

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Cox Communications, Inc.
Petitioner

v.

Entropic Communications, LLC.
Patent Owner

Inter Partes Review No.
IPR2024-00578

Patent No. 9,825,826
Filing Date: November 23, 2015
Issue Date: November 21, 2017

PETITION FOR *INTER PARTES* REVIEW

TABLE OF CONTENTS

I.	Introduction.....	1
II.	IPR Requirements.....	1
	A. Standing (37 C.F.R. § 42.104(a)).....	1
	B. Challenge Under 37 C.F.R. § 42.104(b)	2
III.	Background.....	3
	A. Priority Date and Family	3
	B. The '826 Patent	3
	C. Relevant Prosecution History of the '826 Patent	8
IV.	Expert Testimony, Level of Skill in the Art, and Claim Construction.....	8
	A. Declaration Evidence	8
	B. Level of Ordinary Skill in the Art.....	8
	C. Claim Construction	10
V.	Prior Art.....	10
	A. U.S. Patent No. 8,649,421 to Renken, et al. (Ex. 1005)	10
	B. U.S. Patent No. 5,808,671 to Maycock, et al. (Ex. 1006).....	18
	C. U.S. Patent Publication No. 2010/0253557 to Kidambi, et al. (Ex. 1007).....	20
	D. U.S. Patent No. 7,394,871 to Zhang, et al. (Ex. 1008)	22
	E. Motivation to Combine Maycock with either Kidambi or Zhang	23
VI.	Full Statement of the Reasons for the Relief Requested.....	27

Petition for *Inter Partes* Review
U.S. Patent No. 9,825,826

A.	Ground 1: Claims 1, 2, 3, 4, 6, 8, and 9 are unpatentable as obvious over Renken in view of the General Knowledge of a POSITA	27
B.	Ground 2: Claims 1, 2, 3, 4, 6, 8, and 9 are unpatentable as obvious over Maycock in view of Kidambi and further in view of the knowledge of a POSITA	49
C.	Ground 3: Claims 1, 2, 3, 4, 6, 8, and 9 are unpatentable as obvious over Maycock in view of Zhang and further in view of the knowledge of a POSITA	70
VII.	Secondary Considerations Cannot Overcome the Strong Evidence of Obviousness	74
VIII.	This Petition Should Not Be Discretionarily Denied	75
IX.	Conclusion	78
X.	Mandatory Notices.....	79
A.	Real Parties in Interest (37 C.F.R. § 42.8(b)(1)).....	79
B.	Related Matters (37 C.F.R. § 42.8(b)(2)).....	79
C.	Payment of Fees (37 C.F.R. § 42.103).....	79
D.	Power of Attorney (37 C.F.R. § 42.10).....	80
E.	Designation of Lead and Backup Counsel (37 C.F.R. § 42.8(b)(3)) and Service Information (37 C.F.R. § 42.8(b)(4)).....	80

EXHIBIT LIST

Exhibit No.	Description
1001	U.S. Patent No. 9,825,826
1002	Prosecution History of U.S. Patent No. 9,825,826
1003	Declaration of Dr. James Martin
1004	Curriculum Vitae of Dr. James Martin
1005	U.S. Patent No. 8,649,421 to Renken, et al.
1006	U.S. Patent No. 5,808,671 to Maycock, et al,
1007	U.S. Patent Publication No. 2010/0253557 to Kidambi
1008	U.S. Patent No. 7,394,871 to Zhang, et al.
1009	<i>Entropic Communications, LLC v. Charter Communications, Inc. et al</i> , No. 2-22-cv-00125 (E.D. TX. June 26, 2023) – Markman Order
1010	U.S. Provisional Application No. 61/444,611 to Renken, et al.
1011	<i>Entropic Communications, LLC v. Cox Communications</i> , No. 2:23-cv-01049-JWH-KES (C.D. CA. Feb. 15, 2023) – Return of Service (Dkt. 15)
1012	<i>Entropic Communications, LLC v. Cox Communications</i> , No. 2:23-cv-01049-JWH-KES (C.D. CA. Aug. 12, 2023) – Claim Construction Scheduling Order (Dkt. 75)
1013	Director Vidal Memorandum re: <i>Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation</i> , June 22, 2022

I. Introduction

Cox Communications, Inc. (“Petitioner”) hereby petitions for *inter partes* review (“IPR”) of claims 1, 2, 3, 4, 6, 8, and 9 (“Challenged Claims”) of U.S. Patent No. 9,825,826 (“the ’826 Patent”), assigned to Entropic Communications, LLC (“Patent Owner”). A copy of the ’826 Patent and its prosecution history are attached as Exhibits 1001 and 1002.

The ’826 Patent is invalid. Independent claim 1 recites little more than a method to measure characteristics of received, multi-channel signals on a cable network then to report the measurements to the headend, wherein the claimed signals are digitized. Each of these elements was well known in the art, and each of these elements had been used in combination for exactly the same purpose – measuring and monitoring cable signals to customers downstream – before the earliest possible priority date of the ’826 Patent, September 8, 2011. The combination of these known elements would have been obvious to a POSITA as of the aforementioned priority date. The Challenged Claims should be cancelled as obvious.

II. IPR Requirements

A. Standing (37 C.F.R. § 42.104(a))

Petitioner certifies that the ’826 Patent is available for IPR and Petitioner is not barred or estopped from requesting IPR. The ’826 Patent issued on November

21, 2017; this Petition is filed within one year of service of the Complaint against Petitioner alleging infringement of the '826 Patent (*see* Ex. 1011, Proof of Service of Complaint, Complaint served on February 15, 2023) and is not barred under 35 U.S.C. § 315(b).

B. Challenge Under 37 C.F.R. § 42.104(b)

Pursuant to 35 U.S.C. § 311 and 37 C.F.R. § 42.104(b), this petition requests cancellation of claims 1, 2, 3, 4, 6, 8, and 9 as rendered obvious under 35 U.S.C. § 103 based on the following prior art references:

- U.S. Patent No. 8,649,421 to Renken, et al.;
- U.S. Prov. Appl. No. 61/444,611 to Renken, et al.;
- U.S. Patent No. 5,808,671 to Maycock, et al.;
- U.S. Patent Publication No. 2010/0253557 to Kidambi; and
- U.S. Patent No. 7,394,871 to Zhang, et al.

The statutory grounds for the challenge of each claim are set forth below.

Ground	35 U.S.C. §	Claims	References
1	103	1, 2, 3, 4, 6, 8, and 9	Renken in view of the general knowledge of a POSITA
2	103	1, 2, 3, 4, 6, 8, and 9	Maycock in view of Kidambi and further in view of the general knowledge of a POSITA
3	103	1, 2, 3, 4, 6, 8, and 9	Maycock in view of Zhang and further in view of the general knowledge of a POSITA

The record establishes a reasonable likelihood of prevailing as to each ground of invalidity with respect to the Challenged Claims.

III. Background

A. Priority Date and Family

The '826 Patent was filed on November 23, 2015 and issued on November 21, 2017. The '826 Patent is a continuation of application No. 14/341,880, filed on July 28, 2014, and issued as U.S. Patent No. 9,203,653, which is a continuation of application No. 13/607,916, filed on September 10, 2012, and issued as U.S. Patent No. 8,792,008. The '826 Patent also claims priority to a provisional application filed September 8, 2011. Accordingly, while Petitioners do not concede that the '826 Patent is entitled to rely on the filing date, the earliest possible effective filing date of the '826 Patent is September 8, 2011.

The '826 Patent is thus subject to pre-AIA 35 U.S.C. §§ 102 and 103.

