experts in this case prove otherwise. Beginning with complexity, the proposed combination would actually increase the complexity of Kamieniecki's STB in order to accommodate Konstantino's multi-channel receiver. Ex. 2013, ¶ 105. The high-speed ADC taught by Konstantinos alone would require additional power supplies and shielding in order for the combination to function properly. Ex. 2013, ¶¶ 90-97.

As for costs, contrary to the Petition, the proposed substitution of elements would be expensive, especially considering the applications for which Kamieniecki's STB would be utilized. As an initial matter, there would be a significant cost needed to design and develop the proposed STB. Around the priority date, developing a new STB took significant time and effort: it typically would take at least 100 individuals approximately six to twelve months to develop a new STB.

Ex. 2014, 25:8-19, 30:15-19, 31:11-14; Ex. 2013, ¶¶ 106-07. Furthermore, the cost of a STB is extremely price sensitive to the point where “pennies matter.” Ex. 2014, 26:7-15, 28:17-20; Ex. 2013, ¶ 76. Thus, to keep costs down, a STB would only have the needed functionality for the STB’s intended application. Ex. 2013, ¶ 108; Ex. 2014, 28:13-16.

Here, Kamieniecki’s STB, with its single IB and OOB tuner would be considered a “basic” STB designed for applications that only require a single channel to be selected at a time. Ex. 2013, ¶ 108. On the other hand, Konstantinos’s multi-channel receiver was designed to select multiple channels. *See* Ex. 1010, ¶ [0011]; Ex. 2013, ¶ 108. This type of functionality would be integrated into more advanced STBs that were intended to allow simultaneous viewing or recording of different channels. Ex. 2013, ¶ 108. Given this additional functionality and the additional components needed, a STB with Konstantinos’s multi-channel receiver would be more expensive than a basic STB like Kamieniecki’s. *Id.*, ¶¶ 108-09.

Given the differences in cost, a POSITA would not have been motivated to incorporate a more expensive multi-channel receiver into a basic STB because the application for which the basic STB would be used do not need multi-channel functionality. *Id.*, ¶¶ 108-10. Thus, if a cheaper, basic STB can meet the needs of the consumer, there would be little motivation to add more functionality, thereby increasing the cost. Remember, pennies matter in this industry. By way of an

analogy, replacing the IB and OOB tuners with Konstantinos's multi-channel receiver would be like replacing the engine of a Honda Accord with the engine from a Formula 1 race car. *Id.*, ¶ 109. The Honda may be able to go faster, but this additional speed would unnecessarily drive up the cost of the Honda and make it more expensive than necessary for driving around town or commuting to work—the purposes for which the Honda was designed. Thus, like putting an F1 engine in a Honda, the proposed replacement of the IB and OOB tuners with the multi-channel receiver is absurd.

In sum, the complexity and cost of incorporating Konstantinos's multi-channel receiver into Kamieniecki would weigh against a motivation to combine these references in the manner proposed in the Petition. Moreover, a POSITA would not be compelled by DOCSIS 3.0 to make the combination as DOCSIS 3.0 does not require simultaneous tuning and monitoring.

4. The Proposed Combination Would Fundamental Alter The Asserted Prior Art and Render them Inoperable

To further demonstrate the lack of motivation to combine Kamieniecki and Konstantinos, the Petition's proposed combination requires alterations to the fundamental architecture and functioning of both references.

Starting with Kamieniecki, although the Board found that Kamieniecki “does not *require* collection of information only during idle times” (Paper 8, 20), both

experts agree that Kamieniecki's fundamental principle of operation is to wait for idle before gathering signal quality information. Ex. 1002, ¶¶ 145, 68; Ex. 2013, ¶¶ 112-13. Mr. Lett also confirmed this understanding at his deposition: "Kamieniecki is describing that you are either watching television . . . , or you are monitoring the channel, collecting channel statistics when it is in the idle state or the off state." Ex. 2014, 113:5-18; *also id.*, 128:21-129:14 ("Q. There is no disclosure in Kamieniecki of how to monitor in-band channels, other than when the in-band tuner is idle, right? A. I think that's correct."). Additionally, the experts agree that Kamieniecki conducts signal analysis while the STB 110 is "off" or idle because of the limited number of tuners. Ex. 1002, ¶¶ 145, 68; Ex. 2013, ¶¶ 112-13. Given this, a POSITA would understand that Kamieniecki's does wait for idle.

Despite this common understanding between the experts, the Petition asserts that a POSITA would disregard Kamieniecki's principle of operation and do the exact opposite—i.e., gather signal quality information while the STB is in use. This fundamental change weighs strongly against any motivation to combine. *Plas-Pak Indus., Inc. v. Sulzer Mixpac AG*, 600 F. App'x 755, 759 (Fed. Cir. 2015) ("[A] change in a reference's 'principle of operation' is unlikely to motivate a person of ordinary skill to pursue a combination with that reference."). The Petition's only rationale for disregarding Kamieniecki's disclosure is a POSITA "would have recognized" that the combination's alleged ability to simultaneously tune to multiple

channels would allow for signal monitoring without waiting for an idle time. Petition, 43 (citing Ex. 1002, ¶ 145).

However, simply having the ability to select multiple channels does not automatically mean that monitoring would happen in parallel with data processing as demonstrated in the prior art. According to Mr. Lett, Kamieniecki itself could select different channels and monitor one channel while processing the other. Ex. 2014, 123:19-124:8 (“Q. Kamieniecki can monitor one channel on the in-band band and one channel on the out-of-band at the same time? A. Correct.”). Thus, despite having the ability to monitor one channel and process another, Kamieniecki made the decision to wait for the STB to be idle before gathering signal quality information as both experts have acknowledged. Ex. 1002, ¶ 145; Ex. 2013, ¶¶ 114-15. It made this decision to avoid interrupting the user’s service (Ex. 1009, ¶ [0017]) and the Petition has provided no reason to disregard this deliberate choice.

Another example, Renken—which is asserted in the Petition and is contemporaneous with the ’008 Patent—waits for resources to be idle before monitoring a received signal despite having multiple receivers arranged in parallel. *See* Ex. 1011, 4:45-50; *also* Ex. 1002, ¶ 90 (“Renken describes that the MCCM 100 may receive a request, from a central measurement controller (CMC) 7, to perform measurements using one or more idle receivers, and the MCCM 100 may send its measurement results back to the CMC 7.”); Ex. 2013, ¶ 116. When confronted with

this, Mr. Lett could not explain why his proposed combination would no longer wait for idle while Renken waited for idle. *See* Ex. 2014, 147:3-20. Therefore, having the ability to select multiple channels does not automatically mean you would process information in parallel.

At base, Kamieniecki offers a complete signal-monitoring solution that gathers signal quality information by tuning through the channel list while the STB is idle and then reports that information. Ex. 1009, ¶¶ [0008], [0015], [0017], [0022], Fig. 2. Therefore, absent the hindsight bias of the Petition, a POSITA would not be motivated to fundamentally alter Kamieniecki simply because incorporating Konstantinos's multi-channel receiver would increase the number of tuners, especially when Kamieniecki *already has multiple tuners* and is capable of tuning to multiple channels simultaneously.

The Petition is also implicitly attempting to fundamentally change the architecture of Konstantinos by alternating the number of channel selectors or channel decoders. Mr. Lett attempted to address the glaring gaps in his analysis by asserting that a POSITA would modify the number of channel selectors in Konstantinos's multi-channel receiver to provide a dedicated signal monitoring pathway. Ex. 2014, 139:3-19. Based on this, Mr. Lett is advocating either of the following fundamental changes to Konstantinos: (1) a POSITA would remove a decoder from Konstantinos so that a channel selector would be dedicated to the

signal monitor (N-1 number of decoders), or (2) a POSITA would include an extra channel selector that specifically outputs to the signal monitor (N+1 number of channel selectors).

