

**Comcast Cable Communications LLC, v.
Entropic Communications, LLC
Case No.: IPR2024-00441
U.S. Patent No. 8,792,008**

Patent Owner Demonstrative Slides

**June 6, 2025
10:00 A.M. Eastern**

Demonstrative Only - Not Evidence

Overview of the '008 Patent

(12) **United States Patent**
Gallagher et al.

(54) **METHOD AND APPARATUS FOR SPECTRUM MONITORING**

(75) Inventors: **Timothy Gallagher**, Encinitas, CA (US); **Patrick Tierney**, Solana Beach, CA (US); **Jun Huang**, San Diego, CA (US)

(73) Assignee: **MaxLinear, Inc.**, Carlsbad, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 52 days.

(21) Appl. No.: **13/607,916**

(22) Filed: **Sep. 10, 2012**

(65) **Prior Publication Data**
US 2013/0063608 A1 Mar. 14, 2013

Related U.S. Application Data

(60) Provisional application No. 61/532,098, filed on Sep. 8, 2011.

(51) **Int. Cl.**
H04N 17/00 (2006.01)
H04L 12/66 (2006.01)
H04L 12/26 (2006.01)
H04B 17/00 (2006.01)

(52) **U.S. Cl.**
CPC **H04L 12/66** (2013.01); **H04L 43/08** (2013.01); **H04N 17/00** (2013.01); **H04B 17/0042** (2013.01)
USPC **348/192**

(10) **Patent No.:** **US 8,792,008 B2**

(45) **Date of Patent:** **Jul. 29, 2014**

(58) **Field of Classification Search**
USPC 348/192, 725, 572, 731, 729;
455/234.1, 136, 138, 234.2; 375/349,
375/350, 316
See application file for complete search history.

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8,588,339 B2 * 11/2013 Birru et al. 375/316
8,611,483 B2 * 12/2013 Zhu et al. 375/349
2010/0105332 A1 * 4/2010 McHenry et al. 455/62
2012/0163518 A1 * 6/2012 Reddy et al. 375/350

* cited by examiner

Primary Examiner — Paulos M Natnael
(74) Attorney, Agent, or Firm — McAndrews, Held & Malloy, Ltd.

(57) **ABSTRACT**
A system, such as a satellite reception assembly or customer premises gateway, may comprise an analog-to-digital converter operable to digitize a signal spanning an entire television spectrum (e.g., cable television spectrum or satellite television spectrum) comprising a plurality of television channels. The system may comprise a signal monitor operable to analyze a signal to determine a characteristic of the signal. The system may comprise a data processor operable to process a television channel to recover content carried on the television channel. The system may comprise a channelizer operable to select first and second portions of the signal, and concurrently output the first portion to the signal monitor and the second portion to the data processor.

18 Claims, 7 Drawing Sheets

Ex. 1001; Fig. 1A; POR, 6-9

Ex. 1001; Cover; POR, 5-11

Demonstrative Only - Not Evidence PO-2

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Overview of the '008 Patent

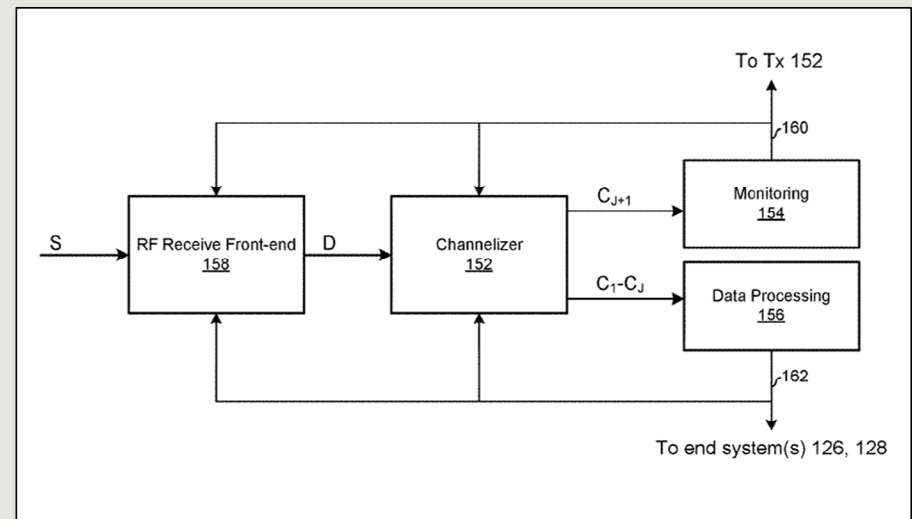
- The '008 Patent describes systems and methods for spectrum monitoring of a network-based service, such as cable or satellite television, using equipment located at the customer's premises

(57)

ABSTRACT

A system, such as a satellite reception assembly or customer premises gateway, may comprise an analog-to-digital converter operable to digitize a signal spanning an entire television spectrum (e.g., cable television spectrum or satellite television spectrum) comprising a plurality of television channels. The system may comprise a signal monitor operable to analyze a signal to determine a characteristic of the signal. The system may comprise a data processor operable to process a television channel to recover content carried on the television channel. The system may comprise a channelizer operable to select first and second portions of the signal, and concurrently output the first portion to the signal monitor and the second portion to the data processor.

Ex. 1001, Abstract; POR, 5-11



Ex. 1001, Fig. 1B; POR, 6-10

Demonstrative Only - Not Evidence PO-3

Overview of the '008 Patent

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; POR 5-10

3. A method comprising:

performing by one or more circuits:

receiving a signal having a bandwidth that spans from a first frequency, F_{lo} , to a second frequency, F_{hi} , wherein said signal carries a plurality of channels;
digitizing said received signal from F_{lo} to F_{hi} to generate a digitized signal;
selecting a first portion of said digitized signal;
selecting a second portion of said digitized signal; and
concurrently outputting said selected first portion and said selected second portion, wherein:
said selected first portion is output to a signal analyzer which analyzes said selected first portion to determine one or more characteristics of the received signal, and which reports said determined one or more characteristics to a source of said received signal; and
said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels.

Ex. 1001, cl. 3; POR 5-10

11. A system comprising:

one or more circuits that are operable to:

receive a signal having a bandwidth that spans from a first frequency, F_{lo} , to a second frequency, F_{hi} , wherein said signal carries a plurality of channels;
digitize said received signal from F_{lo} to F_{hi} to generate a digitized signal;
select a first portion of said digitized signal;
select a second portion of said digitized signal; and
concurrently output said selected first portion and said selected second portion, wherein:
said selected first portion is output to a signal analyzer that is operable to analyze said first portion to determine one or more characteristics of said first portion, and that is operable to report said determined one or more characteristics to a source of said received signal; and
said selected second portion is output to a data processor for recovery of data carried on one or more of said plurality of channels.

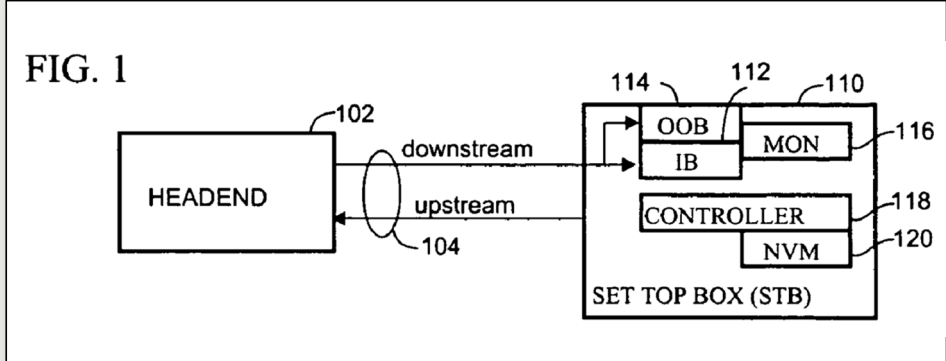
Ex. 1001, cl. 11; POR 5-10

Demonstrative Only - Not Evidence PO-4

Overview of Kamieniecki (Grounds A-C)

(19)	United States		
(12)	Patent Application Publication		
	Kamieniecki	(10) Pub. No.: US 2005/0114879 A1	(43) Pub. Date: May 26, 2005
(54)	MONITORING SIGNAL QUALITY ON A CABLE NETWORK		
(52)	U.S. CL. 725/15; 725/9		
(75)	Inventor: John Kamieniecki , Lafayette Hill, PA (US)		
(57)	ABSTRACT		
	Information related to signal quality on the downstream and upstream paths (104) in a cable network may be monitored (116, 208) at selected ones of a plurality of set-top boxes (110) and sent by the set-top box to the headend (102) as it is collected, or when the set-top box is polled by the headend. The information may be collected with the set-top box is in an idle state (204), by the set-top box tuning through the channels in the channel map (206) and by applying a time stamp to the information (208). Ping messages may be transmitted from the set-top box to the headend and back to the set-top box. Methods and apparatus are disclosed.		
(73)	Assignee: General Instrument Corporation , Horsham, PA (US)		
(21)	Appl. No.: 10/718,074		
(22)	Filed: Nov. 20, 2003		
	Publication Classification		
(51)	Int. Cl. ⁷ H04N 7/16; H04H 9/00		

Ex. 1009, Cover; POR 14-15



Ex. 1009, Fig. 1; POR 15

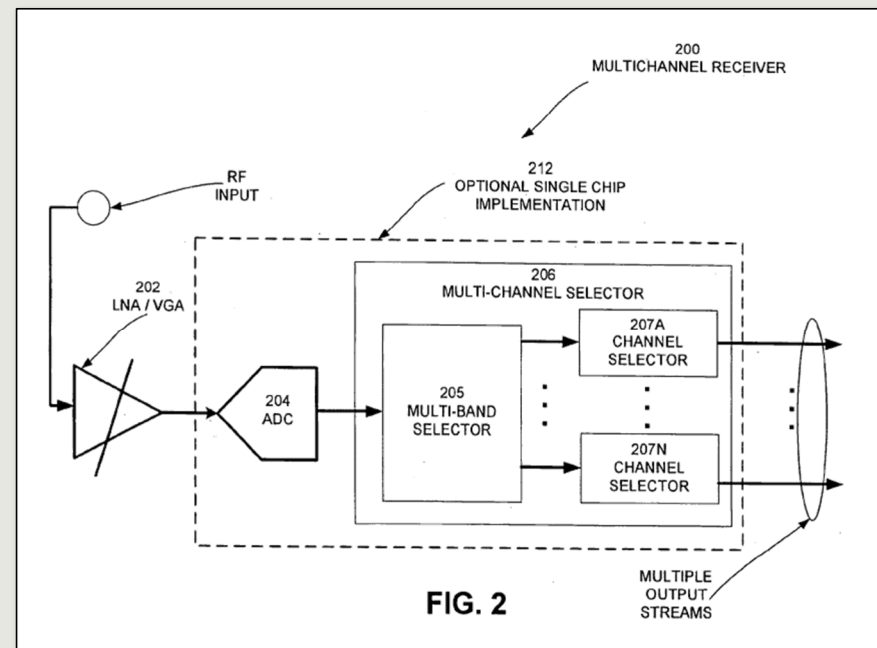
[0014] The STB 110 comprises an in-band (IB) tuner 112 for receiving first signals from the cable operator, an out-of-band (OOB) tuner 114 for receiving second signals from the cable operator, a monitor (MON) 116 for generating information related to signal quality on the channels (either or both IB and OOB), a controller (CONTROLLER) 118 for controlling the overall operation of the STB, and non-volatile memory (NVM) 120 for storing information, par-