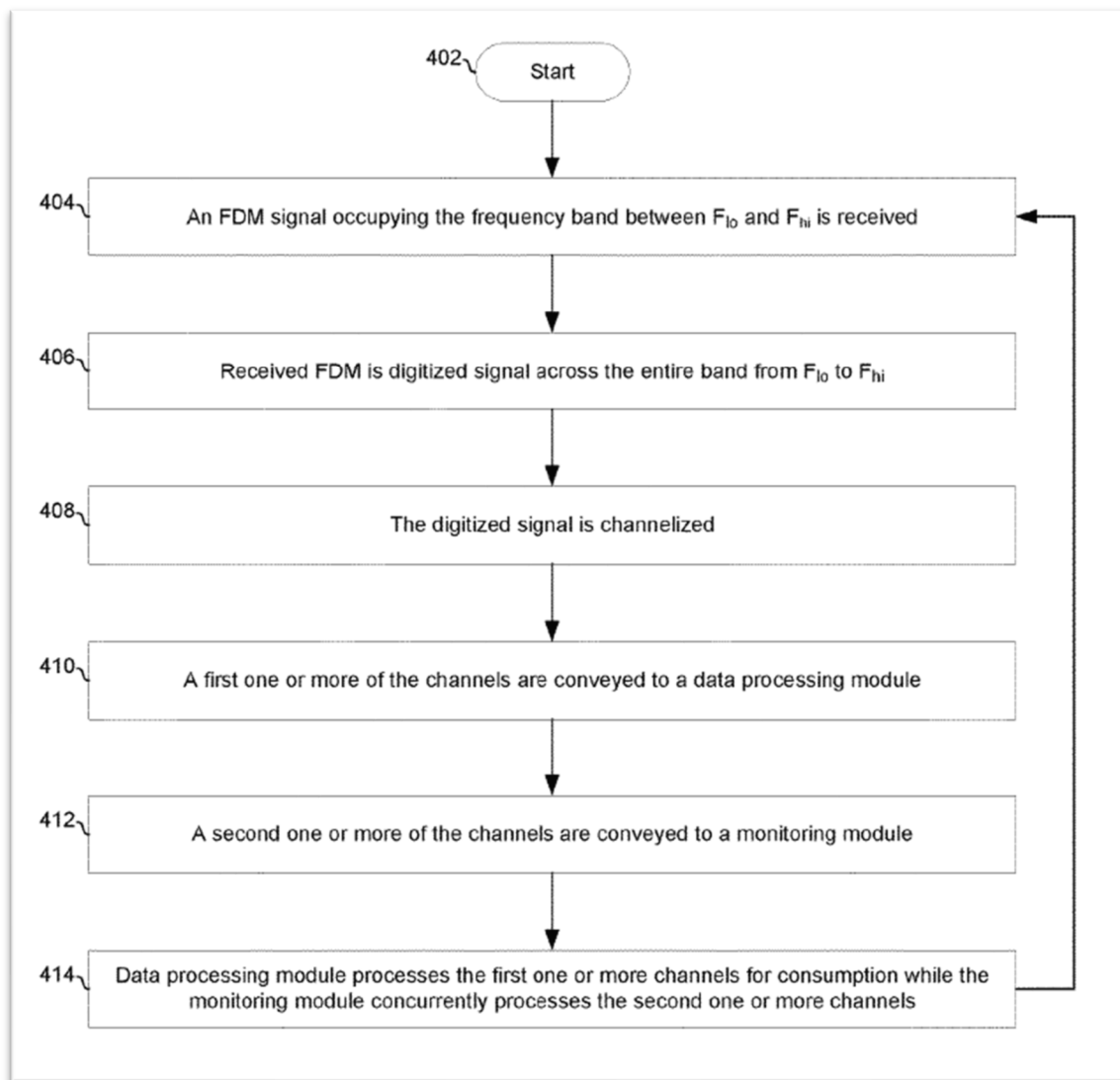
B. The '826 Patent

The '826 Patent relates to signal processing and more specifically to spectrum monitoring. Ex. 1001, 1:37-40. The '826 Patent asserts that “Network-based services can become unacceptable if network parameters fall outside of those for which receivers in the network were designed.” *Id.*, 1:44-46. Examples of such parameters include “the number of channels on the plant, the types of channels, the

signal levels of those channels. . . .” *Id.*, 1:46-50. The ’826 Patent purports to address these alleged problems with methods and systems for spectrum monitoring. *Id.*, 1:63-64.

The ’826 Patent describes a conventional process in which a headend receives television signals and data. Ex. 1001, 2:55-57. A video modulator modulates the television signals onto a carrier, and a CMTS modulates the data onto a carrier. *Id.*, 2:59-62. The outputs are combined, “resulting in a frequency division multiplexed (FDM) signal comprising one or more television channels and/or one or more DOCSIS channels.” *Id.*, 2:55-56.

Figure 4 of the ’826 Patent (shown below) illustrates an example process for spectrum monitoring at the customer’s premise, which receives the FDM signal.



In the example process, the receiver circuit 150a, 150b of a gateway 120a, 120b at a customer's premise receives "a frequency division multiplexed (FDM) signal comprising one or more channels (e.g., satellite television channels, cable television channels, and/or DOCSIS channels) occupying a frequency band between F_{lo} and F_{hi} ." Ex. 1001, 6:39-43. Then, "the received FDM signal is digitized across the full band from F_{lo} and F_{hi} ." *Id.*, 6:43-44. "[T]he digitized signal

is channelized into one or more bands” and “a first one or more of the bands are conveyed to a data processing module.” *Id.*, 6:44-47. Then, “a second one or more of the bands are output to a monitoring module.” *Id.*, 6:47-48. “[T]he data processing module processes one or more of the first one or more bands to recover data on those bands.” *Id.*, 6:47-48. “[T]he monitoring module concurrently processes the second one or more bands to determine characteristics of all or a portion of the frequency band from F_{lo} and F_{hi} .” *Id.*, 6:51-53.

The characteristics may be, for example:

signal power level vs. frequency, delay vs. frequency, phase shift vs. frequency, type and/or amount of modulation, code rate, interference levels, signal to noise ratio, a transfer function of the channel of over which the signal was received, an impulse response of the channel over which the signal was received, and/or any other characteristic that may help assess characteristics of the channel over which the signal was received, assess characteristics of the transmitter that sent the signal and/or any otherwise be pertinent to performance of the communication system.

Id., 3:47-57. The monitoring module “may control the transmission of network management/maintenance messages by the device 150. Such message may comprise, for example, network status updates indicating whether one or more communication parameters of one or more received television or DOCSIS channels are outside acceptable bounds. . . .” *Id.*, 3:63-67.

The gateways 120a and 120b may transmit messages to the CMTS 114. Ex. 1001, 3:4-6. “The CMTS 114 may process the messages and, in an example embodiment, adjust transmission parameters (e.g., modulation parameters, transmit power, frequency offsets, etc.) and/or perform other maintenance/management based on the received messages.” *Id.*, 3:11-15.

The '826 Patent includes 2 independent claims and 16 dependent claims. Of those, claims 1, 2, 3, 4, 6, 8, and 9 are challenged in this patent. Claim 1 recites:

[pre] A method comprising:

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

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

[c] digitizing said received signal to generate a digitized signal;

[d] selecting a first portion of said digitized signal;

[e] selecting a second portion of said digitized signal;

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

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

[h] controlling the transmission of network management messages back to said headend based on said measured characteristic of said

received signal, wherein said measured characteristic is different than said network management messages.

Dependent claim 2 recites “wherein said network management messages indicate whether a parameter is outside of acceptable bounds.” Claims 3, 4, 6, and 8 recite various example parameters or characteristics. And claim 9 recites “configuring, by said one or more circuits, a bandwidth and/or center frequency of said selected first portion of said digitized signal.”

C. Relevant Prosecution History of the '826 Patent

The prosecution of the '826 Patent was sparse and does not materially impact this petition. The claims were amended to overcome a rejection without explanation, and the Examiner allowed the claims, also without explanation. *See*, Ex. 1002, pp. 25, 39.

IV. Expert Testimony, Level of Skill in the Art, and Claim Construction

A. Declaration Evidence

This petition is supported by the declaration of Dr. James Martin. Ex. 1003. Dr. Martin has worked extensively in the field of Electrical engineering and computer science with a focus on telecommunications. Ex. 1004. He studied telecommunications and systems engineering since approximately 1980. *Id.* Dr. Martin has over 20 years of industry experience in telecommunications, including with DOCSIS Cable HFC access networks, systems and services. *Id.* Further, he

has extensive experience in the cable industry, with a deep understanding of network traffic and the DOCSIS standard, having contributed to the DOCSIS 3.0/3.1 CableLabs standards as well as the IEEE 802.16 WiMAX standards. *Id.*

B. Level of Ordinary Skill in the Art

The '826 Patent describes and claims aspects and functionality of cable and satellite television signal processing and communication systems. As of the alleged September 8, 2011 priority date, a person of ordinary skill in the art ("POSITA") of the '826 Patent would have had at least: i) a Bachelor of Science in electrical engineering or an equivalent subject and three or more years of experience working in the field of cable and/or satellite signal processing and communication systems; ii) a Master's in electrical engineering or an equivalent subject and one or more years of experience working in the field of cable and/or satellite television signal processing and communication systems; or iii) a Ph.D. in electrical engineering or an equivalent subject and at least some experience working in the field of cable and/or satellite television signal processing and/or communication systems. Ex. 1003, ¶30. Additional education may substitute for professional experience, and significant work experience may substitute for formal education. *Id.*, ¶31. Dr. Martin was at least one of skill in the art at the time of the alleged invention.