Both options fail. As a procedural matter, neither the Petition nor Mr. Lett provide support for either option. As a substantive matter, a POSITA would not alter Konstantinos's fundamental architecture in this manner. Konstantinos clearly discloses that for N number of channel selectors there would be N number of decoders, thus a 1:1 ratio between channel selectors and decoders. *See, e.g.,* Ex. 1010, ¶ [0046]. A POSITA would not be motivated to remove a decoder (i.e., N-1 number of decoders) as removing a decoder would reduce the number of channels simultaneously available to the user. And neither the Petition nor Mr. Lett identifies any suggestion or motivation to add a dedicated signal monitoring pathway to Konstantinos. Again, as discussed above, the development and design of STBs was extremely price sensitive. Therefore, a POSITA would be unlikely to include additional hardware in the form of an additional channel selector that is not required by any standard or demanded by the customer.

Finally, the Petition's proposed motivation to combine is outweighed by the fact that the proposed combination of Kamieniecki and Konstantinos would render Kamieniecki's reporting functionality inoperable. In its Preliminary Response, Patent Owner argued that replacing the OOB tuner with the multi-channel receiver

would render the combination unable to “report” a determined characteristic to the source. Paper 7, 34-35. The Board rejected this argument in its Institution Decision, finding that “Kamieniecki appears to disclose using a separate transmitter, such as a modem, to transmit signal quality information from the STB to the headend.” Paper 8, 26 (citing Ex. 1009, ¶ 14). The Board was partly correct in this finding. It is true that the disclosed transmitter would remain in the proposed combination, and therefore, the proposed combination would retain the physical capability to transmit information to the headend. However, the transmitter would not know when to report a determined characteristic after removal of the OOB tuner.

Kamieniecki discloses that it reports signal quality information to the headend when (1) the STB is polled by the headend or (2) as the information is collected. Ex. 1009, ¶ [0014]. For (1), “[t]wo-way polling can be implemented, for example, by polling the STB from the headend via the downstream path (*typically on the OOB channel*), and having the STB report back via the upstream path.” Ex. 1009, ¶ [0017] (emphasis added). Although Kamieniecki uses “typically,” a poll would be communicated on the OOB channels because a POSITA would not remove a television signal to make room for a poll given the OOB channels were developed specifically for set-top box management. Ex. 2013, ¶¶ 57-58. Thus, without the OOB tuner, the proposed combination would not be able to receive the poll being

transmitted on the OOB channels unless Konstantinos's multi-channel receiver was redesigned to process an OOB channel. Ex. 2013, ¶¶ 120-22.

For (2), reporting information as it is collected also depends on the OOB tuner. Depending on the OOB channel standard being used, removing the OOB tuner would create one of two issues. Ex. 2013, ¶¶ 122-23. First, if the OOB tuner uses an OOB standard called Society of Cable Telecommunication Engineers ("SCTE") 55-1, then the STB would be unable to receive an acknowledge message and would continue to transmit the same information until the STB stops reporting. Ex. 2013, ¶ 122. Second, if another standard—SCTE 55-2—is used, a STB would need to request a time that it could transmit signal quality information to the headend. Ex. 2013, ¶ 123. In response to the request, the headend sends a message via the OOB channels so the STB knows when to transmit. Ex. 2013, ¶ 123. Without receiving this message, the STB would transmit out of turn thereby causing its message to be lost when it collides with another STB's messages. Ex. 2013, ¶ 123.

Overall, the Petition fails to provide a sufficient motivation to completely disregard Kamieniecki's principle of operation, especially in light of Kamieniecki's deliberate decision to wait for idle, nor any motivation to remove or add hardware to Konstantinos. Also, the proposed combination would effectively render Kamieniecki unable to report information. Thus, it is clear that impermissible

hindsight is guiding the combination of Konstantinos and Kamieniecki. Grounds A-C fail for this reason as well.

B. GROUND A-C ALSO FAIL FOR FAILURE TO IDENTIFY WHERE THE PRIOR ART DISCLOSES OR RENDERS OBVIOUS CERTAIN CLAIM ELEMENTS

“An obviousness determination generally requires a finding that ‘all claimed limitations are disclosed in the prior art.’” *E.g., Univ. of Strathclyde v. Clear-Vu Lighting LLC*, 17 F.4th 155, 160 (Fed. Cir. 2021). Here, the Petition’s proposed combination of elements fails to disclose or render obvious multiple claim elements.

1. The Proposed Combination Fails to Render Obvious Either the “Analyze Said Digitized Signal to Determine a Characteristic of Said Digitized Signal”

The Petition fails to demonstrate that its proposed combination discloses or renders obvious “a signal monitor operable to: analyze said digitized signal to determine a characteristic of said digitized signal.” Ex. 1001, cl. [1C]. For this element, the Petition relies only on the monitor of Kamieniecki, arguing that Kamieniecki’s “monitor 116 would receive a selected IB and/or OOB channel as a *digital* output stream from the Konstantinos receiver 200.” Petition, 39 (emphasis added). The Petition, however, fails to address that Kamieniecki’s monitor analyzes an *analog* signal, and therefore, the Petition has failed to identify where the prior art discloses analyzing a digitized signal.

In its Institution Decision, the Board rejected Patent Owner's argument that the proposed combination failed to disclose or render obvious this element, finding that there was no support for the "contention that one of ordinary skill in the art would have understood 'that digital information streams (like MPEG-2 or DVB) are modulated onto an analog carrier signal at a specific band of frequencies (or channels) to create a frequency division multiplexed (FDM) signal (i.e., the claimed received signal).'" Paper 8, 25. Now, with the benefit of Dr. Russ's Declaration and Mr. Lett's deposition testimony, there is ample support that Kamieniecki's monitor only analyzes an analog signal.

As an initial matter, Kamieniecki does not disclose an analog-to-digital converter (ADC) or anything like it. Therefore, Kamieniecki's monitor receives a signal in the same domain as transmitted by the headend. Ex. 2013, ¶¶ 126-31. Like all digital cable systems, Kamieniecki's STB receives "digital transmission" from the headend. Ex. 1009, ¶¶ [0004], [0014]; Ex. 2013, ¶ 127. Contrary to the Board's findings (Paper 8, 24), "digital transmissions" refer to analog carrier signals modulated with digital information, even by Mr. Lett's testimony. Ex. 2014, 57:3-13 (Q. You mean digital information modulated onto an analog signal, right? A. Of course. Q. But the signal itself, the carrier signal received by the set-top box is analog, you agree? A. Yes."); Ex. 2013, ¶ 127.

Next, these analog carrier signals are received by the IB and OOB tuners. Ex. 1009, ¶ [0014]. These tuners, which would be analog tuners, simply select (i.e. “tune to”) a specific portion of the analog carrier signal and output the selected portion to Kamieniecki’s monitor. Ex. 1009, ¶ [0022]; Ex. 2013, ¶ 128. The IB and OOB tuners do not convert the selected portion of the analog carrier signal to the digital domain. Ex. 2013, ¶ 128.