Ex. 1009, [0014]-[0015]; POR 14-15

Overview of Konstantinos (Grounds A-C)

(19) United States	
(12) Patent Application Publication	
Konstantinos et al.	
(10) Pub. No.: US 2010/0120386 A1	
(43) Pub. Date: May 13, 2010	
(54) MULTI-CHANNEL RECEIVER ARCHITECTURE AND RECEPTION METHOD	Publication Classification
(76) Inventors: Doris Konstantinos , Amsterdam (NL); Erwin Janssen , Veldhoven (NL)	(51) Int. Cl. H04B 1/18 (2006.01) H04N 5/50 (2006.01)
Correspondence Address: NXP, B.V. NXP INTELLECTUAL PROPERTY & LICENSING M/S41-SJ, 1109 MCKAY DRIVE SAN JOSE, CA 95131 (US)	(52) U.S. Cl. 455/180.1; 348/731
(21) Appl. No.: 12/269,302	(57) ABSTRACT
(22) Filed: Nov. 12, 2008	A multi-channel receiver comprising an ADC and a multi-band, multi-channel selector. The ADC converts a broadband multi-channel signal into a digital signal. The digital signal is then broken into sub-bands each containing a plurality of channels. A channel selector selects desired channels from the appropriate sub-band. The multi-channel receiver may deliver simultaneous channels equal to the number of channel selectors that have been implemented. The multi-channel receiver may be implemented on a single integrated circuit.

Ex. 1010, Cover; POR 16-18



Ex. 1010, Fig. 2; POR 17

Overview of Renken (Grounds D-E)

(12) United States Patent Renken et al.

(10) Patent No.: **US 8,649,421 B2**
(45) Date of Patent: **Feb. 11, 2014**

(54) CABLE MODEM FOR NETWORK MEASUREMENTS

(75) Inventors: **Thomas Renken**, Indianapolis, IN (US);
Gregory W. Massey, Greenfield, IN
(US)

(73) Assignee: **JDS Uniphase Corporation**, Milpitas,
CA (US)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 37 days.

(21) Appl. No.: **13/399,797**

(22) Filed: **Feb. 17, 2012**

(65) Prior Publication Data

US 2012/0213259 A1 Aug. 23, 2012

Related U.S. Application Data

(60) Provisional application No. 61/444,611, filed on Feb.
18, 2011.

(51) Int. Cl.
H04L 5/16 (2006.01)
H04L 1/02 (2006.01)

(52) U.S. Cl.
USPC **375/222; 375/347**

(58) Field of Classification Search
USPC **375/222, 347, 349; 370/241.1, 250,**
370/468; 709/224, 236; 715/43, 44, 107,
715/112, 113, 227

See application file for complete search history.

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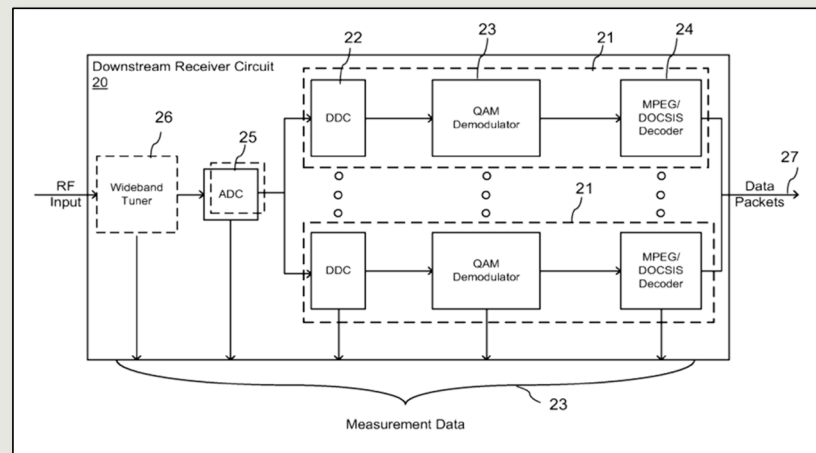
Primary Examiner — Khai Tran

(74) Attorney, Agent, or Firm — Matthew A. Pequignot;
Pequignot + Myers LLC

(57) ABSTRACT

The invention relates to measurement-capable cable modems for cable networks. Idle receivers and transmitters of a cable modem are used to perform upstream and downstream measurements on DOCSIS and non-DOCSIS digital and analog TV channels without disrupting customer services. A currently idle receiver is tuned to a target downstream channel under directions of a modem measurement controller, and is queried by the measurement controller to perform a measurement as specified by a measurement plan. A currently idle transmitter is tuned to a target upstream channel to transmit a test signal that is received by an upstream measurement system. Measurements are communicated to a central measurement controller, for example located at the headend, which collects measurements from a plurality of cable modems and the upstream measurement system. The resulting monitoring system performs cable network wide monitoring using existing cable modems without requiring additional monitoring devices.

19 Claims, 17 Drawing Sheets



Ex. 1011, Fig. 3; POR, 48

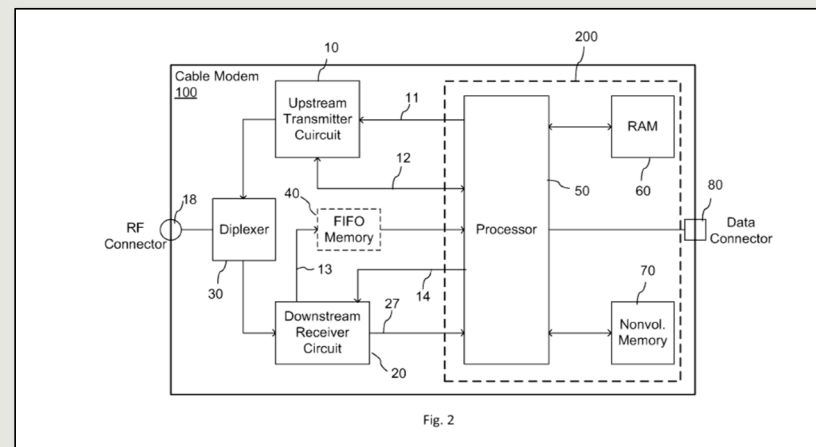


Fig. 2

Ex. 1011, Fig. 2; POR, 49

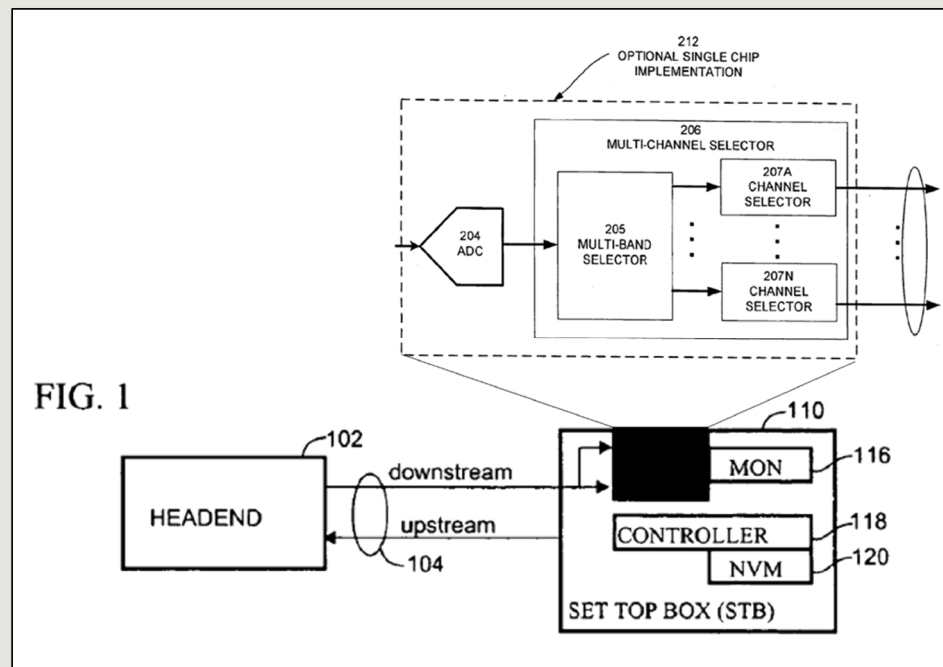
Demonstrative Only - Not Evidence PO-7

**Grounds A-C:
Overview of the Combination and the Proposed POSITA**

Demonstrative Only - Not Evidence PO-8

Petitioner Proposes a Physical Substitution

- The proposed combination “***replaces*** the IB and OOB tuners in *Kamieniecki’s* STB with *Konstantinos’* multi-channel receiver” (Petition, 32-35) (emphasis added)



Ex. 1009, Fig. 1 & Ex. 1010, Fig. 2 (modified); POR, 18

Demonstrative Only - Not Evidence PO-9

Petitioner Proposes a Physical Substitution

- The Petition recognizes that a POSITA must physically replace Kamieniecki's IB and OOB tuners because Konstantinos disparages using single-channel tuners

[0006] Existing receiver architectures based on the concept shown in FIG. 1 are not able to satisfy properly the need for multi-channel reception. The conventional approach would be to use many single channel tuners in parallel connected to the same input signal source to make a multi-channel tuner. This approach, however, faces major limitations related to complexity of system implementation, signal quality, and cost effectiveness. As the number of simultaneously required streams/channels goes beyond two, the conventional approach becomes completely impractical.

Ex. 1010, ¶ [0006]; Petition, 33-34

systems like that of Kamieniecki. Ex. 1002, ¶ 116. As Konstantinos recognizes, Kamieniecki's separate tuners become impractical in view of the increased demand for multi-channel tuning, because each time an RF input is replicated for separate tuners, the signal quality degrades, and Konstantinos' receiver avoids this loss by digitizing the RF input in its entirety, and then making selections from that digitized version. Ex. 1010, [0006]-[0007], [0043], [0045], [0049]. A POSITA would recognize that using Konstantinos' multi-channel receiver in place of the Kamieniecki IB and OOB tuners would offer savings in terms of cost and component complexity while providing improved multi-channel capability. Ex. 1002, ¶ 116.