C. Claim Construction

The claim terms of the '826 Patent are construed under the *Phillips* standard, considering the plain meaning of the claim terms to a person of ordinary skill in the art, in light of the intrinsic record.¹ None of the claim terms of the '826 Patent need be construed by the Board. *See*, Ex. 1003, ¶28. However, “network management messages” was construed to mean “messages which report on the network based on the measured characteristics” in previous district court proceedings. Ex. 1009, p. 29.

V. Prior Art

A. U.S. Patent No. 8,649,421 to Renken, et al. (Ex. 1005)

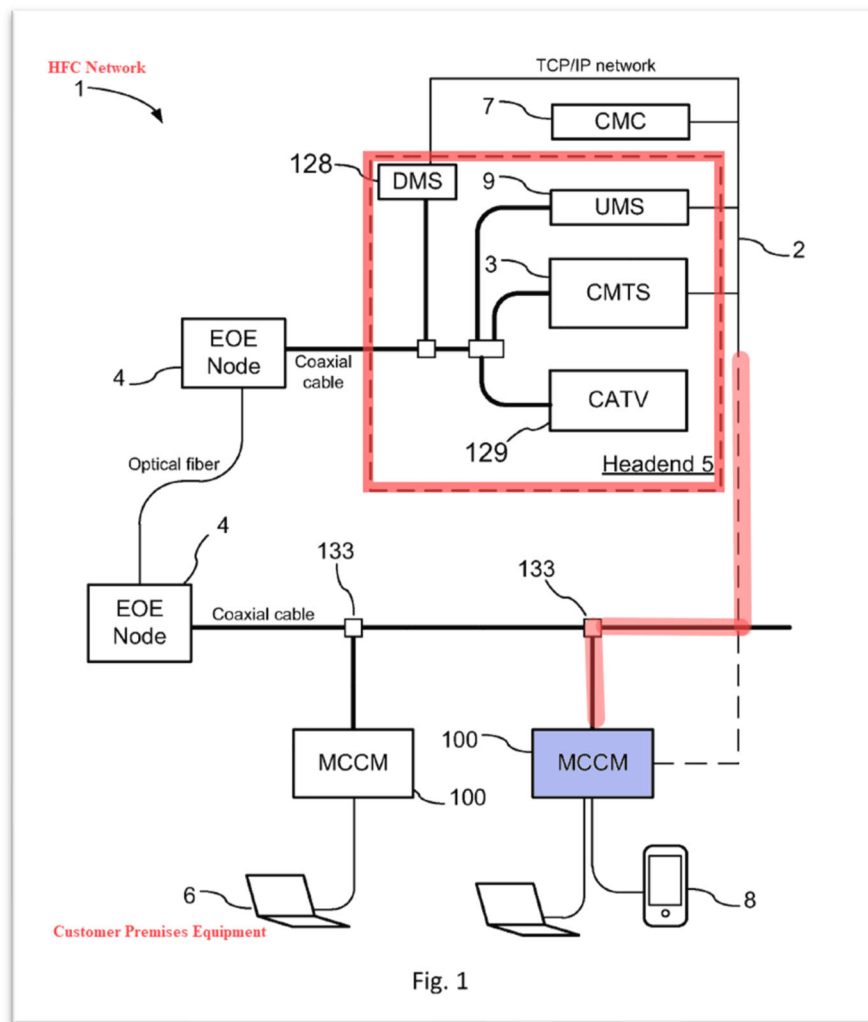
The Renken patent, entitled “Cable Modem for Network Measurements,” was filed on February 17, 2012, and issued February 11, 2014 from provisional application filed on February 18, 2011. Ex. 1005. The Renken patent is thus prior art to the '826 Patent under at least pre-AIA 35 U.S.C. § 102(e).

¹ Petitioner is not conceding that each claim satisfies all statutory requirements, such as §§ 101 and 112, nor is Petitioner waiving any arguments concerning claim scope or grounds that can only be raised in district court.

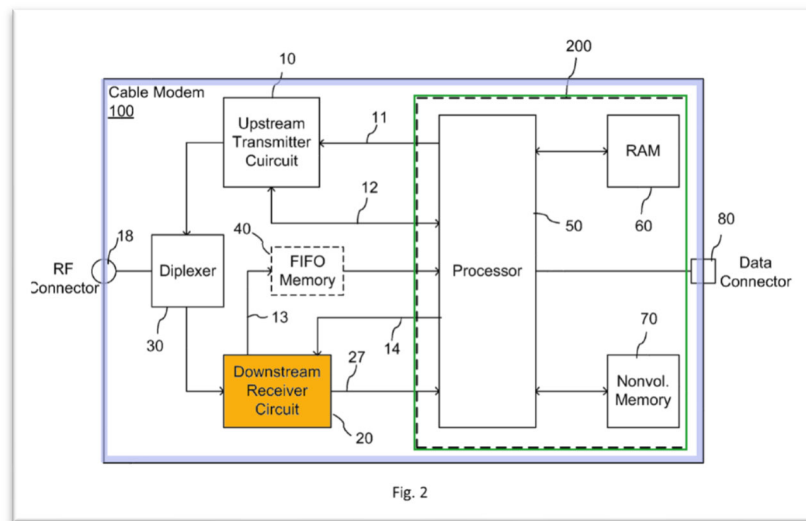
Renken addresses and solves the same problem as the '826 Patent—how to remotely monitor signals in a cable network. Ex. 1005, 1:14-17 (Renken describes “systems, methods and devices for monitoring cable networks, and in particular to monitoring cable networks using measurement capable cable modems.”).

Specifically, Renken addresses eliminating noise and interference in a bidirectional cable network by improving then existing monitoring methods – without adding additional equipment. Ex. 1005, 2:36-4:17.

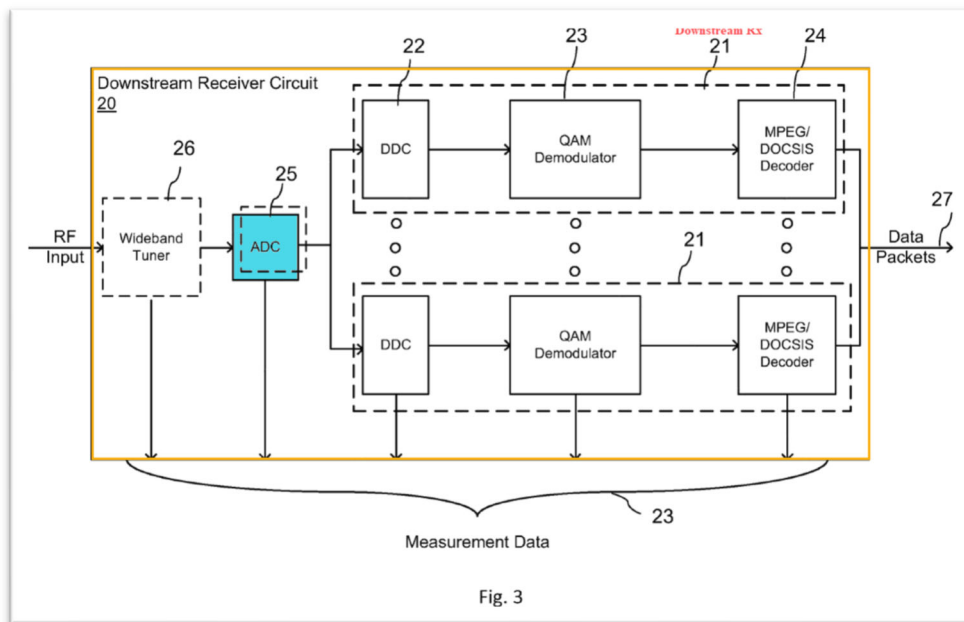
In Renken’s system, the HFC network 1 sends Cable Television (CATV) signals (analog and digital) and data signals to a customer’s premises. *See, e.g.*, Ex. 1005, 7:42-8:34, Fig. 1. Data services are provided using the CMTS 3 and TV services are provided using CATV transmitters 129, both located at the network operator’s headend 5. *Id.* These signals are distributed to a plurality of measurement capable cable modems, MCCMs 100, connected to customer premises equipment, CPE 6. *Id.*



Ex. 1005, Fig. 1 (annotated).



Ex. 1005, Fig. 2 (annotated).



Ex. 1005, Fig. 3 (annotated).

Further, the MCCM 100 includes a downstream receiver circuit 20 which digitizes, via an ADC 25, the received signals from the CMTS and/or CATV. *Id.* at 9:19-60, 11:19-40, Figs. 2-3. Measurements may be taken in the downstream

receiver circuit 20 without interrupting normal operation. Ex. 1005, 10:56-11:18, 12:38-52. Further, messages that include information about the measurements are sent to the headend. *Id.*, 12:53-13:38.