Mr. Lett attempts to obfuscate this point by asserting that the IB and OOB tuners disclosed in Kamieniecki could be “digital tuners.” Ex. 2014, 68:3-9. When asked what a digital tuner is, Mr. Lett provided two examples, neither of which would change the fact that the IB and OOB tuners disclosed in Kamieniecki would output an *analog* signal to the monitor. The first example Mr. Lett provided is a tuner that outputs 1’s and 0’s. Ex. 2014, 104:14-19. However, Mr. Lett provides no explanation of how a tuner—whose purpose is to simply select a portion of the signal it receives—would convert an analog carrier signal into a digital signal. Mr. Lett appears to be asserting that the IB and OOB tuners would also include the decoder, which is responsible for extracting the digital content (i.e., the 1’s and 0’s) from the analog carrier signal. Ex. 2013, ¶ 129. Thus, the first example still selects and outputs an analog carrier signal. *Id.*

The second example is “a tuner that receives a signal and has circuitry that performs digital signal processing.” Ex. 2014, 105:5-8. For this example, Mr. Lett

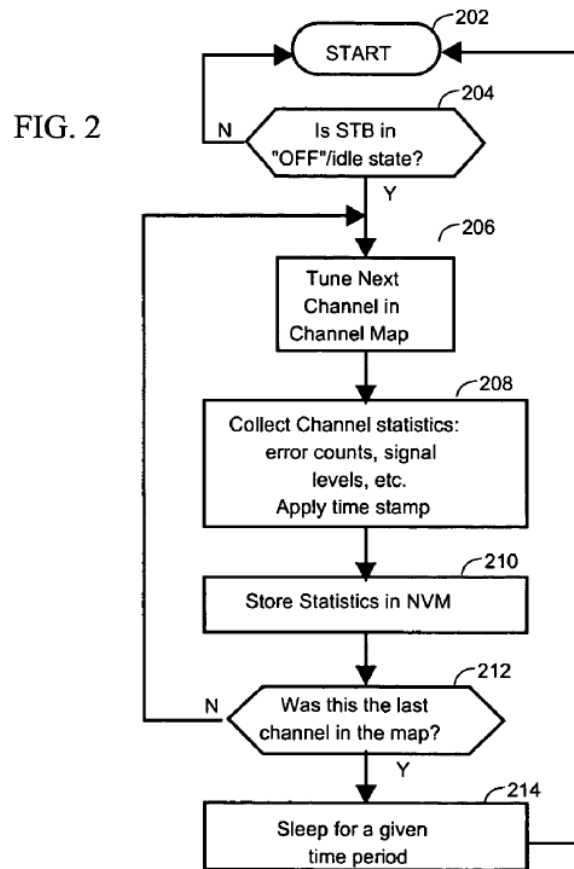
provided the example that this “digital” tuner would select a portion of an analog signal, convert the selected portion to digital, perform digital signal processing, and then convert the signal back to analog. Ex. 2014, 102:22-103:9 (“Q. Meaning, it would have an analog-to-digital converter on the front end, do some processing and revert back to analog? A. Correct.”). Under either example, a so-called “digital” tuner would output an analog signal to Kamieniecki’s monitor. Ex. 2013, ¶ 130. Therefore, Kamieniecki discloses a monitor only capable of analyzing portions of an analog carrier signal.

Despite this fundamental problem, the Petition does not propose modifying Kamieniecki’s monitor 116 so that it can analyze digital signals. Instead, the Petition proposes a physical replacement of the analog IB and OOB tuners with the digital multi-channel receiver of Konstantinos without modifying the monitor at all. Petition, 33-34. In other words, Petitioner’s combination would have Kamieniecki’s analog-signal-processing monitor 116 receive and process digital signal outputs from the multi-channel receiver of Konstantinos, but fails to provide any explanation for how that could happen. Rather, a POSITA would know that a component designed to process an analog input could not—absent extensive modification—process digital signals. Ex. 2013, ¶ 131. The Petition has thus failed to demonstrate that the prior art discloses or renders obvious the “signal monitor operable to: analyze said digitized signal . . .”

**2. The Proposed Combination Fails to Render Obvious
“Concurrently Output”**

Finally, the Petition fails to render obvious the last element of claim 1: “concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor.” Ex. 1001, cl. [1E]. The Petition fails for two alternative reasons: (1) neither Kamieniecki, Konstantinos, nor the proposed combination discloses concurrent data processing and signal monitoring, and (2) the Petition fails to explain how the proposed combination concurrently outputs to a decoder (the claimed data processor) and Kamieniecki’s monitor (the claimed signal monitor).

First, Kamieniecki does not disclose concurrently outputting to a signal monitor and a data processor because Kamieniecki discloses gathering signal quality information *only* when the STB 110 is *idle* (i.e., when no data processing is occurring). See Ex. 1009, ¶¶ [0008], [0015], [0018], [0022], Fig. 2. In fact, Figure 2 of Kamieniecki states that the STB must be idle before gathering signal quality information:



Ex. 1009, Fig. 2. Moreover, both experts agree that Kamieniecki waits for idle, contrary to the findings in the Board's Institution Decision as described above. *See* Section V.A.4., *supra*. This decision to wait for idle is for a very important reason: to not disturb viewer experiences which would happen if monitoring was done, for example, while a user is watching TV. Ex. 1009, ¶ [0017] (“The monitoring feature can operate automatically in the background so as not to disturb any viewer experiences; i.e., when the STB is turned ‘off’ and in an idle state.”).

As for Konstantinos, the Petition does not identify or rely on any disclosure of a signal monitor, and therefore, the Petition does not identify any disclosure of

concurrent output to a data processor and a signal monitor. In fact, the Petition appears unsure as to what it should rely upon from Konstantinos. *See* Petition, 43-44. The Petition initially appears to identify that the output of selected “channels” from channel selectors 207A-N is a concurrent output. Petition, 43 (citing Ex. 1010, ¶ [0046]). But then a few sentences later, the Petition identifies the output of an “interface circuit” as the concurrent output. Petition, 44 (citing Ex. 1010, ¶ [0121]). Petitioner’s own confusion or reluctance to commit to a position underscores that the proposed combination is something entirely different from the challenged claims. In any event, neither of these portions of Konstantinos disclose concurrent output to a signal monitor and a data processor. At best, Konstantinos discloses outputting multiple television channels in parallel, but this is just *data processing* in parallel. Nothing therein contemplates also concurrently outputting to a *signal monitor*.

Second, as discussed above, the Petition fails to explain how the multi-channel receiver is connected to either of the decoders or the monitor. *See* Section VI.A.2., *supra*. For the decoders, the Petition fails to explain what reference it is relying on for disclosing the location of the combination’s decoders (*see* Petition, 40), and Mr. Lett could not explain what reference he relied upon for the location of the decoders. Ex. 2014, 159:6-20. For the monitor, the Petition is not clear whether there is a dedicated signal processing pathway to the monitor. *See* Section VI.A.4., *supra*. If

any doubt remains as to whether the Petition addresses this critical point, Mr. Lett confirmed that he did not provide an opinion as to how the multi-channel receiver (the claimed channelizer) would concurrently output to both the decoders and Kamieniecki's monitor. Ex. 2014, 170:2-171:18. That is a critical admission that Petitioner and Mr. Lett have failed to meet their burden to prove that the proposed combination meets requirement [1E], "concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor."

In sum, the Petition's proposed combination thus fails to disclose the claimed "concurrently output" element [1E] for two reasons. First, the claimed concurrent output contradicts explicit disclosure from Kamieniecki about when to gather signal quality information. Second, the Petition never explains how a POSITA would be motivated to and have a reasonable expectation of success in arranging the various components in its proposed combination so as to generate the claimed concurrent output, including because Mr. Lett has no supporting testimony on that point. Therefore, the Petition fails to carry its burden to demonstrate by the preponderance of evidence that the proposed combination would render claim element [1E].