Petition, 33-34

Demonstrative Only - Not Evidence PO-10

Petitioner's Expert Understood the Combination is a Physical Substitution

- Petitioner's expert testified in his declaration that Konstantinos's multi-channel receiver would **replace** Kamieniecki's IB and OOB tuner

112. In general, I believe a POSITA would have considered it obvious to modify Kamieniecki's STB 110 to use the Konstantinos multi-channel receiver **in place of** its separate IB and OOB tuners, as this was a natural evolution of television technology, and is specifically taught by Konstantinos. Ex. 1009, [0007]-[0008], [0013]-[0017]; Ex. 1010, [0001], [0011], [0016].

Ex. 1002, ¶ 112; Petition, 33

a more efficient digital processing system by avoiding multiple individual tuners. A POSITA would have understood that the IB and OOB tuners of Kamieniecki would be **replaced** by Konstantinos' multi-channel receiver providing enhanced capabilities as well as reducing cost and complexity through a single chip solution. Ex. 1010, [0016], [0044]; Ex. 1009, [0013].

Ex. 1002, ¶ 126, Petition, 34

Accordingly, it would have been obvious to a POSITA to use Konstantinos' multi-channel receiver **in place of** the IB and OOB tuners in Kamieniecki's STB 110, as doing so merely combines prior art elements according to known methods to yield predictable results.

Ex. 1002, ¶ 116; Petition, 34

channel receiver chip. In particular, a POSITA would have known how to incorporate Konstantinos' ADC 204 and multi-channel selector 206 (in place of Kamieniecki's IB and OOB tuners) to receive Kamieniecki's downstream IB and OOB channels and output digital signals of the selected channels. A POSITA would thus have been able to **implement Konstantinos' multi-channel receiver into Kamieniecki's STB** with an expectation of success and without undue experimentation.

Ex. 1002, ¶ 127; Petition, 34-35

Demonstrative Only - Not Evidence PO-11

Petitioner's Expert Understood the Combination is a Physical Substitution

- Petitioner's expert also testified at his depositions that Konstantinos's multi-channel receiver would **replace** Kamieniecki's IB and OOB tuner

So in your proposed combination of Kamieniecki and Konstantinos, I understand that you are saying to take the in-band and out-of-band tuners of Kamieniecki and **replace** that with the multi-channel receiver of Konstantinos; is that correct?

A. That's right.

Ex. 2014, 149:22-150:6

A. The capability for Kamieniecki to monitor both in-band and out-of-band tuners is not necessary for supporting my opinion, because we brought in Konstantinos and we **replaced** the in-band and out-of-band tuners with the Konstantinos multi-channel receiver.

Ex. 2014, 128:3-8

A. We talked about **simply replacing** the out-of-band and in-band tuners of Kamieniecki with the Konstantinos digital multi-channel receiver.

Q. You are not opining that additional hardware is necessary between the multi-channel receiver of Konstantinos and the monitor of Kamieniecki, correct?

A. Correct.

Ex. 2014, 155:3-11

A. No. I think we are talking about just **simply replacing** the out-of-band and in-band tuner of Kamieniecki with the downstream receiver.

Ex. 2014, 154:7-10

Is it your opinion that a person of skill in the art in 2011 would look to combine Kamieniecki and Konstantinos?

A. That's right.

Q. And in that process of combination, is it your opinion that the person of skill in the art would use Kamieniecki as a baseline, a starting point, and then integrate the chip of Konstantinos into that baseline starting point?

A. I think that's what I described, yes, because, you know, essentially **we're taking the single chip implementation as an example, disclosed by Konstantinos, and using that for the channel selector functionality, and we're in the -- in the -- let's call it the architecture of Kamieniecki.**

Ex. 2021, 33:12-34:1

Demonstrative Only - Not Evidence PO-12

Petitioner's Expert was Guided by Hindsight

Q I just did. We've established that you are going to take Kamieniecki as a starting place and add Konstantinos into that. Correct?

A So what I did was I mapped the claims in the patents, like the '008 and '826, to prior art that was known, and would be known by a POSITA, to implement that functionality, and it's clearly disclosed that taking the Kamieniecki architecture and using the single chip implementation of the multichannel receiver from Konstantinos would be known and understood and obvious to do.

Ex. 2021, 34:13-23; PO Sur-Reply, 13

Demonstrative Only - Not Evidence PO-13

Petition Proposes a Less-Experienced POSITA and a Generic Expectation of Success

A person of ordinary skill in the art (a “POSITA”) at the time of the alleged invention would have had a degree in electrical engineering or a similar discipline, and three-to-four years of experience working with television signal processing and communication systems. Additional education may substitute for professional experience and significant work experience may substitute for formal education. Ex. 1002, ¶¶ 40-42.

Petition, 30

Combining Konstantinos with Kamieniecki also would be merely using known techniques (a single chip multi-channel digital receiver) to improve similar devices (Kamieniecki’s STB having multiple TV tuners) to yield a predictable result (converting a received RF signal into multiple digital outputs). Ex. 1002, ¶ 127. A POSITA would have had the skill to implement Konstantinos’ teachings in the system of Kamieniecki 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 chip and the POSITA would be familiar with the design of RF receivers. A POSITA would thus have been able to implement Konstantinos’ multi-channel receiver into Kamieniecki’s STB with an expectation of success. Ex. 1002, ¶ 127.

Petition, 34-35

Demonstrative Only - Not Evidence PO-14

**Grounds A-C: The Proposed Combination Fails to Render Obvious
Every Claim Element**

Demonstrative Only - Not Evidence PO-15

Petition Relies on the Following to Allegedly Render Obvious Claim 1

Claim Element	What the Petition Relies Upon
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;	"In the Kamieniecki-Konstantinos combination, the IB and OOB channels of Kamieniecki would be the RF Input that is received by the Konstantinos multi-channel receiver 200. The digitization of the IB and OOB channels of Kamieniecki by the ADC 204 [of Konstantinos] results in a multi-channel digital signal ('digitized signal') that is a digitized equivalent of the input RF signal." (Petition, 38)
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;	"In the proposed combination, the monitor 116 would receive a selected IB and/or OOB channel as a digital output stream from the Konstantinos receiver 200." (Petition, 39) (citing Lett (Ex. 1002) at ¶ 131)
a data processor operable to process a television channel to recover content carried on the television channel; and	"Kamieniecki's STB 110 would obviously have a decoder to decode the MPEG-2 stream . . ." "Konstantinos also describes channel and source decoders . . ." "A POSITA would have known that such decoders would be data processors . . ." (Petition, 40) (citing Lett (Ex. 1002) at ¶¶ 135-136)
a channelizer operable to: select a first portion of said digitized signal; select a second portion of said digitized signal; and	"Konstantinos describes a Multi-Channel Selector 206 [] (claimed 'a channelizer'), which includes a Multi-Band Selector 205 and multiple Channel Selectors 207A-N, which select channels from the digitized broadband input signal, and output them concurrently, as illustrated in Figure 2." (Petition, 41)
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.	Lett (Ex. 1002) at ¶¶ 145-146

Demonstrative Only - Not Evidence PO-16

The Cited Prior Art Fails to Render Obvious the “Concurrently Output” Element

- The “concurrently output” element is supplied by Petitioner’s expert

Once Kamieniecki is updated with Konstantinos’ multi-channel receiver, a POSITA would have recognized that Kamieniecki’s measurements can be made without waiting for an idle time, and can be done in parallel without disturbing users.

Ex. 1002, ¶ 145. Indeed, network errors can occur at any time of day, and a POSITA

Petition, 43

A POSITA would have recognized that as a result of replacing Kamieniecki’s IB and OOB tuners with Konstantinos’ multi-channel receiver, the channel(s) to be monitored (“first portion of said digitized signal”) would be output to Kamieniecki’s monitor 116 in order for signal quality monitoring to take place and the signal quality information to be sent to the headend, as taught by Kamieniecki. Ex. 1002, ¶¶ 145-

146. A POSITA would also have recognized that Konstantinos’ interface circuit

Petition, 44

Demonstrative Only - Not Evidence PO-17

The Cited Prior Art Fails to Render Obvious the “Concurrently Output” Element

- The Petition relies on gap-filling testimony not based on the references

Once Kamieniecki is updated with Konstantinos' multi-channel receiver, a POSITA would have recognized that Kamieniecki's measurements can be made without waiting for an idle time, and can be done in parallel without disturbing users.

Ex. 1002, ¶ 145. Indeed, network errors can occur at any time of day, and a POSITA

Petition, 43

145. As for the claimed “concurrently output” limitation, a POSITA would recognize that when the Konstantinos multi-channel receiver 200 is used with the Kamieniecki STB 110, Kamieniecki's measurements can be made without waiting for an idle time, and can be done in parallel so as to not disturb users. This is

Ex. 1002, ¶ 145

Demonstrative Only - Not Evidence PO-18

The Cited Prior Art Fails to Render Obvious the “Concurrently Output” Element

- The Petition relies on gap-filling testimony not based on the references

A POSITA would have recognized that as a result of replacing Kamieniecki's IB and OOB tuners with Konstantinos' multi-channel receiver, the channel(s) to be monitored (“first portion of said digitized signal”) would be output to Kamieniecki's monitor 116 in order for signal quality monitoring to take place and the signal quality information to be sent to the headend, as taught by Kamieniecki. Ex. 1002, ¶¶ 145-

146. A POSITA would also have recognized that Konstantinos' interface circuit

Petition, 44

146. In the combination, since many channels can be simultaneously selected and output by the Konstantinos multichannel receiver 200, it would have been obvious to a POSITA to select one or more channels (“first portion of said digitized signal”) to be output to the Kamieniecki monitor 116 for monitoring, and select one or more channels (“second portion of said digitized signal”) to be output for normal usage, such as watching a television channel, thereby showing the “concurrently output” recited in element [1E]. Konstantinos also describes an