Finally, Renken's provisional discloses the referenced portions of the Patent. *Compare* Ex. 1005 Figs. 2, 3, 7, 8, 17 and associated discussion with Ex. 1010, Figs. on pp. 3, 4, 7, 8, 10 and associated discussion. Further, Renken Provisional, Ex. 1010 enables at least claim 1 of Renken's Patent, Ex. 1005. *See*, Ex. 1003, ¶39.

Renken Patent, Ex. 1005	Renken Provisional, Ex. 1010
1. A measurement-capable cable modem (MCCM) comprising:	"In the preferred embodiment of this invention, subscriber modems are configured with software providing these extra measurement capabilities." Ex. 1010., p. 1.
a cable port for connecting to a cable network;	"Multiple MCCMs working together, as directed by the CMC, could detect that there is a problem with one or more non-DOCSIS channels in one part of the cable network." <i>Id.</i> , p. 13. <i>See</i> "Fig.1 Cable Modem Block Diagram Description" – "RF Connector" <i>Id.</i> , p. 3.
a data port for connecting to a customer premises equipment (CPE) for providing customer services;	<i>See</i> "Fig.1 Cable Modem Block Diagram Description" – "Data Connector" <i>Id.</i>
a plurality of transmitters coupled to the cable port for transmitting upstream digital communication signals from the CPE over one or more upstream channels of the cable network;	<i>See</i> "Fig.1 Cable Modem Block Diagram Description" – "Upstream Transmitter" bank. <i>Id.</i> As the dashed lines indicate optional elements, here one upstream transmitter

	<p>is required; however, additional upstream transmitters may be included to improve effectiveness. <i>Id.</i>, p. 3.</p> <p>“A DOCSIS 3.0 compliant modem will have the ability to transmit at multiple frequencies. If a transmitter is not currently being used by the CM for data transmit, it can be used to perform sweep style measurements to the headend. The measurement program would have the ability to configure the transmitters for various types of transmissions so as to perform upstream tests. Use of spare upstream transmitters would facilitate tests[.]” Ex. 1010, p. 4.</p>
<p>a plurality of receivers coupled to the cable port for receiving downstream digital communication signals over one or more downstream channels of the cable network for communicating to the CPE; and,</p>	<p><i>See</i> “Fig.1 Cable Modem Block Diagram Description” – “Downstream Receiver” bank Ex. 1010, p. 3.</p> <p><i>See Id.</i>, Fig.2, p. 4.</p> <p>“The CM has one or more downstream receivers, each capable of demodulating one or more downstream channels. Note that DOCSIS 3.0 currently specifies that up to eight downstreams could be present as the bonded DOCSIS channel group and that as we go forward with future DOCSIS specifications, it looks like the number of bonded channels will only increase. A DOCSIS 3.0 downstream receiver is typically made up of the following components:” <i>Id.</i></p>
<p>a modem controller coupled to the transmitters and the receivers for controlling thereof, wherein the modem controller is configured for tunably allocating at least one of the receivers</p>	<p>“The wideband tuner allows the CM to tune to a group of channels. Depending on the implementation, a tuner's bandwidth could be as narrow as 6 MHz or as wide as 1 GHz. The input into the</p>

<p>and at least one of the transmitters for data communications between the cable network and the CPE, while leaving at least another one of the receivers as a currently idle receiver that is not allocated for the data communications, or leaving at least another one of the transmitters as a currently idle transmitter that is not allocated for the data communications;</p>	<p>tuner is analog RF data from the diplexer cutoff frequency to approximately 1 GHz. It converts RF signals at a band of frequencies to corresponding frequencies centered at an intermediate frequency (IF). A tuner is optional because all tuning processes can be performed purely digitally using one or more ADCs and DDCs. The tuner could be queried or use the FIFO to gather data for the following measurements: Level[,] Spectrum style measurements[,] Downstream frequency response[.]” <i>Id.</i>, pp. 4-5.</p> <p>“The cable modem examines its hardware configuration to determine how many downstream receivers are not being used. If at least one downstream receiver is idle, then the cable modem has resources available for measurement of non-DOC SIS downstream channels.” <i>Id.</i>, p. 12.</p> <p><i>See, e.g. Id.</i>, p. 11 (Steps 1-6 disclosing how a central measurement controller (CMC) is initialized, the MCCM establishes a DOCSIS connection to the CMTS. The MCCM determines how many idle receivers are available to take measurements, the MCCM sends a measurement capable list to the CMC – which generates a measurement plan, the MCCM receives the measurement plan, performs the measurements, and sends the results to the CMC).</p>
<p>wherein the modem controller further comprises a measurement controller for</p>	<p><i>See, e.g. Id.</i>, p. 11 (Steps 1-6 disclosing how a central measurement controller</p>

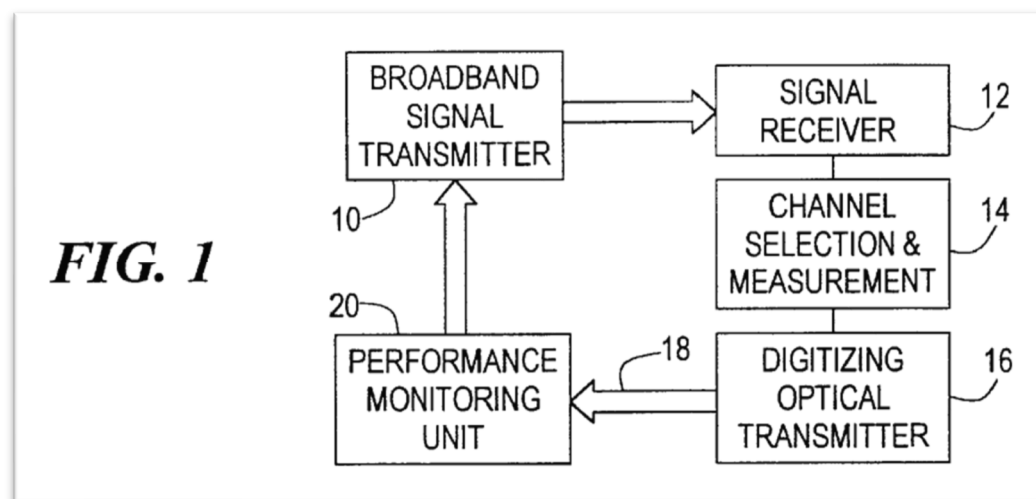
<p>utilizing the currently idle receiver or the currently idle transmitter to perform a network measurement.</p>	<p>(CMC) is initialized, the MCCM establishes a DOCSIS connection to the CMTS. The MCCM determines how many idle receivers are available to take measurements, the MCCM sends a measurement capable list to the CMC – which generates a measurement plan, the MCCM receives the measurement plan, performs the measurements, and sends the results to the CMC).</p> <p>“Digital Measurement Capabilities - These measurement capabilities are available if at least one downstream receiver is idle and if the cable modem hardware and measurement software can support the necessary requirements to accomplish them....Digital Signal Type Capabilities - These capabilities indicate what types of digital signals can be measured by the cable modem ... Once the MCCM has constructed its measurement capability list, it sends it to the CMC so that the CMC can generate an appropriate measurement plan for the modem.” <i>Id.</i>, p. 12.</p> <p>“Instead of using measurement capability lists, the CMC could construct an arbitrary measurement plan and send it to all or some MCCMs in the network. It would then be up to the MCCMs to verify that they have the required resources available to perform the requested measurement before actually performing the measurement. Some level of resource availability verification would probably always need to be run on the MCCM because at any</p>
--	--

	time the CMTS could change the channel bonding group for load balancing activities” <i>Id.</i> , p. 13.
--	---

B. U.S. Patent No. 5,808,671 to Maycock, et al. (Ex. 1006)

Maycock, entitled, “Apparatus and Method for Remote Monitoring of Video Signals,” was filed originally in Canada on November 24, 1994 and in the United States on November 22, 1995. Maycock issued on September 15, 1998, and is thus prior art under at least pre-AIA 35 U.S.C. § 102 (a), (b), and (e).

Maycock addresses and solves the same problem as the ’826 Patent—how to remotely monitor video signals. Ex. 1006, Title, Abstract, 1:6-9, 2:20-23. But Maycock solved the remote monitoring problem over a decade before the ’826 Patent.