C. GROUND C FAILS FOR FAILURE TO EXPLAIN HOW THE PROPOSED COMBINATION RENDERS OBVIOUS CLAIMS 9 AND 17

In addition to the failures above, Ground C also fails for failure to explain how a POSITA would combine Kamieniecki, Konstantinos, and Cholas in the manner proposed in the Petition to render obvious claims 9 and 17, both of which recite “wherein one or more circuits reside in a customer premises gateway.” The Petition asserts that a POSITA would place its hypothetical Kamieniecki-Konstantinos STB into a premises gateway as taught by Cholas. Petition, 53. Yet the Petition does nothing to address what modifications would be necessary to Cholas’s gateway to accommodate the functionality of its putative Kamieniecki-Konstantinos STB that allegedly renders obvious the independent claims upon which claims 9 and 17 depend. For example, at no point does the Petition explain how Kamieniecki’s monitor would be incorporated into the gateway to allow it to report a determined characteristic. In fact, the Petition does not even address where Kamieniecki’s monitor would be located within Cholas’s gateway.

This failure to explain even the location of the monitor once incorporated into Cholas is a critical failure because the claims require a concurrent output to both the signal monitor/analyzer. Ex. 1001, cls. 3, 11. Because Mr. Lett and Petitioner contend a combination by physical substitution of elements, the Petition needed to provide some indication how the components would be placed within Cholas’s

gateway so as to still meet the requirements of the independent claims, like [1E]'s "concurrently output" element.

Instead of doing this, Mr. Lett confirmed at his deposition that he had not considered how the combination would be accomplished in his analysis. When asked where Kamieniecki's monitor would be located in Cholas's gateway, Mr. Lett simply said "inside this box" with "this box" referencing the premises services gateway 200 of Figure 13. Ex. 2014, 199:1-8. When pressed on this issue, Mr. Lett confirmed that he offered no opinions in his declaration as to how the references would be combined by a POSITA. Ex. 2014, 202:18-22 ("Q. The discussion we had about Figure 13 and what would be replaced and where arrows would go, that is not something you put in your declarations, is it? A. No."); *also id.*, 203:9-16. All Mr. Lett can say is that Kamieniecki's monitor would be located somewhere in the gateway. That is not enough to meet Petitioner's burden.

Given this critical failure, Ground C fails because the Petition does not identify where the prior art, specifically the Kamieniecki-Konstantinos-Cholas combination, discloses all of the claimed elements.

Additionally, Mr. Lett's deposition testimony undercuts the Petition's proffered motivation to place Kamieniecki-Konstantinos's STB into Cholas. The Petition asserts that it would reduce costs and redundancies to combine the references because "Cholas expressly teaches placing STB components into a

premises services gateway 200 . . . with other kinds of devices, such as a cable modem.” Petition, 52-53. Mr. Lett, however, testified that Kamieniecki’s STB has a cable modem already. Ex. 2014, 85:2-7. Accepting Mr. Lett’s testimony, the proposed combination would have at a minimum two cable modems—one from Kamieniecki and one from Cholas—thereby resulting in *more* redundancy, not less. The redundant cable modems also would increase the overall cost of the device given the additional (and superfluous) components. Because “pennies matter” in the industry, this would weigh heavily against a motivation to combine. For these reasons, Ground C fails.

D. GROUNDS D-E FAIL FOR FAILURE TO IDENTIFY WHERE RENKEN DISCLOSES “CONCURRENTLY OUTPUT”

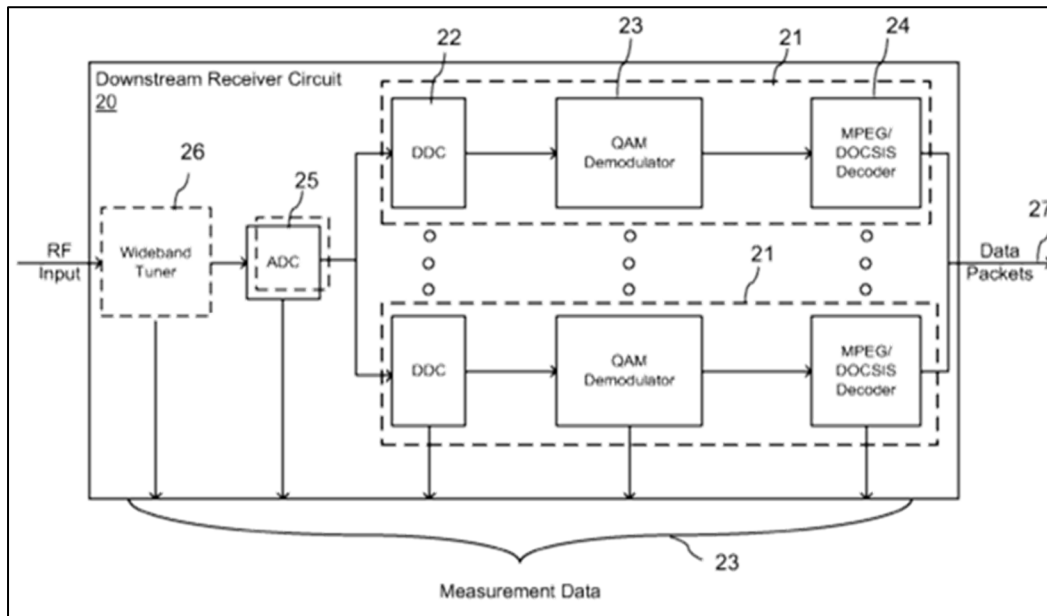
Grounds D and E of the Petition fail for two reasons. First, Renken is not prior art to the ’008 Patent because its provisional does not support certain subject matter being relied upon to invalidate the claims of the ’008 Patent. Second, Renken fails to render obvious the “concurrently output” element because Renken’s receiver architecture does not allow for a concurrent output as recited in the independent claims.

1. Overview of U.S. Patent 8,649,421 (Renken)

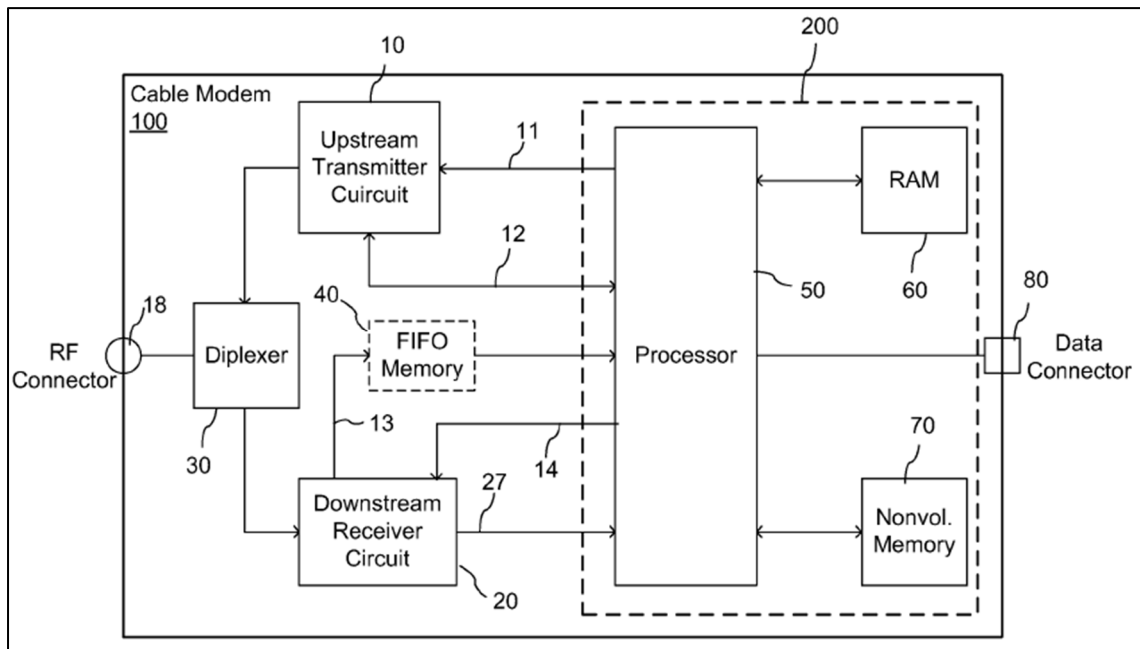
Renken discloses measurement-capable cable modems (MCCMs) for use in a cable network that seeks to leverage receivers 21 that are not processing data (“idle

receivers”) in the MCCMs to perform network measurements and then send those measurements to a central point (e.g., a central measurement controller (CMC)). Ex. 1011, 8:35-40, 11:6-18. At this central point, information received from the MCCMs is processed and compared to detect errors in the network. *See* Ex. 1011, 22:22-39; Ex. 2013, ¶ 132.