Ex. 1002, ¶ 146

Demonstrative Only - Not Evidence PO-19

The Cited Prior Art Fails to Render Obvious the “Concurrently Output” Element

- Mr. Lett’s deposition testimony demonstrates failure of proof

Q. Sir, are you unwilling to fill in Exhibit 2012?

A. I do not feel comfortable creating evidence at this time.

Q. So you are unwilling?

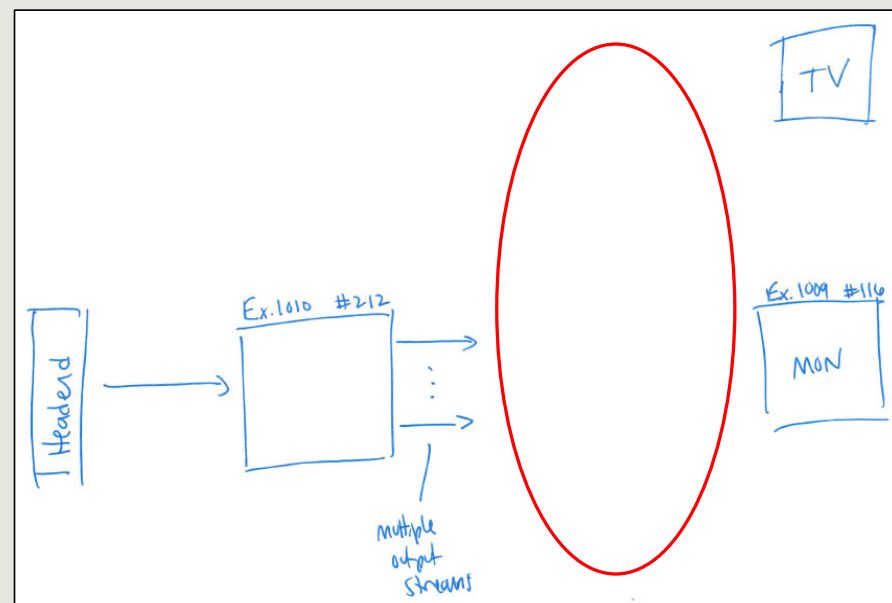
A. I am here to answer questions about my declaration.

Q. And I think your declaration is hopelessly ambiguous on this point and my attempt is to try to figure out visually what you are trying to get across and give you an opportunity to show me because I am failing to understand.

So here is my question: Are you able to fill in Exhibit 2012 at a high level to depict how the multiple output streams from Konstantinos's multi-channel receiver can go to both the monitor and/or the TV?

THE WITNESS: I believe it would be a new opinion for me to draw this block diagram and I am not comfortable with it at this time, because I need to think about all the details that are required to draw that block diagram.

Ex. 2014, 174:21-175:16, 175:21-176:3; POR, 24



Ex. 2012 (annotated in red); POR, 24

Demonstrative Only - Not Evidence PO-20

The Cited Prior Art Fails to Render Obvious the “Concurrently Output” Element

- Petitioner also took the position that a decoder could be before the monitor, which would also prevent a concurrent output to both a decoder and Kamieniecki’s monitor

2014, 161:1-8, 170:2-19; Ex. 1002, ¶ 135. Pressed further, he explained that an MPEG decoder could be in the path between the Konstantinos multi-channel receiver and the Kamieniecki monitor, but it would depend on the desired monitoring. Ex. 2014, 166:4-167:9.

Petitioner Reply, 4-5

Demonstrative Only - Not Evidence PO-21

The Proposed Combination Fails to Render Obvious Every Claim Element

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

Demonstrative Only - Not Evidence PO-22

Kamieniecki's Monitor Does Not Analyze a Digitized Signal

- Both experts agree that *Kamieniecki's* STB and the proposed combination receive an ***analog*** carrier signal that carries digital information

Q. That set-top box shown in Figure 1 and described in Kamieniecki, that receives an analog carrier signal in the downstream direction, right?

A. Well, as stated in the declaration and also in Paragraph 4 of Kamieniecki, set-top can receive analog or digital transmissions.

Q. What do you mean by "digital transmissions"?

A. Not an analog channel but a digital channel.

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. 2014, 56:18-57:13; POR, 38

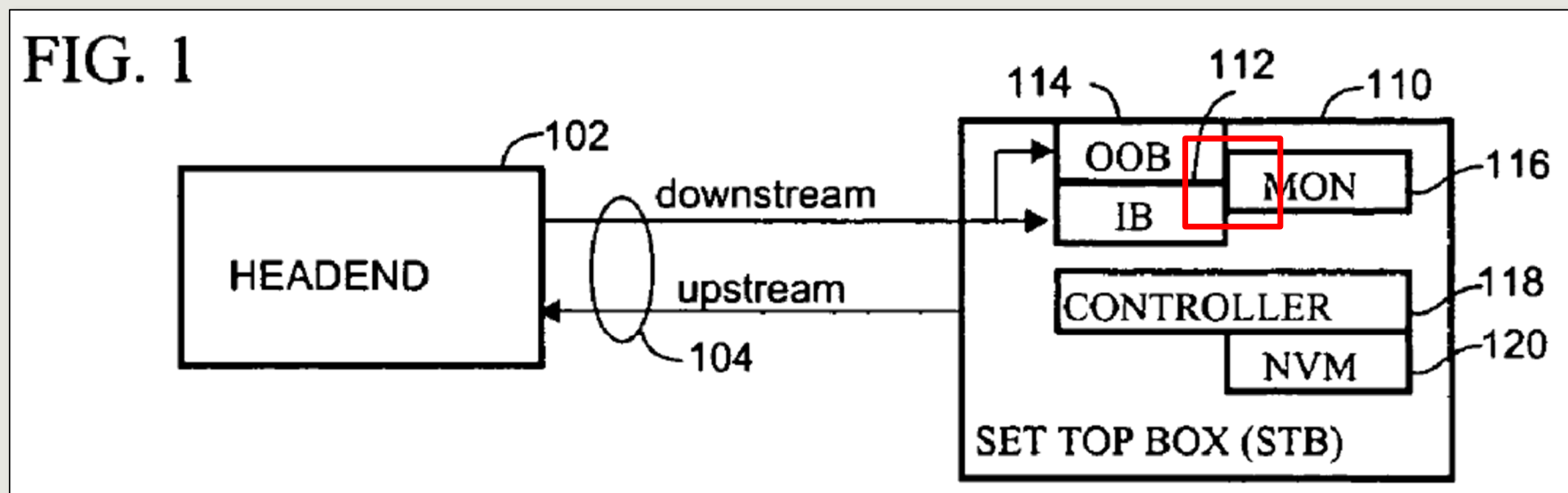
127. Given this, a POSITA would understand Kamieniecki's reference to digital transmissions is discussing the fact that information (e.g., video or data)—regardless of whether it is in an analog or a digital format—can be modulated onto an analog carrier signal for transmission from the headend to the customer's premises. There simply is no such thing as a digital carrier signal in the art of Kamieniecki or the '008 Patent. This is the same understanding of digital transmissions that Mr. Lett provided at his deposition. 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; POR, 38

Demonstrative Only - Not Evidence PO-23

Kamieniecki's Monitor Does Not Analyze a Digitized Signal

- The parties disagree what components exist between the IB and OOB tuners and the MON



Ex. 1009, Fig. 1 (annotated)

Kamieniecki's Monitor Does Not Analyze a Digitized Signal

- If the IB and OOB tuners output directly to MON, then the MON is designed to analyze an analog signal because both experts agree that Kamieniecki is selecting an analog channel

Q When Kamieniecki is receiving that kind of information, Kamieniecki's in-band tuner is selecting a channel within that analog carrier; is that right?

A Yeah, that's fair to say.

Ex. 2021, 38:21-25

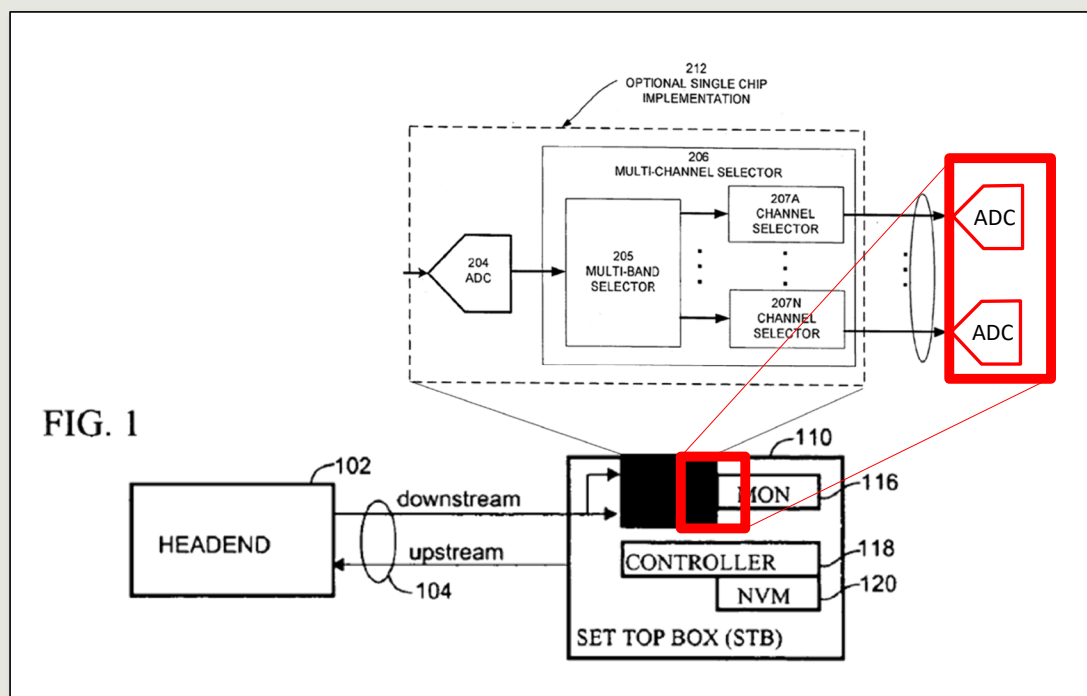
128. Next, these analog carrier signals are received by the IB and OOB tuners. Ex. 1009, ¶ [0014]. The tuner then selects a single 6-MHz analog signal (or, in the case of OOB, a single 1.8-MHz/1-2MHz analog signal) and passes it on for further processing. At his deposition, Mr. Lett discussed a distinction between “analog” and “digital” tuners. Ex. 2014, 68:3-9. I understand that Mr. Lett went on to provide examples of analog and digital tuners. Ex. 2014, 104:14-19, 105:5-8.