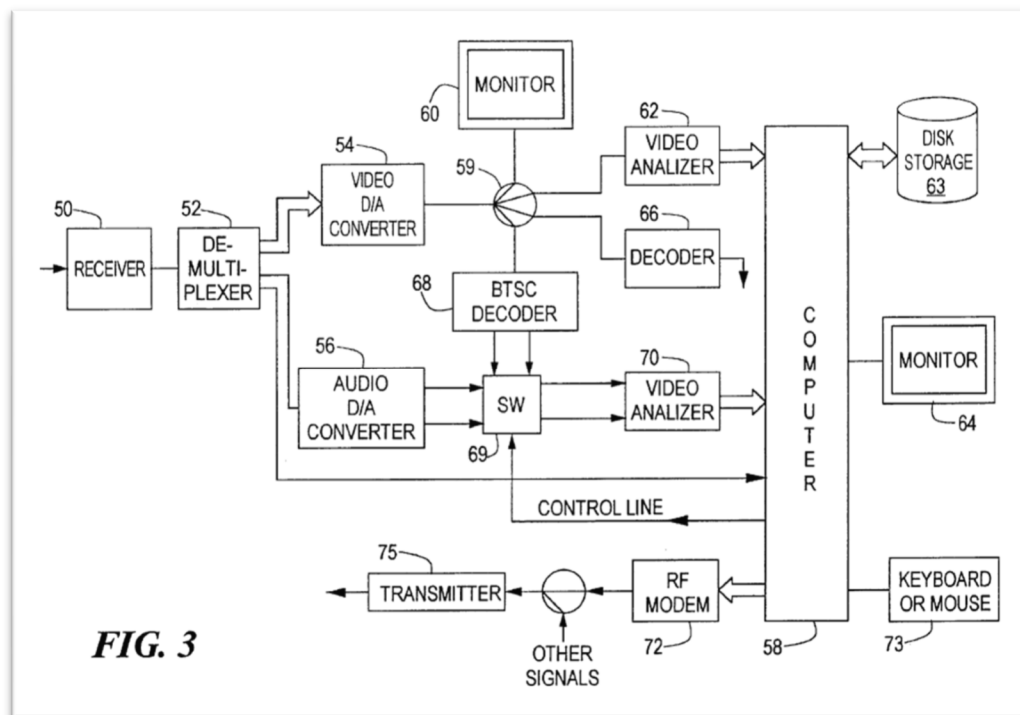


Ex. 1006, Fig. 1.

In Maycock's system, received broadband video signals are processed by channel selector 14, labeled in Figure 1 as "channel selection & measurement."

The "channel selector 14 selects from the received signal a channel to be monitored and measures parameters of the selected signal." *Id.*, 3:9-11.

"Corresponding measurement data and the selected received entire video signal are transmitted . . . to a monitoring unit 20" (*Id.*, 3:11-14), which performs the functionality described below with respect to Figure 3.



Ex. 1006, Fig. 3.

Monitoring unit 20 includes a digital opto-electronic video receiver 50. Ex. 1006, 5:65-6:7. Receiver 50 outputs the digitized signal to demultiplexer 52, which

separates the digitized signal into three outputs and sends those outputs to computer 58, video digital-to-analog converter 54, and audio digital-to-analog converter 56. Ex. 1006, 6:2-7. The video portion of demultiplexer's 52 output is analyzed—to measure signal quality parameters: “video analyzer 62 measures signal quality parameters such as signal-to-noise ratio, differential gain, differential phase and other video parameters referenced in the video specification EIA RS-250.” *Id.*, 6:24-27. “The data from the video analyzer 62 is acquired by the control computer 38 and displayed on a computer monitor 64.” *Id.*, 6:27-29.

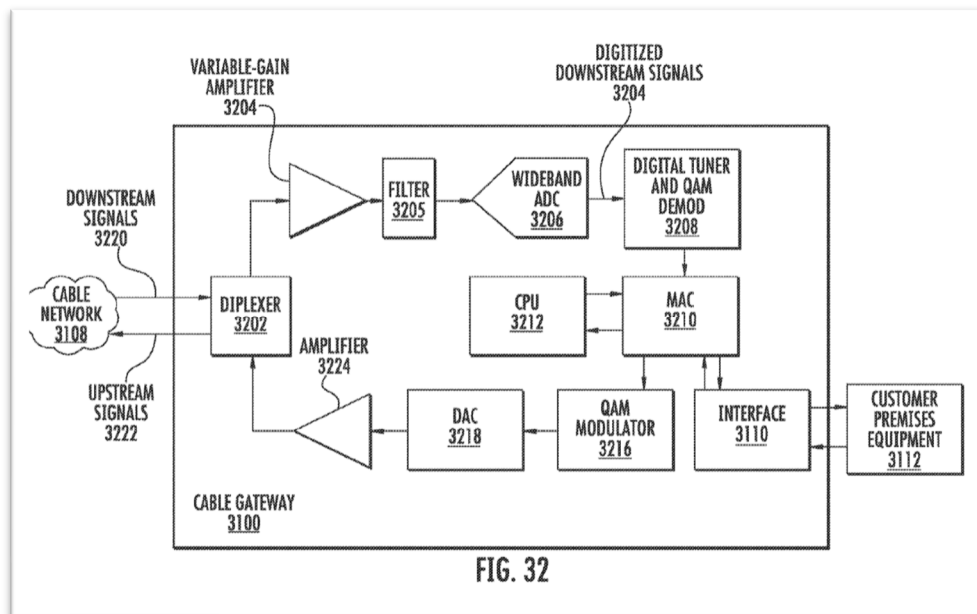
While Maycock describes and claims “an analog video signal-monitoring apparatus,” Maycock notes that its monitoring system can be used “with suitable modification, for compressed digital signals of the future and satellite frequency modulated signals in both analog and digital formats.” Ex. 1006, 2:37-46.

C. U.S. Patent Publication No. 2010/0253557 to Kidambi, et al. (Ex. 1007)

The Kidambi publication, entitled, “Calibration of offset, gain and phase errors in m-channel time-interleaved analog-to-digital converters,” was filed January 21, 2010, published on October 7, 2010, and is thus prior art under at least pre-AIA 35 U.S.C. § 102(a) and (e).

Kidambi teaches digitizing an entire bandwidth of an incoming television system at a set-top box prior to performing error correction. Ex. 1007, ¶¶082-84.

Specifically, Kidambi teaches using a wideband ADC called an M-channel time-interleaved analog-to-digital converter (MCTIADC) and then correcting offset, gain, and timing errors in the digital signal. Ex. 1007, Title, Abstract, ¶5.



Ex. 1007, Fig. 32.

Kidambi details cable gateway 3100 using a wideband, multi-channel, time-interleaved, analog-to-digital converter 3206 to digitize signals (*e.g.*, all of the signals) received from cable network 3108. Ex. 1007, ¶84, Fig. 32. Kidambi emphasizes that the entire received bandwidth is digitized, so that the system can tune to multiple channels in the digital domain rather than in the analog domain. Ex. 1007, ¶¶82-84.

Kidambi expressly described the benefits of simultaneously digitizing multiple channels instead of single-channel digitization. Ex. 1007, ¶¶82. Ex. 1003, ¶46.

D. U.S. Patent No. 7,394,871 to Zhang, et al. (Ex. 1008)

The Zhang Patent, entitled, “Digital implementation of multi-channel demodulators,” was filed January 21, 2004, published on November 4, 2004, patented July 1, 2008 and is thus prior art under at least pre-AIA 35 U.S.C. §§ 102(a), (b), and (e).

Zhang teaches a television system including a high-speed analog-to-digital converter for performing wideband ADC conversion by converting an “entire signal band” from the analog domain to a digital domain. Ex. 1008, 3:15-19, 3:60-63.