Renken uses a downstream receiver circuit 20 as shown in Figure 3 below to both process and generate the data necessary to measure the digitized signal.



Ex. 1011, Fig. 3; Ex. 2013, ¶ 133. This downstream receiver circuit 20 outputs to processor 50, which is a component of controller 200, as shown in Figure 2:



Ex. 1011, Fig. 2 (displaying downstream receiver circuit 20 communicating demodulated downstream data 27 to processor 50); Ex. 2013, ¶ 133.

2. Renken is Not Prior Art to the '008 Patent

To show all of the subject matter contained in a reference is prior art, the petitioner must carry two burdens. Under *Dynamic Drinkware LLC v. Nat'l Graphics, Inc.*, the Petitioner bears the burden of demonstrating that a pre-AIA 35 U.S.C. § 102(e) reference is entitled to the benefits of its provisional application's filing date. 800 F.3d 1375, 1378–82 (Fed. Cir. 2015). To do this, the petitioner must show two conditions are satisfied: (1) the provisional application must provide sufficient support for at least one claim in the reference patent or published patent application (*id.*, 1382); and (2) the provisional application must provide sufficient

support for the subject matter relied upon for prior art purposes in the reference patent or published patent application. *Id.*, 1381-82.

If a petitioner wants to challenge a challenged patent's priority claim in an *inter partes* review, the petitioner bears the burden of first challenging whether a patent is entitled to an earlier effective filing date "by identifying, specifically, the features, claims, and ancestral applications allegedly lacking § 112, first paragraph, written description and enabling disclosure support for the claims based on the identified features." *Unified Patents, LLC v. MasterObjects, Inc.*, IPR2020-01201, Paper 26 at 9 (PTAB Jan. 11, 2021) (collecting decisions). Then, the burden of production shifts to the patent owner "to make a sufficient showing of entitlement to earlier filing date or dates, in a manner that is commensurate in scope with the specific points and contentions raised by Petitioner." *Id.*

Here, in order for Petitioner to succeed, Petitioner must successfully show that the Renken Provisional provides written description support for all the subject matter being relied upon as prior art in Renken or demonstrate that the claims of the '008 Patent are not entitled to the date of the '008 Patent's provisional application. Petitioner has failed on both for failure to carry its burdens.

As to the Petitioner's burden of showing that Renken is entitled to the benefit of its provisional filing date, Petitioner tacitly admits that there is no written description support in the Renken Provisional for the CMC being located at the

headend—which is necessary for Renken to disclose reporting information to the “source of the received signal”—by stating “it would at least be obvious that results are sent to the headend.” Petition, 64. But obviousness is the wrong test; “a description that merely renders the invention obvious does not satisfy the [written description] requirement.” *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1352 (Fed. Cir. 2010) (en banc). Petitioner’s “obviousness” argument and evidentiary support thus concedes a lack of necessary written-description support for transmitting a measured characteristic to the headend.

Moreover, Petitioner only cites two different pages of the provisional application and its expert with no accompanying explanation. Petition, 64 (citing Ex. 1012, pp. 10, 13; Ex. 1002, ¶ 205). Where, as here, the relevance of the cited portions is not self-evident, citations to a provisional application with no accompanying explanation is not sufficient to demonstrate that a later-filed disclosure is entitled to the provisional application’s priority date. *See Google LLC v. Ikorongo Tech. LLC*, IPR2021-00058, Paper 14 at 15 (PTAB May 10, 2021) (denying institution because the Board found “the relationship between the cited portions of the two documents [was] unclear” because the petition did “not explain sufficiently the significance of the citations to the ’187 provisional”).

Even if Petitioner’s bare citations were procedurally sufficient, the substance of the Renken Provisional still cannot afford Renken an earlier priority date. The

claims require that a determined characteristic be reported “to a source of said received signal.” Ex. 1001, cls. 1, 3, 11. The ’008 Patent specification describes that the “source” is the cable headend. Ex. 1001, 3:51-57. Renken and the Renken Provisional, however, do not disclose sending measurements to the headend, rather they disclose sending characteristics to the CMC. Petition, 63. Therefore, Renken’s disclosure of the CMC being located at the headend is prior art only if the Renken Provisional provides written description support for the CMC being located at the headend.

Despite citations to the three pages cited by Petitioner and Dr. Lett, the Renken Provisional does not provide written description support for the CMC being located at the headend. The cited pages describe only that the MCCM is capable of sending measurements to the CMC and that upon receiving the measurements, the CMC can store or analyze the received measurements. *See* Ex. 1012, pp. 4, 10, 13. There is no discussion of any relationship between the CMC and the headend. The Renken Provisional is silent on this, and that disclosure—that the CMC could be located at the headend—appears to be no more than subject matter conceived *after* the Renken Provisional was filed, reinforcing the fact that Renken *is not prior art*.

As to the priority date of the ’008 Patent, Petitioner has failed to identify any basis under which the claims of the ’008 Patent are not entitled to the September 8, 2011, filing date of U.S. Provisional Application No. 61/532,098 (the “’008

Provisional”), to which the ’008 Patent claims priority. Specifically, Petitioner does not identify any features, claims, or other information contained within the ’008 Patent that it asserts is not entitled to the priority date of the ’008 Provisional.

Because Petitioner has failed to carry its burden to show either that the Renken Provisional discloses the subject matter being relied upon and challenge the priority date of the ’008 Patent, Petitioner has failed to show Renken’s disclosure of the CMC being located at the headend is prior art to the ’008 Patent. Therefore, Petitioner fails to carry its burden to demonstrate a likelihood of prevailing on claim 1 because Petitioner has failed to show Renken renders obvious “a signal monitor operable to: . . . report said determined characteristic to a source of said received signal.”

3. Renken Fails to Render Obvious “Concurrently Output”

Even if Renken were prior art, the challenged claims are not obvious over Renken. The Petition identifies the “MCCM processor” as the claimed signal monitor for element [1C] (Petition, 63) and, for this element [1E], the Petition identifies each Digital Down Converter (“DDC”) or the DDCs collectively as the claimed “channelizer.” Petition, 66-67. But that is where any clarity of the Petition and Mr. Lett’s Declaration ends as the Petition then proceeds to create confusion by identifying a series of disparate items that it asserts meets the claim elements of [1E].

Regardless of what item the Petition intended to rely upon, Renken misses the mark under any interpretation of Petitioner's confusing arguments.