Ex. 2013, ¶ 128; POR, 39

Demonstrative Only - Not Evidence PO-25

Kamieniecki's Monitor Does Not Analyze a Digitized Signal

- If Petitioner is correct that an ADC is between the IB and OOB tuners and the MON, then the combination does not make sense



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

Kamieniecki's Monitor Does Not Analyze a Digitized Signal

- Moving an ADC from after channel selection (*Kamieniecki*) to before channel selection (*Konstantinos*) drastically affects the required power and thus would not be as simple as Petitioner suggests

92. However, ADC 204, as described in the cited paragraphs of Mr. Lett's declaration, would be extremely difficult to implement because of the sampling rate needed to digitize signals with around 1 GHz bandwidth. As described above, the Nyquist theorem provides that the sampling rate would need to be at least two times the largest bandwidth. *Supra* ¶ 62. Thus, as Konstantinos readily acknowledges, ADC 204 would most likely require a sampling rate of 2 GSamples/sec, which produces a data rate of 20-80 Gbits/sec. Ex. 1010, ¶ [0051]. In another embodiment, Konstantinos specifically discloses a sample rate of 500 MSamples/sec. Ex. 1010. ¶ [0100]. Accomplishing sampling rates of this magnitude requires a significant amount of power. Thus, additional power supplies would need to be added to Kamieniecki's set-top box to ensure Konstantinos's ADC received sufficient power to accomplish the analog to digital conversion and, because of the sensitive nature of ADC circuits, the power would require careful design and extensive filtering. See *supra* ¶¶ 62-64.

Ex. 2013, ¶ 92; POR, 28

Demonstrative Only - Not Evidence PO-27

Kamieniecki's Monitor Does Not Analyze a Digitized Signal

- As found by the PTAB in another proceeding, moving the point of digitization earlier is not as simple as moving an ADC

We also disagree with Petitioner's characterization of our Institution Decision as "fixated" on the problems addressed by the prior art references rather than their teachings as a whole. There were several other considerations that we discussed in the Institution Decision. Inst. Dec. 24–27. Those considerations include that moving the point of digitization earlier in Williams's system according to Pugel's teaching, as Petitioner proposed, is not merely a matter of moving Pugel's analog-to-digital converter (ADC) but would require additional circuitry that the Petition did not sufficiently account for (Inst. Dec. 24–25). We also noted that the Petition did not identify adequately digital equivalents for Williams's analog components, and "whether they were available at the time of the '576 patent" (Inst. Dec. 25). We further noted that Petitioner did not sufficiently

Entropic Communications, LLC v. DISH Network Corp, IPR2023-00391, Paper 13 at 4 (PTAB Jan. 19, 2024)

Demonstrative Only - Not Evidence PO-28

Kamieniecki's Monitor Does Not Analyze a Digitized Signal

- Petitioner's expert relies on a cherry-picked document about the Explorer 4200 because he did not recall the specifics about any particular STB from Scientific-Atlanta

Q. What is the 2100?
A. Boy, I am going back in my memory archives here.
Actually, it was 2010, right, or -- it was 2010 series? I can't remember.
Q. My understanding is it was the 2100 series but if you remember it as the 2010 series, we can go with that.
A. You know, it's been so long ago.
For me to testify as to the features and functionalities for a specific model, I just -- I'm sorry. I just don't feel comfortable with that on the record.
I, of course, know in general about all the set-top boxes and have memories of some of the functionalities, but to answer your question, I would really like to be totally accurate and I probably would need to think about it and perhaps reference some documents to refresh my memory.

Ex. 2014, 21:6-22:3; PO Sur-Reply, 4

Q. The Explorer 4200 had a DOCSIS modem in it; is that right?
A. That's right.
Q. And that modem was for out-of-band signaling?
A. It was for DOCSIS functionalities. Two-way -- DOCSIS has an upstream and downstream. So it has two-way functionality.
Q. I guess my point is, that DOCSIS modem wasn't for receipt of television video channels, correct?
A. It can be, and it was used for video channels.
Q. In the 4200?
A. I don't remember in the 4200, if that was true or not. It might have been. I just don't recall.
Q. Understanding that DOCSIS could be used generally for receiving television channels, you have no reason to believe that it was for the 4200, correct?
A. I have no reason to recall, but, I mean -- scratch that.
I do not recall.

Ex. 2021, 24:16-25:14; PO Sur-Reply, 4

Demonstrative Only - Not Evidence PO-29

Grounds A-C: There is No Reasonable Expectation of Success

Demonstrative Only - Not Evidence PO-30

Petitioner's Expert Failed to Explain How the Proposed Combination Would Function

- If Petitioner's expert could not figure out the details, how would the less-experienced POSITA?

Q. And I think your declaration is hopelessly ambiguous on this point and my attempt is to try to figure out visually what you are trying to get across and give you an opportunity to show me because I am failing to understand.

So here is my question: Are you able to fill in Exhibit 2012 at a high level to depict how the multiple output streams from Konstantinos's multi-channel receiver can go to both the monitor and/or the TV?

THE WITNESS: I believe it would be a new opinion for me to draw this block diagram

and I am not comfortable with it at this time, because I need to think about all the details that are required to draw that block diagram.

BY MR. GALLUZZO:

Q. You haven't already thought about all those details that are required?

A. I haven't drawn a schematic diagram.

Q. You say you need time to think about all the details that are required to draw that block diagram.

You agree with me that you have not yet already thought about all those details?

MR. QUALEY: Objection to form.

THE WITNESS: No. I need more time to think about those details in order to complete this drawing.

Ex. 2014, 175:21-176:16; POR 20-24

So would that person of skill in the art take the decoders from the Konstantinos disclosure or would it take the decoders from what you say would be obvious in the Kamieniecki disclosure?

A. It could be either. It is just obvious that we need multiple decoders and --

and Kamieniecki doesn't go into much detail about MPEG decoding, right, so one would, you know, he could -- he just knows that you have to have multiple MPEG decoders if you are going to output and view multiple channels and so, you know, more details of that could be rendered from Konstantinos and/or Ota or perhaps a million other references.

Ex. 2014, 159:6-20; POR 20-24

Q. If we go back to Konstantinos and look at that multi-channel receiver, there are channel selectors A through N.

In your proposed combination, what is that number N?

A. I didn't give a number, I don't think in my declaration.

Q. I didn't see one either, which is why I am asking.

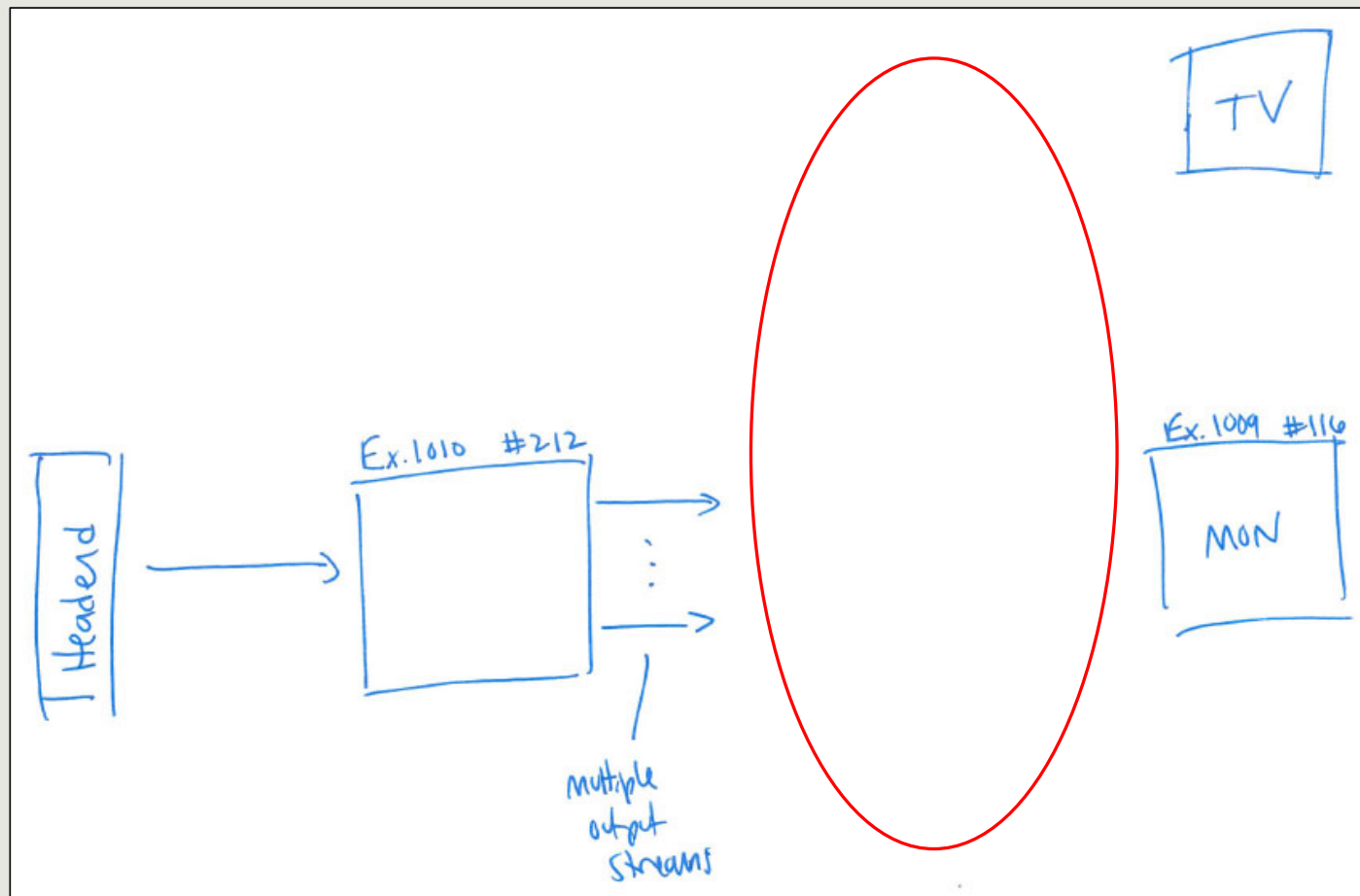
So in your opinion, in your combination that you believe renders the asserted claims obvious, what is that number N?

A. I don't know. I would need to think about that.

Ex. 2014, 150:7-20; POR 20-24

Demonstrative Only - Not Evidence PO-31

“Ordinary Creativity” is Not a Gap-Filler



Ex. 2012 (annotated in red); POR, 24

Demonstrative Only - Not Evidence PO-32

**Grounds A-C: *Kamieniecki* and *Konstantinos* Receive Differently
Formatted Input Signals**

Demonstrative Only - Not Evidence PO-33

Kamieniecki and Konstantinos Receive Differently Formatted RF Signals

- The proposed combination receives a signal with IB and OOB channels

Kamieniecki describes headend 102 transmitting a plurality of IB channels and one or more OOB channels (together “a received signal spanning an entire television spectrum”) that are received by STB 110. Ex. 1109, [0013], Fig. 1. The IB channels (claimed “a plurality of television channels”) include audio and video content of television programs for display at the STB. Ex. 1009, [0002]-[0004], [0013]-[0014], Ex. 1002, ¶¶ 120-121.