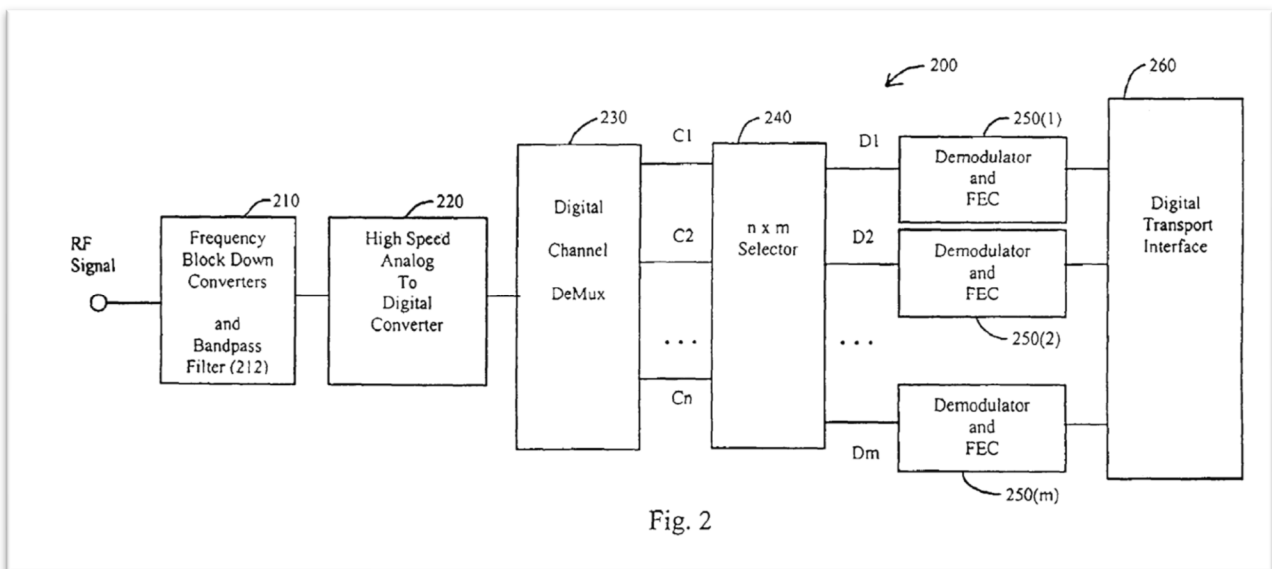


Fig. 2

Ex. 1008, Fig. 2. Zhang discloses frequency-block down-converter 210 that receives one or more analog television channels and outputs the one or more analog television channels to high-speed ADC 220, where a digitization of multiple channels occurs. Ex. 1008, 3:13-63.

E. Motivation to Combine Maycock with either Kidambi or Zhang

Maycock is analogous art to the '826 Patent. Both systems monitor television signals and also help ensure that quality television/data services are provided to their customers. *See, e.g.*, Ex. 1001, Abstract, 1:44-60; Ex. 1006, 1:31-44, 2:20-29, 3:2-16, 7:21-25, 7:41-53.

The base device, Maycock, teaches monitoring one channel at a time, while expressly recommending performing multiple, successive signal monitoring processes to collect data for multiple television channels. Ex. 1006, 7:27-29, 8:1-25. Further, Maycock teaches/suggests that the base system may be digital. Specifically, Maycock discloses using an analog-to-digital converter 38 to convert a selected channel for digitization before monitoring the signal “so as not to degrade the performance of the received signal.” Ex. 1006, 4:28-30. Further, Maycock’s system may be used “*with suitable modification, for compressed digital signals of the future* and satellite frequency modulated signals in both analog and digital formats.” *Id.*, 2:41-46 (emphasis added). A POSITA would have recognized that federal discussions surrounding the transfer from analog TV to Digital

Television (DTV) indicated that DTV, with digital tuners and digital modems, was the future of cable TV/Internet technology. Ex. 1003, ¶50. A POSITA would have also recognized that digitizing an analog process, as Maycock suggests, was well-known at the time of the alleged invention. Ex. 1003, ¶50. Maycock teaches everything in the '826 Patent, but to the extent the Board finds it lacking, one of skill in the art would have turned to Kidambi and Zhang. Ex. 1003, ¶50.

Kidambi:

There is a motivation in Maycock or in the knowledge of one of skill in the art to expedite data sampling. Maycock suggests that the port-to-port sampling of analog inputs would be expedited if the analog signals are individually converted into digital data where a microprocessor controls port-to-port sampling, using a digital multiplexer for fast switching between different inputs. Ex. 1006, 5:10-22. Further, a POSITA would recognize that Maycock teaches that a non-analog solution to monitoring signals is suggested to improve signal quality. *Id.*, 2:41-46 (“Also, the present apparatus may be used with amplitude modulated vestigial side band signals (i.e. the normal CATV format) and, with suitable modification, for compressed digital signals of the future and satellite frequency modulated signals in both analog and digital formats.”); Ex. 1003, ¶51.

Kidambi is in the same field of endeavor, i.e., processing cable systems' signals, and/or is something one of skill in the art who is looking at Maycock would turn to. Ex. 1003, ¶52. Specifically, Maycock and Kidambi disclose systems for transmitting and receiving television signals. *See, e.g.* Ex. 1006, 4:1-6; Ex. 1007, ¶83.

Kidambi teaches the need for wideband digitization (e.g., digitizing many channels simultaneously even though it requires a “very high sampling rate.” Ex. 1007, ¶¶82-84). Kidambi details digitization using a wideband ADC 3206. Ex. 1007, ¶84, Fig. 32. While Kidambi's measurements/monitoring may be noted to occur in apparatuses different from Maycock; however, Maycock teaches general possible measurements and monitoring activities that were well-known years prior to the alleged invention. Ex. 1003, ¶53.

Further, Maycock recognizes certain major challenges associated with monitoring cable network received and transmitted signals, such as system cost and complexity. Ex. 1006, 1:52-55, 2:5-8. Those same challenges are also recognized in Kidambi. Ex. 1007, ¶82 (Kidambi discloses that instead of the cost and complexity surrounding having a tuner for each channel – as more channels are added to the system, “the incremental cost for each additional channel is relatively low and should decrease rapidly over time as digital process technology advances.”).

Zhang:

Similarly, Zhang is in the same field of endeavor as Maycock – disclosing systems and methods to process broadband signals. Ex. 1008, 1:28-30. 3:15-18. Further, POSITA would be motivated to incorporate Zhang’s wideband ADC into Maycock’s signal monitoring system because it would increase the ability to monitor multiple (or all) channels simultaneously, thereby increasing the efficacy of monitoring. Ex. 1003, ¶55.

Zhang teaches wideband digitization, including allowing simultaneous reception of multiple content streams while enabling wideband return communications in satellite and cable systems. Ex. 1008, 6:52-61. Zhang also explains that conventional systems with one analog tuner per RF channel results in “the cost, power consumption, and complexity go[ing] up as the required number of RF channels goes up.” Ex. 1008, 1:66-2:2. Zhang then describes an improved system with a wideband ADC converter to digitize multiple channels at once. Ex. 1008, 6:38-61.

The aforementioned cost and complexity challenges addressed by Maycock are also addressed by Zhang. Ex. 1008, 1:66-2:2, 2:7-9 (“At least some embodiments are characterized by lower cost, lower power consumption, and/or lower complexity.”). For example, Zhang details reducing cost by employing a single downconverter (combined with a high speed ADC). Ex. 1008, 3:54-63

(“Because demodulator 200 requires only one single stage frequency-block down-converter, instead of many RF tuners as in the prior art, the cost of the overall system is reduced.”).

By incorporating Zhang’s disclosure of wideband capture and digitization into Maycock, a POSITA would understand that digitizing the entire wideband spectrum would provide the benefit of having a more efficient digital processing system with reduced complexity by avoiding multiple digital conversions for specific RF channels, with only a slight expense of a relatively small initial computational cost. Ex. 1003, ¶¶56-58. Digitizing multiple RF channels at a time is especially advantageous as the required number of RF channels increases. Ex. 1003, ¶56-58.

VI. Full Statement of the Reasons for the Relief Requested

A. Ground 1: Claims 1, 2, 3, 4, 6, 8, and 9 are unpatentable as obvious over Renken in view of the General Knowledge of a POSITA

Renken renders all Challenged Claims obvious in view of the general knowledge of a POSITA. Ex. 1003, ¶59.

1. Independent claim 1

a. *Claim 1 Preamble – A method comprising*²:

To the extent that it is limiting, Renken discloses the preamble, detailing how various components perform “in operation.” Ex. 1005, Abstract, 9:24-27, 10:25-29, 12:38-44, 15:27-33, 15:42-45, Figs. 7-15 and 17, Claims 10-19; Ex. 1010, p. 7-13 (steps and flow diagrams detailing how the Renken system works); Ex. 1003, ¶60. For example, “[i]n operation, the MCCM 100 transforms digital data transmitted over RF to one or more data interfaces, such as Ethernet, USB, and others as known in the art.” Ex. 1005, 9:24-27.