The Board was correct in its Institution Decision to reject the Petition on this basis. As the Board correctly determined:

For each of Renken's downstream channel receivers 21, the selected channel output by DDC 22 is sent to the corresponding decoder 24 and then out of downstream receiver circuit 20 as data packets 27. Ex. 1011, Fig. 3. The data packets output from each downstream channel receiver 21 are sent collectively to processor 50. *Id.* at Figs. 2, 3. In other words, all of the selected channels pass through the corresponding decoder and then to the processor.

Paper 8 at 36. The Board should reaffirm its Institution Decision reasoning in its Final Written Decision.

The Board should also find that the Petition fails to meet its burden because it is inconsistent and incoherent in identification of the claimed "first portion of said digitized signal." Within the space of a handful of sentences, the Petition (as best as can be discerned) identifies three different items as allegedly disclosing this element.

First, the Petition seems to identify the collection of "selected channels" from the entire set of DDCs as the "first portion." On page 66, the Petition argues that Renken's DDCs meets the "concurrently output" element because each DDC is "responsible for filtering out, or selecting, a particular downstream channel, and

which collectively output (claimed ‘concurrently output’) the *selected channels*.” Petition, 66 (emphasis added). But the collective output of the DDCs cannot meet the requirement to output the first portion to the signal monitor because the DDCs output selected channels to the QAM Demodulator in the DDCs’ respective receiver, not to the processor. *See* Ex. 1011, Fig. 3 (depicting each DDC outputting to a QAM Demodulator). Thus, Renken’s receiver architecture does not allow for the DDCs to output a selected channel to the signal monitor (i.e., the processor).

On the very next page, the Petition changes phrases. It identifies the alleged “channels/*signals* to be monitored” are the “first portion,” while the alleged “*channels* to decode for viewing” as the “second portion of said digitized signal.” Petition, 67 (emphasis added). Thus, some alleged channels/signals, and not just some of the channel, are identified. But Petitioner does not specify further what it means.

The next sentence makes another shift, identifying the same “data” as it did with respect to claim element [1C] as the first portion: “the DDC or other downstream components [of Renken] (e.g., QAM Demodulator or MPEG/DOCSIS Decoder) send *data* to the monitor as directed by the measurement program, while a second DDC may concurrently select a *channel* (e.g., a television channel) to be decoded by MPEG/DOCSIS Decoder for viewing.” *Id.* (emphasis added); *also id.*, 63 (stating that, for the purposes of claim element [1C], the measurement program

“analyzes *data* from the MPEG/DOCSIS Decoder to determine characteristics”) (emphasis added).

In summary, Petitioner seems to present three possibilities for the first portion: (1) some of the “selected channels” from the DDCs; (2) something called “channels/signals”; and (3) some “data.” The Petition does not make any of this clear, nor does Mr. Lett. *See* Ex. 1002, ¶¶ 215-217. Regardless of which one the Petition intended, they all fail for the following reasons.

If the Petition is relying upon possibility (1), Renken itself demonstrates this is impossible. In Renken’s architecture the channels are sent seriatim from DDC, to demodulator, to decoder, to processor. Ex. 1011, 12:49-52, 13:6-8, Fig. 3; Ex. 2013, ¶¶ 138-39. There is no pathway for the DDCs to concurrently output a first portion to the processor—what the Petition identified as the signal monitor—and a second portion to the QAM Demodulator—what the Petition identified as the data processor. Ex. 2013, ¶ 139. Figure 3 of Renken (the detailed drawing of the inner working of Downstream Receiver Circuit 20 from Figure 2) shows that the channels selected by Renken’s DDCs are output to the QAM Demodulators, then to the MPEG/DOCSIS Decoders, and then out of the Downstream Receiver Circuit 20 as Data Packets 27, as shown by the red arrow below:

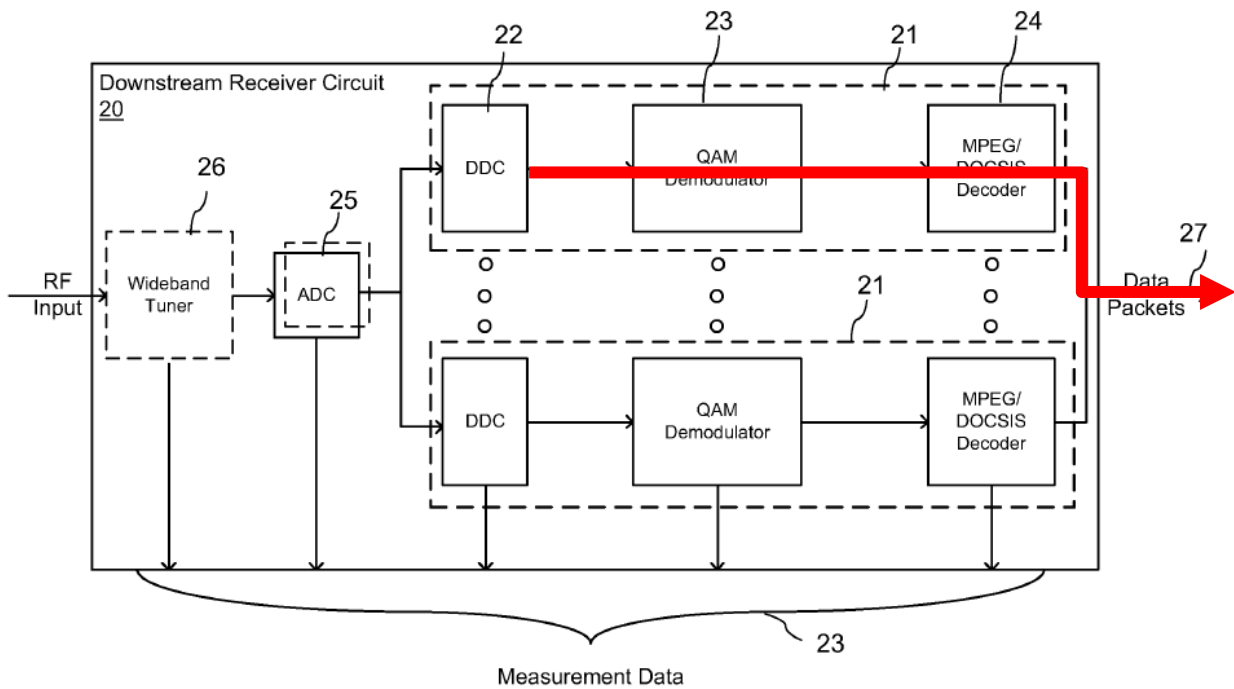
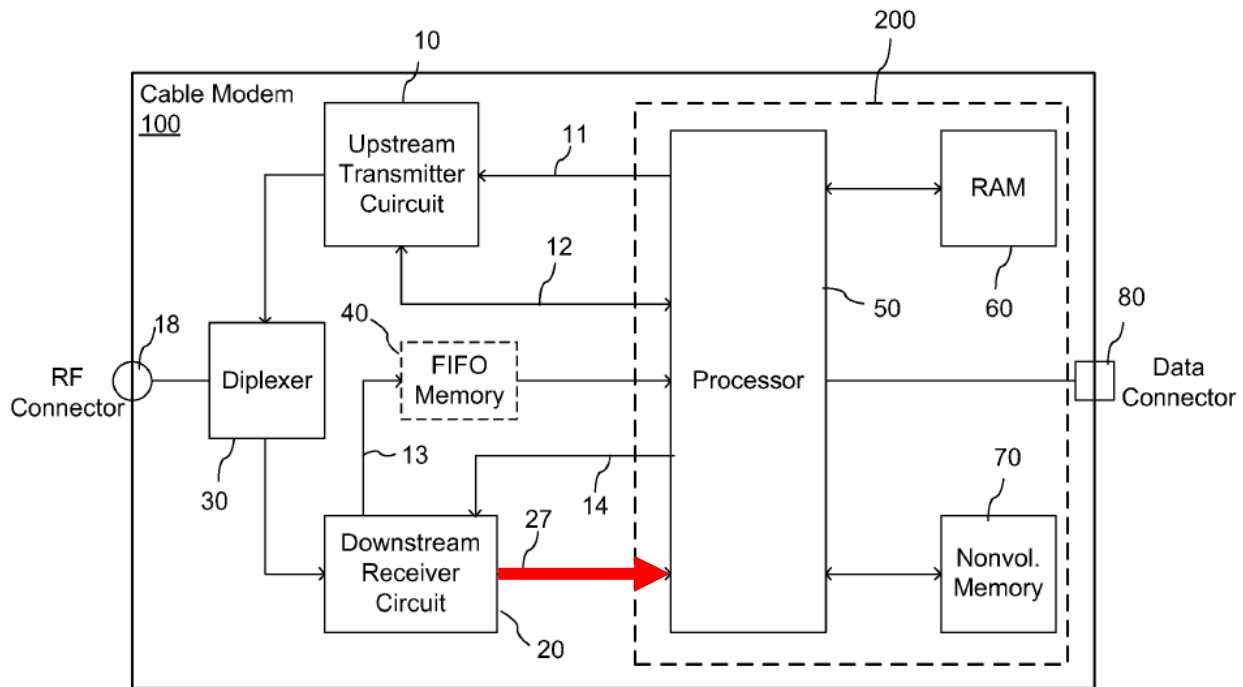