Petition, 36

Demonstrative Only - Not Evidence PO-34

Kamieniecki and Konstantinos Receive Differently Formatted RF Signals

- Both experts agree that OOB channels have bandwidths between 1-2 MHz

58. Two industry standards were established for the OOB channels: (1) SCTE 55-1, originally developed by General Instrument, and (2) SCTE 55-2, originally developed by Scientific Atlanta. Ex. 1026, p. 415. For downstream OOB channels, these would occupy the 70-130 MHz frequencies, but for channel spacing, SCTE 55-1 used 1.8 MHz channel spacing; whereas, SCTE 55-2 used 1 or 2 MHz. *Id.* For downstream IB channels, a separate standard established that the channel spacing in North America is 6 MHz. Ex. 1002, ¶ 52.

Ex. 2013, ¶ 58; POR, 35

Q. So for the systems that you are familiar with that have the approximately 108 megahertz portion of the spectrum for the out-of-band communications, if Konstantinos wants to select that portion of the bandwidth, its channel selector is selecting a 6 megahertz-wide portion of bandwidth, right?

A. No. No. The out-of-band signals were not that wide. They were typically a lot less than that and I can't remember how much.

Q. One and a half?

A. Maybe. I don't know.

Ex. 2014, 142:21-143:10

Demonstrative Only - Not Evidence PO-35

Kamieniecki and Konstantinos Receive Differently Formatted RF Signals

- Konstantinos receives a DOCSIS signal, which has channels with a 6 MHz bandwidth

95. I disagree with Mr. Lett that the RF signals are the same between the two references because, although both Kamieniecki and Konstantinos teach an RF signal, the signals are formatted according to different protocols and use different modulations. Because the Petition relies on Kamieniecki to disclose the claimed “a signal that carries a plurality of channels, wherein said channels comprise one or both of television channels and data channels” (Petition, 31), the proposed combination would receive a signal that included both IB and OOB channels. As discussed above, this means that there would be a mixture of channel bandwidths and the OOB channel would be modulated using QPSK modulation. *See supra* ¶¶ 56-61. Konstantinos, however, is not designed to handle different bandwidth because it receives a signal with only channel bandwidths of 6 MHz and modulated using QAM in accordance with the DOCSIS protocol. *Supra* ¶ 61.

Ex. 2013, ¶ 95; POR 23-25

[0011] In August of 2006, Cable Labs, Inc. issued “Data Over Cable Service Interface Specification (DOCSIS) 3.0.” DOCSIS 3.0 data reception and channel binding, both of which require the simultaneous reception of at least 4 channels placed not further than 60 MHz apart from each other. The block tuner described above enables DOCSIS 3.0, but does not enable unrestricted multi-channel functionality. For example, the simultaneously received number of channels is small and there is no freedom from a user’s perspective to select (or combine together for faster data reception) many/any channels freely out of the full cable TV band. The latter usually consist of up to 100 channels between 50-1000 MHz. The resulting situation is that separate receivers are required to receive both TV and DOCSIS (data) channels without the reception of one restricting the basic functionality of the other. Several implementation limitations appear as well. For example, for a 4-channel system the tuner IC needs to output four clean analog baseband output signals to the decoder IC. The block receiver approach is clearly not the best for interference reasons.

Ex. 1010, ¶ [0011]

Demonstrative Only - Not Evidence PO-36

Kamieniecki and Konstantinos Receive Differently Formatted RF Signals

- These differences would render Kamieniecki's STB unfit to report signal quality information

[0014] The 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, particularly that information relating to signal quality which is gathered by the monitor (MON) 116. This signal quality information can include information about channel absence/presence, error count and signal level estimates. As described below, the information about signal quality can be transmitted by the STB to the headend either as it is collected, or when the STB is polled by the headend. The transmitter (e.g., modem) and other details of the STB, which are well known to those skilled in the art, are omitted for illustrative clarity.

Ex. 1009, ¶ [0014]; POR 31-33

123. To the extent Petitioner argues that Kamieniecki uses SCTE 55-2 instead of SCTE 55-1, those are the only two options, after all, removing the OOB tuner would also render this reporting mechanism inoperable. As described above, SCTE 55-2 assigns each set-top box a specific time when it is able to transmit information to the headend. *Supra*, ¶ 60. For the set-top box to know when to transmit, it must receive via the OOB channel a "SL-ESF START" message. *Id.* Thus, by removing the OOB tuner, the set-top box would be unable to determine its timeslot. If the set-top box were to report outside its timeslot, it would interfere with other set-top box transmissions, eventually causing the headend to drop messages. Thus, without the OOB tuner, the proposed combination would effectively be unable to report information to the headend unless Konstantinos's multi-channel receiver was redesigned to process an OOB channel. Mr. Lett and the Petition fail provide any reason to modify Konstantinos's multi-channel receiver in this way, let alone discuss that a POSITA would be motivated to do so or how a POSITA would do so. Therefore, it is my opinion that removing the OOB tuner would render Kamieniecki's set-top box inoperable for its intended purpose.

Ex. 2013, ¶ 123; POR 31-33

Demonstrative Only - Not Evidence PO-37

**Grounds A-C: The Proposed Combination Would Unnecessarily
Increase Cost and Complexity**

Demonstrative Only - Not Evidence PO-38

Kamieniecki's Single-Tuner Design is Sufficient for Its Intended Application

Q Is Kamieniecki an impractical design?

A What do you mean?

Q Well, is it a practical design or an impractical design?

A I mean I'm not sure what you mean by practical or impractical in this case.

Q You have no understanding what that word means?

A I mean I think -- I mean it would be obvious to a POSITA on how to implement the design as taught by Kamieniecki.

Q And is that design a practical one that could be used in the real world?

A Sure.

Q So it's not an impractical design?

A That's fair.

Q Is having a single channel tuner in a set-top box an impractical design?

A No.

Ex. 2021, 10:6-24; PO Sur-Reply, 10

Q And in 2011, single channel tuners were still being sold to customers?

A Well, yes. So we had, and vendors like the company I work for, we had low-end models, you know. Some didn't have a return path. They're like basic set-top boxes. And then all the way up to DVRs with multiple tuners, as well as, you know, IPTV boxes that receive channels through DOCSIS.

There was a lot of different types of set-top boxes being sold, depending on what the customer wanted, right.

So, for example, like Comcast would have very, let's call them, low-feature customers that were just interested in, you know, watching one channel at a time and going channel up, channel down, that kind of thing.

Ex. 2021, 12:16-13:6; PO Sur-Reply, 10-11

Demonstrative Only - Not Evidence PO-39

The Proposed Combination Unnecessarily Increases Complexity

- The high-speed ADC would require additional power supplies and shielding to function properly

105. Beginning with complexity, Mr. Lett's opinion that using a single integrated circuit (IC) would reduce complexity ignores the extensive alterations to Kamieniecki that would be needed to accommodate Konstantinos's multi-channel receiver. As described above, a POSITA would have to add additional power supplies, shielding, and reprogram the channel selectors so that the proposed combination would function. *Supra*, ¶¶ 90-97. Thus, by forcing complex digital signal processing in the form of Konstantinos's multi-channel receiver into Kamieniecki's basic set-top box (*supra*, ¶¶ 80-87), the proposed combination increases complexity.

Ex. 2013, ¶ 105; *POR* 28-29

Demonstrative Only - Not Evidence PO-40

The Proposed Combination Unnecessarily Increases Complexity

- Petition's POSITA lacked the knowledge and experience to integrate the complex functionality such as high speed analog to digital conversion into *Kamieniecki's* STB

99. While at S-A, I directly oversaw an extensive redesign of certain S-A products that replaced can tuners—which were used in the Explorer 4200—with a silicon tuner—which was used in Explorer 8300. This changeover from can tuners to silicon tuners required years of effort by a large team of individuals with a range of education and experience levels. As Mr. Lett testified and I experienced while working at S-A, design teams often included individuals with Ph.D.'s or master's degrees and extensive experience. Ex. 2014, 33:1-12, 34:21-35:1, 35:5-11. Yet, despite the number of individuals and the advance degrees held by team members, it still took 5-6 full-time RF engineers, most with over 20 years of experience, to design and develop a new set-top box with silicon tuners.

Ex. 2013, ¶ 99; POR 20-21

100. The proposed replacement of Kamieniecki's IB and OOB tuners with Konstantinos's multi-channel receiver chip is more difficult than replacing conventional tuners with a silicon tuner like we did at S-A. This is true because the proposed replacement requires integrating an entirely new component into Kamieniecki—a high speed ADC—that necessitates extensive changes to components throughout the set-top box as described above. These changes are so extensive, especially redesigning the set-top box to provide the necessary power, that I would give this task to individuals with advanced degrees or with many more years of experience. I would do this because designing the power distribution for an ADC requires very specialized knowledge—regarding design consideration such as sampling rate, data transfer, thermal load on the ADC (i.e. are the components getting so hot that the circuit board will melt)—that I would not expect a less experienced team member, like the Petition's POSITA, to have. Additionally, I

Ex. 2013, ¶ 100; POR 20-21

Demonstrative Only - Not Evidence PO-41

The Proposed Combination Unnecessarily Increases Complexity

- Petitioner's expert did not know how to resolve these complexities

Q In 2011, did an ADC digitizing only a six megahertz channel require less power than an ADC digitizing a one gigahertz spectrum?

A There's a lot of other factors, like, again -- it may or may not, depending on what you're comparing. Comparing what to what?

Q From your experience in 2011, can you think of a single ADC that could digitize an entire one gigahertz spectrum that required less power than an ADC that could only digitize a single six megahertz channel?

A So I'm going to look at Konstantinos to answer your question.

(Pause.)

A I'm sorry, perhaps I was thinking about something else. Can you repeat that question?

MR. GALLUZZO: Ms. Robinson, would you mind repeating it back. I have since forgotten.

(The record was read by the reporter as follows: "From your experience in 2011, can

you think of a single ADC that could digitize an entire one gigahertz spectrum that required less power than an ADC that could only digitize a single six megahertz channel?")

(Pause.)

A So Konstantinos addressed the power requirements of such a multichannel tuner by disclosing the interleaved architect for its ADC, and that's in Paragraphs 59 through 61 of Konstantinos.

So he recognized that traditional ways of implementing such an ADC could be greatly improved when power requirements by the interleaved sampling and digitization architecture that he discloses.

Q Thank you. Are you able to answer the question that I asked?