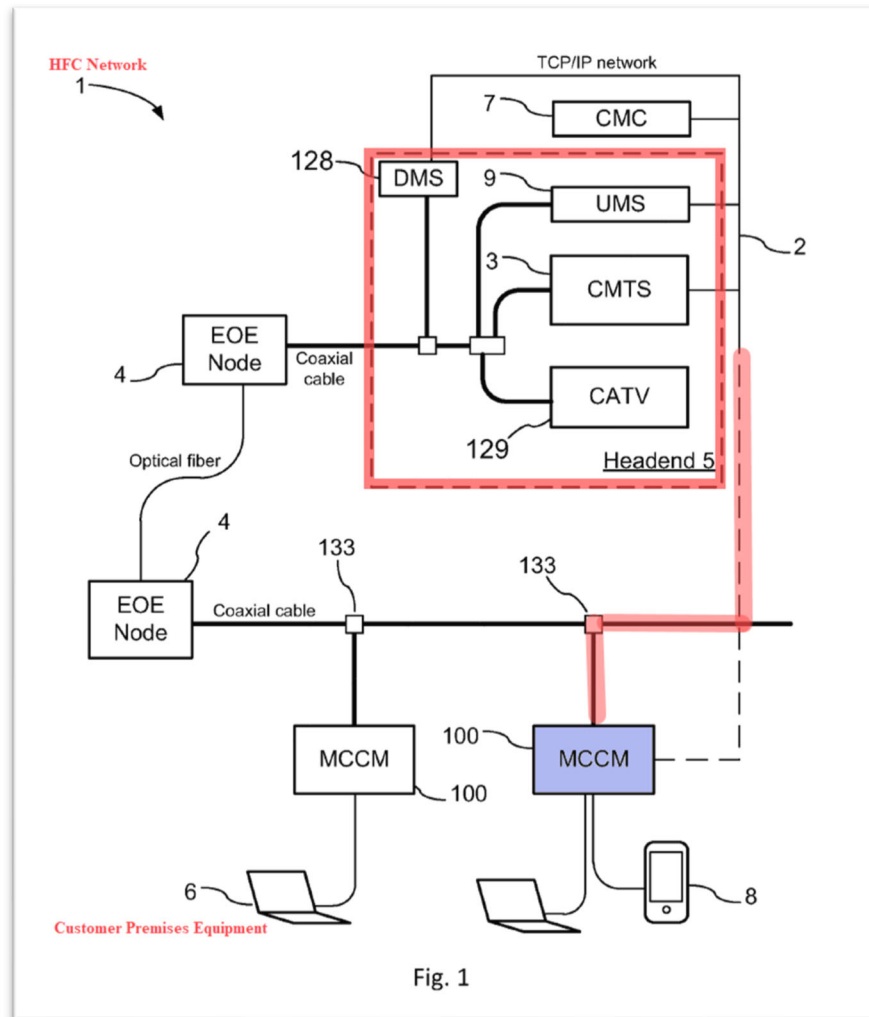
b. *Claim 1a – performing by one or more circuits of a receiver coupled to a television and data service provider headend via a hybrid fiber coaxial (HFC) network:*

Renken discloses element 1a, including that in “the HFC network 1, which is also referred to herein as cable network 1, data services are provided using a DOCSIS transceiver 3, which is commonly referred to as a Cable Modem Termination System (CMTS). As shown, the CMTS 3 is located at the cable

² Petitioner does not take a position as to whether the preamble is limiting.

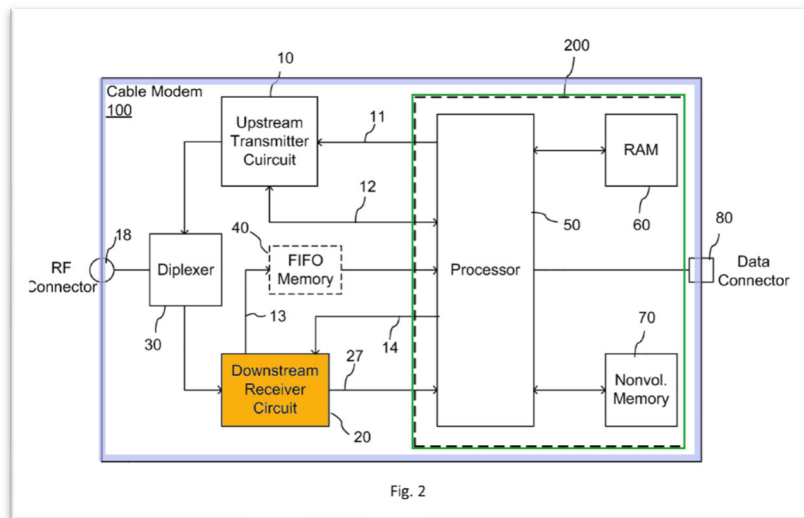
However, if the Board finds it is limiting, the prior art of either of the three primary grounds, 1, 2, and 3, discloses it.

television and data network operator's headend 5[.]” Ex. 1005, 7:47-52; *see, e.g.* 7:42-8:12, Fig. 1. Ex. 1003, ¶61.



Ex. 1005, Fig. 1 (annotated). Further, “signals are distributed using coaxial cables ... to a plurality of MCCMs 100 located at the customer premises.” *Id.*, 7:61-64. And each “MCCM 100 is connected to customer premises equipment (CPE) 6,” where “CPE may refer to any computing device having a suitable data interface, such as a personal computer, a laptop, a smartphone, a smart appliance, a TV set,

etc.” *Id.*, 8:18-23. Finally, each MCCM possesses at least one receiver circuit. *Id.*, 6:51 (“cable modems may include multiple downstream receivers”), *see, e.g.* Fig. 2 below.



Further, “DOCSIS 3.0 compliant cable modems” for network monitoring are used to receive and transmit video and data to a cable operator’s head end over their existing infrastructure, which would include a hybrid fiber-coaxial (HFC) network between a headend and a customer premise. *See e.g.* Ex. 1010, pp. 1, 5, 6 Ex. 1003, ¶63.

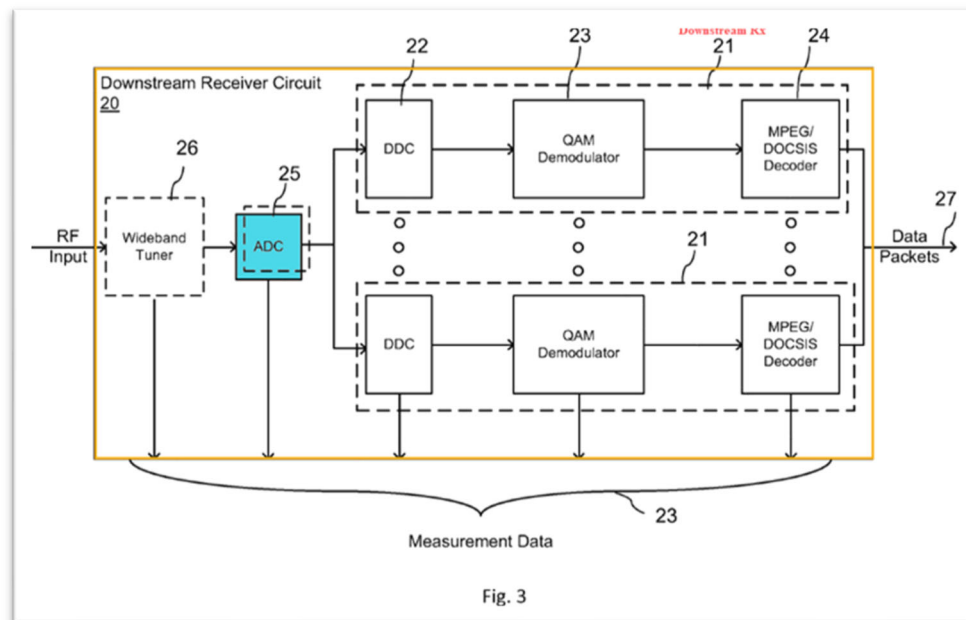
- c. ***Claim 1b – receiving, via said HFC network, a signal that carries a plurality of channels, wherein said channels comprise one or both of television channels and data channels;***

Renken discloses that an HFC network delivers a signal including multiple channels, including CATV channels and data channels, from the head end to MCCMs located at customer premises. Ex. 1005, Fig. 1; 7:42-64; 8:61-64 (“All these signals [including CATV channels and DOCSIS channels] are distributed using coaxial cables, and, optionally fibers to a plurality of MCCMs 100 located at the customer premises.”); Ex. 1010, pp. 4-6 (“Additionally, MPEG and DOCSIS decoders that are being used as part of the active DOCSIS connection can be used to passively perform a downstream throughput measurement on each downstream channel.”); Ex. 1003, ¶64. Renken further discloses that “[e]ach MCCM is connected to Customer Premises Equipment (CPE) ... Here, CPE may refer to any computing device have a suitable data interface, such as a personal computer, a laptop, a smart phone, a ‘smart’ appliance, a TV set, etc. Each MCCM 100 extracts from the downstream RF signal those data packets that are aimed at the corresponding CPE 6, and directs them to that CPE 6.” Ex. 1005, 8:13-26. Ex. 1003, ¶64.