Fig. 3

Ex. 1011, Fig. 3 (red annotation added); *see also* Ex. 1012, Fig. 2; Ex. 2013, ¶ 139.

Subsequently, those Data Packets 27 are then sent to the Processor 50, as shown by the red arrow in Renken's Figure 2 below:



Ex. 1011, Fig. 2 (red annotation added); *see also* Ex. 1012, Fig. 1; Ex. 2013, ¶ 139. Thus, all of the channels selected by the DDC *first* go through the MPEG/DOCSIS Decoder and *then* go to the Processor.

If Petitioner is instead relying upon options (2) or (3), where some “channels/signals” or some “data” from the DDC/QAM Demodulator/MPEG/DOCSIS Decoder are simultaneously output along with the “channels” from the DDC and “data” as meeting element [1E], the Petition has failed to show how that meets the requirements of the claims. Ex. 2013, ¶ 140. As for “channels/signals,” the Petition does not explain how Renken’s receiver outputs a channel or signal to the MCCM processor. Rather, Renken’s receiver outputs “data” to the MCCM Processor, not “channels/signals.” This obfuscation between data and

“channels/signals” only further muddies the water as to what the Petition is relying upon as the claimed first and second portion.

As for “data,” the Petition does nothing to explain how this “data” is a “portion of *said digitized signal*” as recited by the challenged claims. For example, Petitioner and Mr. Lett do not say whether they are relying on “Measurement Data 23” shown at the bottom of Renken’s Figure 3 (Renken Provisional’s Figure 2) or some other data. Petitioner and Mr. Lett also do not support how that “Measurement Data 23” is sent to the Processor, given that there is no element “23” in the higher-level view of Renken’s Figure 2.

This failure of explanation is likely a result of the Petition (and Mr. Lett) realizing that the identified data is unlike the claimed portion of the digitized signal. The references to data in Renken refer to data being *generated* by the components within Renken’s receiver—i.e., the DDC, QAM Demodulator, and MPEG/DOCSIS Decoder—for the purposes of the signal analysis conducted by the processor. Ex. 1011, 12:38-48, 12:53-63, 13:6-15; Ex. 2013, ¶ 140. The process of a controller directing a receiver to create data for analysis is unlike the claimed invention, which passes a portion of the digitized signal itself to the signal monitor where it is then analyzed. Ex. 1001, cl. 1; Ex. 2013, ¶ 140. At best, the Petition has identified a component that outputs a portion of the digitized signal to one component and data *related to* the digitized signal to another component. Given this, the Petition has

failed to identify where a single component concurrently outputs both a first portion and a second portion of the digitized signal.

To the extent that Petitioner asserts that Renken's receiver can process and measure a signal at the same time, this argument is antithetical to Renken's disclosure. At Mr. Lett's deposition, he made an unsupported assertion that Renken does not "preclude from using a single downstream receiver for both watching video and measuring and monitoring." Ex. 2014, 148:2-10. This flies in the face of Mr. Lett's declaration which clearly states "Renken describes that the MCCM 100 may receive a request, from a central measurement controller (CMC) 7, to perform measurements *using one or more idle receivers . . .*." Ex. 1002, ¶ 90 (citing Ex. 1011, 9:5-18) (emphasis added). Moreover, an invention is rendered obvious by what the prior art *discloses*, not what it does not preclude.

At base, the Petition and Mr. Lett have not even met their burden to explain why they contend Renken renders [1E] obvious. It is not Patent Owner's (or the Board's) job to "sift through the information presented by Petitioners, determine where each element [of the challenged claims] is found in [the cited references], and identify any differences between the claimed subject matter and the teachings of [the cited references.]" *Google Inc. v. Everymd.com LLC*, IPR2014-00347, Paper 9 at 25 (PTAB May 22, 2014); *see also Netflix, Inc. v. DivX, LLC*, 84 F.4th 1371, 1377 (Fed. Cir. 2023) ("A petitioner may not rely on a vague, generic, and/or meandering

petition and later fault the Board for failing to understand what the petition really meant. Ultimately, it is the petitioner's burden to present a clear argument.”).

The Lett Declaration cannot save the Petition because it is simply an exact restatement of the Petition without any additional reasoning or support from Renken on the following point:

In operation, a first DDC may select a channel that the processor (monitor) desired to be measured and either the DDC or other downstream components (e.g., QAM Demodulator or MPEG/DOCSIS Decoder) send data to the monitor as directed by the measurement program, while a second DDC may concurrently select a channel (e.g., a television channel) to be decoded by MPEG/DOCSIS Decoder for viewing.

Ex. 1002, ¶ 216. This verbatim regurgitation of conclusory assertions without any basis in Renken is entitled to little weight. *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 16-17 (PTAB Aug. 24, 2022) (precedential) (holding a declaration is entitled to little weight when it contains an exact restatement of the petition's unsupported, conclusory assertions without any additional supporting evidence or reasoning). Thus, the Petition has failed to adequately explain that Renken discloses “a channelizer operable to . . . concurrently output said first portion of said digitized signal to said signal monitor and said second portion of said digitized signal to said data processor.”

Ultimately, the Petition has failed to demonstrate that claim 1 is obvious in view of Renken. The Petition's analysis of claims 3 and 11 simply references its analysis of claim 1; therefore, the Petition likewise fails to render obvious claims 3 and 11. Given the failure to render obvious all of the independent claims, it is axiomatic that the Petition has failed to render obvious the dependent claims.

E. OBJECTIVE INDICIA OF NON-OBVIOUSNESS

If the Board does find any of the claims to be unpatentable over the prior art, objective evidence of industry praise of the challenged claims of the '008 Patent supports the conclusion that the challenged claims are not obvious. As described above, network service providers—sometimes referred to as Multi-System Operators (MSOs)—sent out technicians to troubleshoot network issues, which is invasive and expensive. Ex. 2015, p. 2, 6. Likewise, monitoring the spectrum using CPE also had limited success because either it interrupted service so the monitoring had to be done while the device was off (*see, generally*, Ex. 1009), or the device was only capable of measuring small portions of the received signal. *See* Ex. 2015, p. 3 (explaining that development of full-spectrum capture ADCs allows for more of the spectrum to be monitored than what was allowed previously). Because of these limitations, MSOs struggled to monitor the spectrum throughout their network in a cost-effective manner that did not interrupt the customer's service.