A I don't know the answer.

Ex. 2021, 43:5-44:17; PO Sur-Reply, 8

Demonstrative Only - Not Evidence PO-42

The Proposed Combination Unnecessarily Increases Costs

- The redesign of *Kamieniecki's* single-tuner STB would have a steep initial design cost

107. First, Mr. Lett's opinions ignore the steep initial cost associated with designing and developing the set-top box given the number of individuals and time it takes to develop a new set-top box. As described above and as Mr. Lett testified at his deposition, it typically would take at least 100 individuals approximately six to twelve months to develop a new set-top box. Ex. 2014, 25:8-19, 30:15-19, 31:11-14. Thus, the cost to simply design the proposed combination and ensure that it would function properly would be significant based on the time and number of individuals involved.

Ex. 2013, ¶ 107; POR 27-28

Q. Sitting here today, can you remember the amount of time it took to develop any one particular set-top box for any of your projects prior to 2011?

A. I mean, in a range of maybe six months to a year from first silicon was kind of the, in general, you know, I could be off a little bit on that, but that's kind of the range of time that it took from -- let's call it first silicon, meaning the chip sets are available to release the product for production.

...

Q. Fair to say that a development project for a set-top box in 2009, 2010, 2011, would have hundreds of people or a hundred people?

A. At least a hundred, yes.

Ex. 2014, 25:8-19, 30:15-19; POR 27-28

Demonstrative Only - Not Evidence PO-43

The Proposed Combination Unnecessarily Increases Costs

- Multi-channel functionality would be unnecessary for *Kamieniecki's* STB

108. Second, the proposed combination would make Kamieniecki more expensive than necessary for its intended applications. As described above, the cable TV industry is extremely price sensitive to the point that pennies matter. *Supra*, ¶¶ 75-79. Therefore, to keep costs down, a set-top box would be designed to only include the functionality needed for its intended applications. *Id.* A POSITA would recognize that Kamieniecki, with its single IB tuner, would be considered a “basic” STB designed intended for applications that only require a single channel to be selected at a time. In contrast, Konstantinos’s multi-channel receiver was designed to select multiple channels. *See* Ex. 1010, ¶ [0011]. This type of functionality would be integrated into more advanced STBs that were intended to allow simultaneous viewing or recording of different channels, such as a DVR set-top box that could display one channel while recording others simultaneously. An example is the Explorer 8300 that my group designed.

Ex. 2013, ¶ 108; POR 28-29

109. Thus, by incorporating additional functionality into Kamieniecki’s basic set-top box, the proposed combination would result in a more expensive set-top box than what was needed. 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. The Formula 1 engine would achieve a similar result as the engine of the Honda Accord—it would propel the car—but the Formula 1 engine would be overengineered and imbue the Honda Accord with capabilities that it was never designed for. In an industry where pennies matter, it is my opinion that the added costs, even a minor increase in cost, would weigh strongly against a motivation to make the proposed substitution of elements.

Ex. 2013, ¶ 109; POR 28-29

Demonstrative Only - Not Evidence PO-44

The Proposed Combination Unnecessarily Increases Costs

- Petitioner's expert agreed it would not make sense to add unnecessary features

Q And it wouldn't make sense to put it in there because it would cost more than the feature set needed?

A I think that's accurate, yes. In the very low end -- let's make it as cheap as we can possibly make it kind of box.

Ex. 2021, 22:11-16; PO Sur-Reply, 11

Demonstrative Only - Not Evidence PO-45

Grounds A-C: Combining *Konstantinos* and *Kamieniecki* in the Manner Proposed Would Fundamentally Alter Both References

Demonstrative Only - Not Evidence PO-46

Kamieniecki Waits for Idle Before Gathering Signal Quality Information

- Both experts agree that Kamieniecki waits for the STB to be idle before monitoring

112. Beginning with Kamieniecki, its principle of operation for conducting signal analysis is waiting until the STB 110 is “off” or idle. Ex. 1009, ¶¶ [0008], [0015], [0017], [0018], Fig. 2. Although the Board found that Kamieniecki “does not require collection of information only during idle times” (Paper 8, 20), the Board took this position because of Kamieniecki’s disclosure that it “may” wait for idle, which is generally non-limiting language. However, both Mr. Lett and I agree that the Board’s initial reasoning was not correct because a POSITA would *not* understand this to be non-limiting language for the many reasons that follow.

Ex. 2013, ¶ 112; POR, 31

68. Kamieniecki describes its looping process as handling one channel at a time, and this makes sense as the STB 110 is described as having only one IB tuner and only one OOB tuner. Ex. 1009, [0004], [0013]-[0017], Fig. 2. This would also be the reason why Kamieniecki’s Figure 2 process begins with a determination (step 204) of whether the STB 110 is in an off/idle state – Kamieniecki allows its monitoring to occur automatically in the background so as not to disturb any viewer experiences, so waiting for an off/idle state helps avoid interfering with a viewer experience. Ex. 1009, [0014]-[0017], Fig. 2. For example, if the IB tuner 112 were

Ex. 1002, ¶ 68; POR, 31

be in use. 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, and because Kamieniecki wished to avoid disturbing users. Ex. 1009, [0014]-[0017], Fig. 2. For

Ex. 1002, ¶ 145; POR, 31

Demonstrative Only - Not Evidence PO-47

***Kamieniecki* Waits for Idle Before Gathering Signal Quality Information**

- Petitioner proposes disregarding this principle of operation

Once Kamieniecki is updated with Konstantinos' multi-channel receiver, a POSITA would have recognized that Kamieniecki's measurements can be made without waiting for an idle time, and can be done in parallel without disturbing users.

Petition, 43

Demonstrative Only - Not Evidence PO-48

Fundamental Changes to *Konstantinos's* architecture

- Real-time monitoring would require a change to *Konstantinos's* 1:1 ratio between channel selectors and decoders

117. The proposed combination would also require fundamental changes to *Konstantinos's* architecture. *Konstantinos* discloses for N number of channel selectors that there would be N number of decoders, thus a 1:1 ratio between channel selectors and decoders. *See, e.g., Ex. 1010, ¶ [0046]*. Because of this 1:1 ratio, a POSITA would need to change the architecture of *Konstantinos* so that an output of the multi-channel receiver goes to Kamieniecki's monitor and not to a decoder. Because Mr. Lett and the Petition fail to address this, it is not clear how the combination is capable of the claimed concurrent output. I can think of only two modifications to *Konstantinos* that would allow for a channel selector to output to Kamieniecki's monitor: (1) remove a channel decoder and replace it with Kamieniecki's monitor (N-1 number of decoders); or (2) add an additional channel selector that provides a selected channel to the Kamieniecki's monitor (N+1 number of channel selectors). A POSITA would not be motivated to make either modification.

Ex. 2013, ¶ 117; PO Sur-Reply, 14

[0046] The channel selectors 207 realize a fine channel selection. Each sub-block 207A-N receives any of the L sub-bands, selects one channel only and delivers it at the output. The number of channel selectors determines the number of simultaneously received TV channels at the output. For example, using 16 channel selectors permits 16 channels contained in the original TV band to be received simultaneously.

Ex. 1010, ¶ [0046]; POR 32

Demonstrative Only - Not Evidence PO-49

Grounds D-E: *Renken* is Not Prior Art

Demonstrative Only - Not Evidence PO-50

Petitioner Fails to Meet Its Burden to Show *Renken* is Prior Art

- Petitioner argues it would have been obvious to place the CMC at the headend

The Renken Provisional also states that results are sent to the CMC, but does not explicitly say that the CMC is located at the headend. Ex. 1012, pp. 10, 13. A POSITA would have understood that upstream transmissions from a cable modem arrive at the headend, so it would at least be obvious that the results are sent to the headend. Ex. 1002, ¶ 205. Further, the headend is the most logical place to send the results. This was recognized by the Renken Provisional, which in describing a prior

Petition, 64

Demonstrative Only - Not Evidence PO-51

Petitioner Fails to Meet Its Burden to Show *Renken* is Prior Art

- The Federal Circuit has rejected this “obvious” argument

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.

POR, 51

Demonstrative Only - Not Evidence PO-52

Petitioner Fails to Meet Its Burden to Show *Renken* is Prior Art

- Petitioner shifts in Reply and argues *Renken* is prior art regardless of whether the *Renken* provisional discloses the CMC is located at the headend

issue here is obviousness, not anticipation. Even if the *Renken* provisional is found to not expressly or inherently disclose that the CMC is located at the headend, it is still prior art under *Dynamic Drinkware*, and still at least renders this limitation obvious. Pet. 64.

Petitioner Reply, 19

Demonstrative Only - Not Evidence PO-53

Petitioner Fails to Meet Its Burden to Show *Renken* is Prior Art

- *In re Riggs* rejects Petitioner's new argument

argument is no longer based on good law (if it ever was). As the Federal Circuit recently held in *In re Riggs*, “the provisional application must also provide written description support for the specific portions of the patent specification identified and relied on” as prior art. 131 F.4th 1377, 1384 (Fed. Cir. 2025). This is the exact argument made in the POR. POR, 49-53. Specifically, Dr. Russ testified that the portions of *Renken*'s provisional cited by Petitioner fail to provide written description support for the CMC being located at the headend because the cited portions do not discuss “sending messages to the headend, any relationship between the CMC and the headend, or any suggestion for the CMC to be located at the headend.” Ex. 2013, ¶ 136. Petitioner has failed to address that issue or the

PO Sur-Reply, 19

Demonstrative Only - Not Evidence PO-54

Grounds D-E: *Renken* Fails to Render Obvious Every Claim Element

Demonstrative Only - Not Evidence PO-55

Renken Fails to Render Obvious Every Claim Element

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

Demonstrative Only - Not Evidence PO-56

Petition Relies on the Following to Allegedly Render Obvious Claim 1

Claim Element	What the Petition Relies Upon
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;	"Renken describes an analog-to-digital converter (ADC) 25 [], which is part of the downstream receiver circuit of a measurement-capable cable modem (MCCM)." (Petition, 61)
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;	"Renken describes an MCCM processor (claimed 'signal monitor') executing a measurement program to obtain signal measurements." (Petition, 63)
a data processor operable to process a television channel to recover content carried on the television channel; and	"Renken describes a MPEG/DOCSIS Decoder [] (claimed 'data processor'), which is found in each of the Receivers in MCCM." (Petition, 64-65)
a channelizer operable to:	"Renken describes a number of parallel digital down converters (DDC) [] (claimed 'channelizer'), each responsible for filtering out, or selecting, a particular downstream channel." (Petition, 66)
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.	"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." (Petition, 67)

Demonstrative Only - Not Evidence PO-57

Renken's Architecture does not Allow for Concurrent Output

- Petitioner and its expert explicitly identified the “MCCM processor” alone as the claimed signal monitor and distinguished the QAM Demodulator as separate from the signal monitor

Renken describes an MCCM processor (claimed “signal monitor”) executing a measurement program to obtain signal measurements. Ex. 1011, 10:15-31; Fig. 2; Ex. 1012, pp. 5-6, Fig. 1 (p. 5); Ex. 1002, ¶ 202. For example, the measurement

Petition, 63

20:36-45; Ex. 1012, pp. 3, 9, 13; Ex. 1002, ¶ 216. 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.

Petition, 67

202. Renken describes an MCCM processor executing a measurement program (“signal monitor”) to obtain signal measurements. Ex. 1011, 10:15-31; Fig. 2; Ex. 1012, pp. 5-6, Fig. 1 (p. 5). For example, the measurement program can obtain

Ex. 1002, ¶ 202

20:41-43; Ex. 1012, pp. 3, 9, 13. 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 processor 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

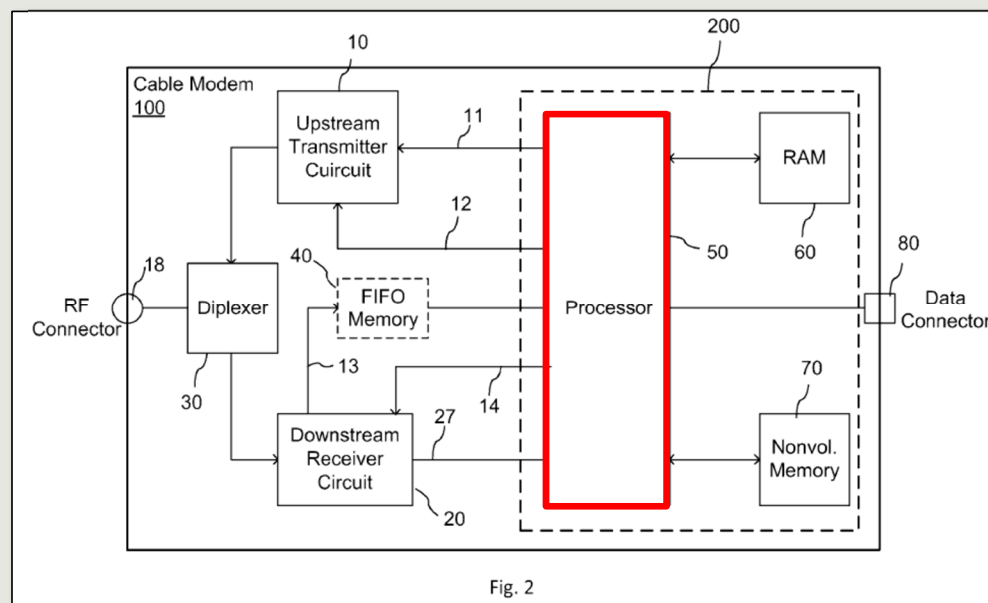
Demonstrative Only - Not Evidence PO-58

Renken's Architecture Does Not Allow for Concurrent Output

- The Board understood that Petitioner identified MCCM processor 50 as the signal monitor

¹¹ Petitioner asserts that Renken's MCCM processor 50 corresponds to the claimed signal monitor and MPEG/DOCSIS decoder 24 corresponds to the claimed data processor. Pet. 63–66.

ID (Paper 8), 35 n.11

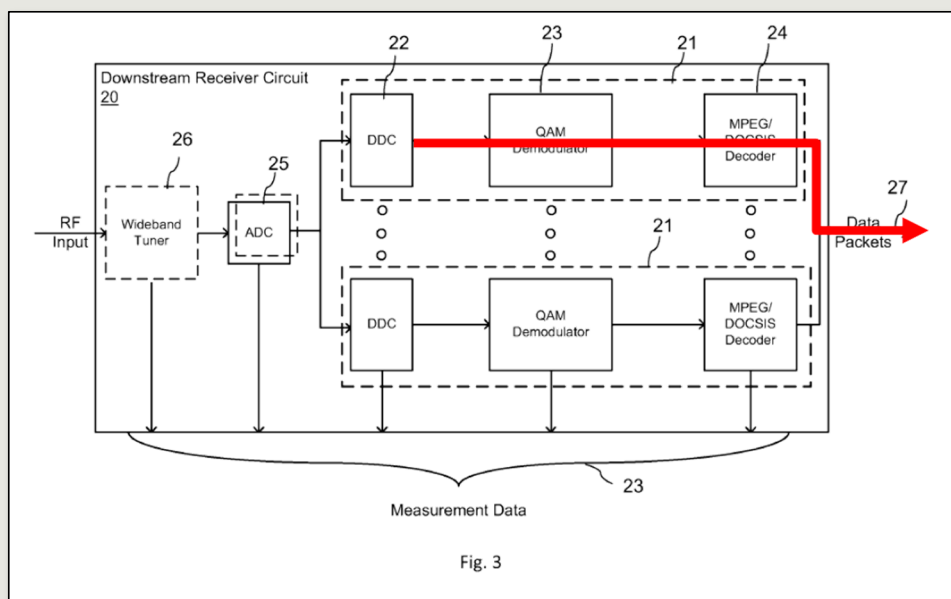


Ex. 1011, Fig. 2 (annotated)

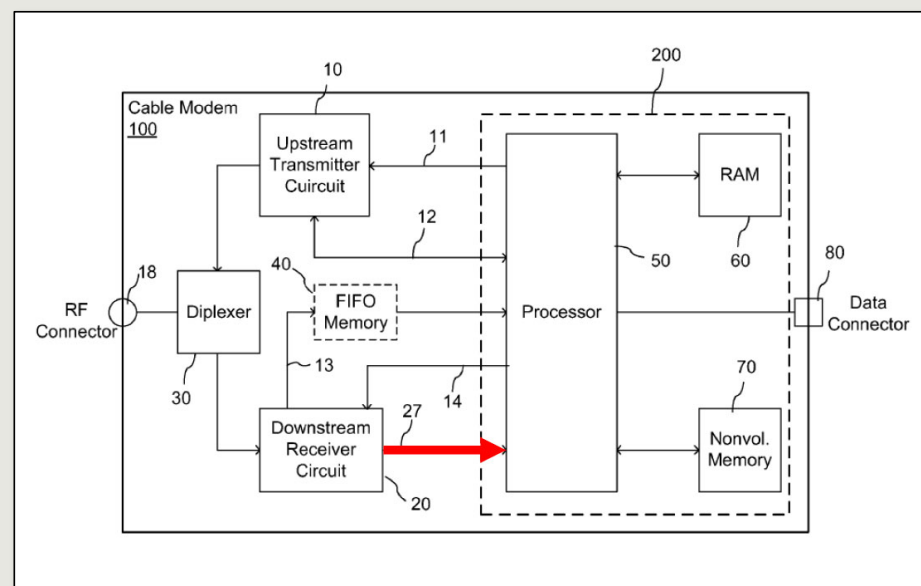
Demonstrative Only - Not Evidence PO-59

Renken's Architecture Does Not Allow for Concurrent Output

- The selected channels are not “concurrently” output to what the Petition identifies as the signal monitor and the data processor



Ex. 1011, Fig. 3 (red annotation added)



Petitioner's Argument Based on "Measurement Data" Fails

- Petitioner fails to explain how "measurement data" is a "portion of said digitized signal"

140. To the extent Petitioner and Mr. Lett are relying on "data" being sent from the DDC to the processor as the first portion, they have failed to explain how Renken's data would be considered a portion of the digitized signal when this data is generated by the DDC, not as a result of digitization of the received signal. *See* Ex. 1001, cl. 1[B] ("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"). Thus, the DDC functions in a different manner than the claimed channelizer, which selects different portions of the digitized signal and then sends the selected portions to different components.

Ex. 2013, ¶ 140; POR, 58

Demonstrative Only - Not Evidence PO-61

There are Objective Indicia That the Challenged Claims of the '008 Patent are Not Obvious

Demonstrative Only - Not Evidence PO-62

Industry Praised Remote Spectrum Monitoring

- Dr. Russ testified in his declaration that the cable industry uses the term “Full-Band Capture” interchangeably with MaxLinear’s “Remote Spectrum Monitoring”
- Petitioner’s expert provided no opinions regarding objective indicia

144. Near in time to MaxLinear’s development of Full-Spectrum Capture, Broadcom developed a similar technology referred to as Full-Band Capture. Thus, the industry has started to use these two terms interchangeably to refer to the ability of equipment to digitize the entire received spectrum. Ex. 2007, p. 17. Confusingly, the industry has also started using the term Full-Band Capture to refer to the ability to digitize and report a determined characteristic back to the MSO. Thus, Full-Band Capture can be used interchangeable with Remote Spectrum Monitoring. However, one point to emphasize is that the MaxLinear’s Remote Spectrum Monitoring can be done in parallel with data processing—which allows for signal analysis to be conducted in the background.

Ex. 2013, ¶ 144; POR, 63 n. 1

Demonstrative Only - Not Evidence PO-63

Petitioner's Expert Supports PO's Objective Indicia

- Part of the reason the industry praised Remote Spectrum Monitoring was because it addressed a well-known problem in the industry

conclusion: Remote Spectrum Monitoring received significant industry praise because it was the first to resolve long standing problems in the industry. In particular, Mr. Lett testified that monitoring was a well-known problem in the industry. Ex. 2021, 35:25-36:1. Mr. Lett also testified that Kamieniecki supposedly discloses “a need to monitor more channels so that [MSOs] could provide, you know, better service by addressing any particular issues that were seen on those channels and be proactive with customer support.” Ex. 2021, 31:18-25. But Mr. Lett also testified that MSOs could not solve this problem, despite trying, for a “long time before Konstantinos.” *Id.*, 33:1-8. Dr. Russ testified likewise in his declaration: “MSOs struggled to monitor the spectrum throughout their network in a cost-effective manner” because of limitations in the prior art. Ex. 2013, ¶ 142.

PO Sur-Reply, 22-23

Demonstrative Only - Not Evidence PO-64

Industry Praised Remote Spectrum Monitoring

- Remote Spectrum Monitoring was praised by industry groups and MaxLinear's competitors

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.*

POR, 64-65

Demonstrative Only - Not Evidence PO-65

There is a Clear Nexus Between the Claimed Invention and the Industry Praise

- The independent claims of the '008 Patent recite all of the components needed to implement Remote Spectrum Monitoring

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

POR, 65

Demonstrative Only - Not Evidence PO-66