Eventually, MaxLinear—the original assignee of the '008 Patent—realized that it could leverage modems using wideband digitization or its proprietary Full-Spectrum Capture¹ technology “to capture and report local (end-user) cable-plant spectra” to allow MSOs to remotely monitor, manage, and troubleshoot their networks without interrupting their service. Ex. 2004, p. 2. Understanding the significance of this realization, MaxLinear began embedding “Remote Spectrum Monitoring” into its devices at least as of September 4, 2013. Ex. 2016. What distinguished MaxLinear’s use of Remote Spectrum Monitoring from other approaches was that the monitoring was conducted in parallel with processing data so as to not disrupt the customer’s service. *See* Ex. 2004, p. 2; Ex. 2013, ¶¶ 143, 145. Thus, MaxLinear’s Remote Spectrum Monitoring was a “paradigm shift in how cable operators troubleshoot home and network issues in the field.” Ex. 2016. The use of Remote Spectrum Monitoring resulted in significant cost savings for MSOs while simultaneously increasing the amount of network performance data available

¹ Full Spectrum Capture is how MaxLinear refers to the ability of equipment to digitize the entire received spectrum that is then monitored. The industry generically refers to this capability as full-band capture. Ex. 2007, p. 13. Thus, it should be understood in this context that Remote Spectrum Capture and Full-Band Capture are used interchangeably. Ex. 2013, ¶ 144.

to MSOs. Ex. 2015, p. 3; *also* Ex. 2009, p. 5 (Remote Spectrum Monitoring “resonated instantly across the industry which had been seeking an affordable method of deploying remotely-accessible field probes for the better part of a decade.”).

Eventually, the industry came to praise MaxLinear's Remote Spectrum Monitoring. For example, CableLabs—which develops standards and best practices for the cable industry—praised Remote Spectrum Monitoring because it enabled MSOs “to take remote spectrum captures at the customer premises without having to carry an expensive spectrum analyzer or requiring access into a subscriber's home.” Ex. 2007, p. 18. Additionally, one of the industry leaders in the development of front-end silicon chips—Broadcom—also praised Remote Spectrum Monitoring. *See* Ex. 2009 & Ex. 2020 (both white papers explaining the benefits of Remote Spectrum Monitoring and listing Broadcom authors among a host of employees of other industry participants). Industry participants especially praised Remote Spectrum Monitor because MaxLinear's implementation allowed for signal analysis to be conducted in a “unobtrusive” manner—i.e., signal analysis happened in parallel with data processing and thus did not interrupt data processing. Ex. 2009, p. 5. More specifically, the unobtrusive nature is important because if Remote Spectrum Monitor degraded the user experience, it would be relegated to “non-peak off hours,

not during times when the highest trouble ticket call volumes are typically generated.” *Id.*

Importantly, MaxLinear’s Remote Spectrum Monitoring, especially the aspect of Remote Spectrum Monitoring that did not interrupt the customer’s service, could not be implemented without the claimed inventions embodied in the independent claims of the ’008 Patent. To implement MaxLinear’s Remote Spectrum Monitoring in CPE, the following components are needed: (1) an ADC capable of digitizing either large swaths of the received signal or the entire received signal; (2) a spectrum analyzer that measures the signal; (3) a component that reports any measurements; (4) the ability to process TV and/or DOCSIS channels; and (5) a component that breaks up the signal into smaller components so that signal analysis can occur in an unobtrusive manner—i.e., in parallel with the processing of TV and/or DOCSIS channels. *See* Ex. 2018, pp. 5-7; Ex. 2013, ¶¶ 146-50.

All of these elements are recited in the independent claims. Using claim 1 as an example, it specifically recites “an analog-to-digital converter operable to digitize a received signal spanning an entire television spectrum.” Ex. 1001, cl. [1B]. Given the recited ADC must be capable of digitizing large swathes of the received spectrum, it satisfies the ADC needed for Remote Spectrum Capture. Ex. 2013, ¶ 148.

The next two requirements are met by the recited signal monitor, which is “operable to analyze said digitized signal to determine a characteristic of said digitized signal; and report said determined characteristic to a source of said received signal.” Ex. 1001, cl. [1C]. As described in the specification, the signal monitor is capable of measuring, among others, the signal-to-noise ratio (SNR) of the signal. Ex. 1001, 3:33-45. This is a common measurement used in applications of Remote Spectrum Monitoring. *See, e.g.*, Ex. 2020, p. 18 (listing “Downstream SNR” as a measured characteristic); Ex. 2013, ¶ 149. Next, claim 1 recites a data processor that is “operable to process a television channel to recover content carried on the television channel” thereby meeting the requirement that a channel be processed. Ex. 1001, cl. [1D]; Ex. 2013, ¶ 149.

Next, the recited channelizer breaks the digitized signal into smaller portions, which allows for signal analysis to occur in an “unobtrusive,” or transparent, manner. Ex. 2013, ¶ 150. This is so because “[t]he parallel arrangement of the monitoring module 154 and data processing module 156 may enable determination of signal and/or channel characteristics without having to interrupt service to user equipment 126 and 128.” Ex. 1001, 4:7-10; Ex. 2013, ¶ 150.

Finally, given the other independent claims recite similar elements, there exists a nexus between Remote Spectrum Monitoring and the claimed inventions of the '008 Patent. Therefore, when the cable industry praised Remote Spectrum

Monitoring, the cable industry was praising the claimed invention, which is evidence that the claimed invention was non-obvious. *Apple Inc. v. Samsung Elecs. Co., Ltd.*, 839 F.3d 1034, 1053 (Fed. Cir. 2016) (“Evidence that the industry praised a claimed invention . . . weighs against an assertion that the same claimed inventor would have been obvious.”). When this evidence of objective indicia of non-obviousness is weighed against the Petition’s weak obviousness arguments across all Grounds, it is clear the ’008 Patent claimed non-obvious advancements over the prior art that were praised by the relevant industry.

VI. CONCLUSION

The Petition has failed to carry its burden to prove the challenged claims of the ’008 Patent are obvious in light of the asserted prior art. Therefore, the Board should find all the challenged claims patentable.

Dated: December 6, 2024

Respectfully submitted,

By: /Jason A. Engel/
Jason A. Engel
Reg. No. 51,654
K&L Gates LLP

Counsel for Patent Owner

Certification of Word Count Under 37 C.F.R. § 42.24(d)

The undersigned hereby certifies that the foregoing contains 13,919 words according to the word count of the word-processing software used to prepare the foregoing.

By: /Jason A. Engel/
Jason A. Engel
Reg. No. 51,654
K&L GATES LLP
70 W. Madison Street, Suite 3100
Chicago, IL 60602
Jason.Engel.PTAB@klgates.com
T: (312) 807-4236
F: (312) 827-8145

CERTIFICATE OF SERVICE

I hereby certify that on December 6, 2024, a true and correct copy of the foregoing was caused to be served on the following counsel of record for Petitioner by electronic mail at the following addresses:

Frederic M. Meeker
Paul T. Qualey
Steve S. Chang
BANNER & WITCOFF, LTD.
1100 13th Street, NW
Suite 1200
Washington, DC 20005
Tel: (202) 824-3000
Fax: (202) 824-3001
fmeeker@bannerwitcoff.com
pqualey@bannerwitcoff.com
schang@bannerwitcoff.com
ComcastIPRService@bannerwitcoff.com.

By: /Jason A. Engel/
Jason A. Engel
Reg. No. 51,654