d. *Claim 1c – digitizing said received signal to generate a digitized signal;*

Renken discloses that the MCCM digitizes the signal received from the HFC. Ex. 1003, ¶65. Specifically, Renken discloses that the received signal from the HFC is provided to a Receiving Circuit (RC) 20 in the MCCM “that may be

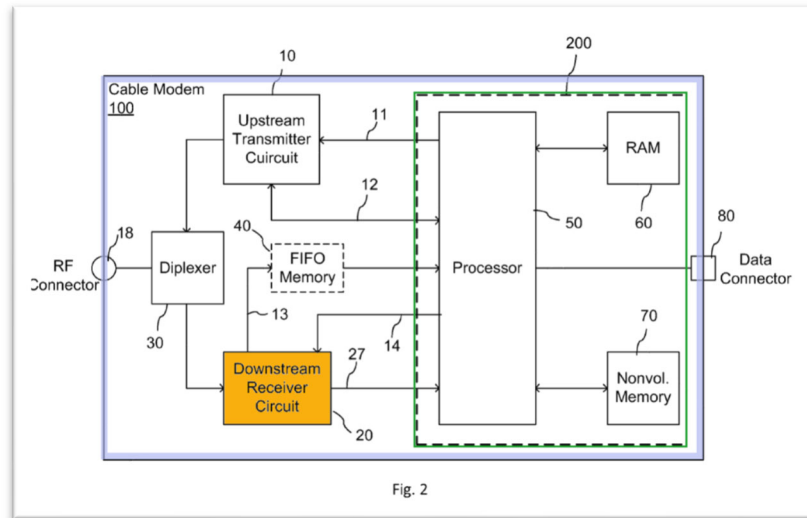
embodied using conventional receiver architecture for DOCSIS ® 3.0 compliant cable modems as known in the art.” Ex. 1005, 10:57-58; Figs. 2, 3; Ex. 1010, Fig. 2, pp. 1, 4, 5. The RC 20 of Renken is shown below.



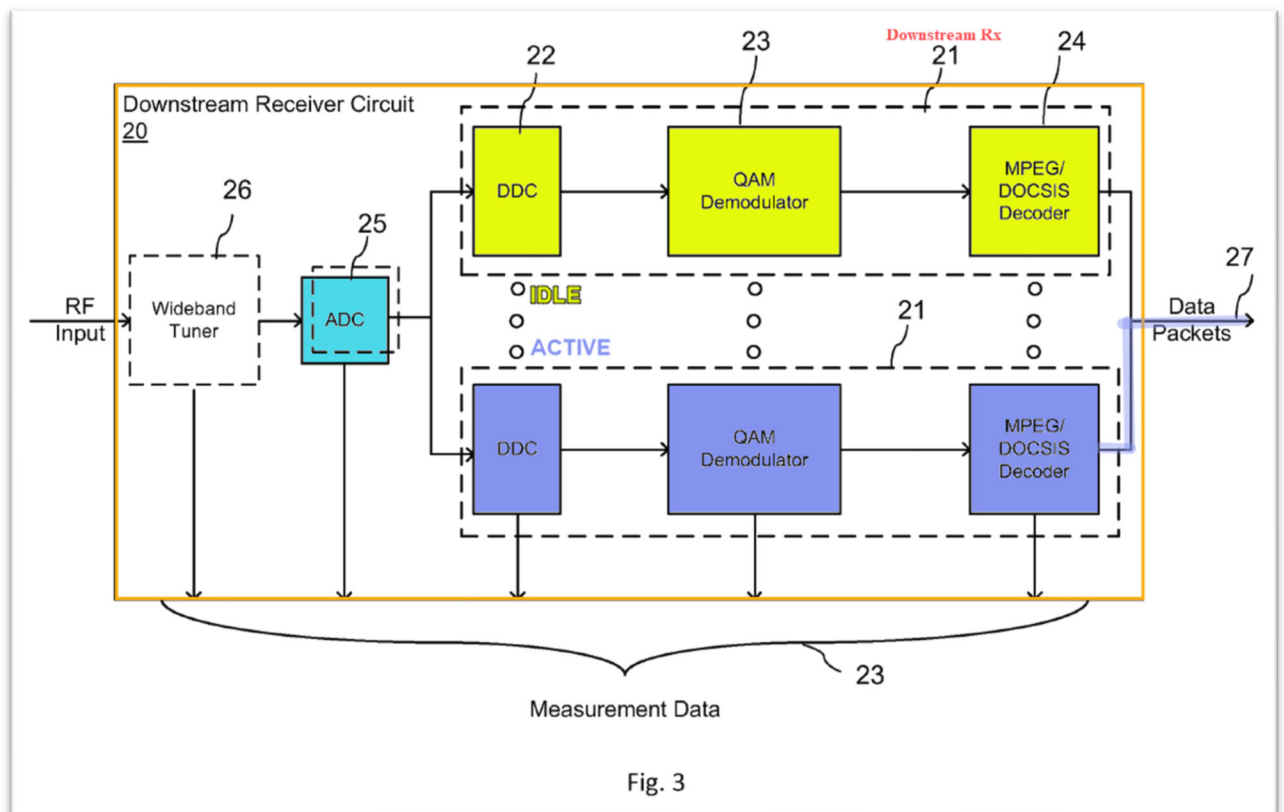
Id., Fig 3 (annotated); Ex. 1010, p. 4. The RC 20 of Renken includes a wideband tuner 26 and one or more Analog to Digital Convertors (ADC) 25. *Id.*, 11:22-27. As described by Renken, the wideband tuner 26 receives the RF input from the received signal and “converts the downstream RF signals to corresponding signals centered at an intermediate frequency.” *Id.*, 11:32-36, *see, also*, Ex. 1010, p. 4. The ADC 25 of Renken then “converts the analog IF output from the wideband tuner 26 into a digitized IF signal.” *Id.*, p. 5; Ex. 1005, 11:39-40, *see, also*, Ex. 1010, p. 5.

e. Claim 1d – selecting a first portion of said digitized signal;

Renken discloses selecting a first portion of digitized signal. Ex. 1003, ¶¶67-69. A POSITA would understand that a “portion” of a signal might include any part of up to and including the whole signal that is received by the receiver. *Id.* The disclosure in Renken regarding a modem controller allocating active and idle receivers discloses selecting both the first portion (claim element 1d), which is received by an idle receiver, and the second portion (claim element 1e), which is received by an active receiver. Ex. 1003, ¶67. Renken discloses selecting a first portion of digitized signal wherein the MCCM’s “modem controller is configured for tunably allocating at least one of the receivers [second portion]... for data communications between the cable network and the CPE, while leaving at least another one of the receivers as a currently idle receiver that is not allocated for the data communications, [first portion]” Ex. 1005, 4:38-41. *See, e.g., id.*, 4:60-67 (“The method comprises: a) allocating at least one of the receivers ... to data communications between the CMTS and the CPE, leaving at least another one receiver ... as a currently idle receiver ... that is not allocated to the data communications; and, b) performing a network measurement using the currently idle receiver”), *Id.*, 4:67-5:3; Ex. 1010, pp. 4-6; Ex. 1003, ¶68.



Ex. 1005, Fig. 2; Ex. 1010, p. 3. Specifically, the received signal, RF input, enters the Downstream Receiver Circuit 20. The output from the ADC are signals traveling to active and idle downstream receivers 21. Ex. 1005, Figs. 1-3; Ex. 1010, pp. 3-6.



Ex. 1005, Fig. 3 (annotated); Ex. 1010, p. 4. As explained by Renken, the “DDC 22 is responsible for filtering out, i.e., selecting a particular downstream channel, such as a DOCSIS 6 or 8 MHz wide channel, from the digital IF output of the ADC 25.” Ex. 1005, 12:22-24. An idle, not active, receiver 21 may be available to perform various signal measurements on a portion of the digitized signal selected by the DDC, constituting “selecting a first portion of said digitized signal.” *Id.*, 12:38-43 (“In operation, the DDC 22 of any idle receiver 21, i.e. the receiver 21 that is not currently in use by the MCCM 100 for receiving customer-directed data, may be used to perform various measurements under the direction of the controller

200”); *Id.*, 12:38-43; Ex. 1010, p. 12 (“The cable modem examines its hardware configuration to determine how many downstream receivers are not being used. If at least one downstream receiver is idle, then the cable modem has resources available for measurement of non-DOCSIS downstream channels.”), p. 5 (“The QAM demodulator in a CM is responsible for demodulating an individual digital channel so that I/Q samples are converted into digital data. Any extra unused QAM Demodulators can be used to perform measurements”).

f. Claim 1e – selecting a second portion of said digitized signal;

See analysis for claim element 1[d].

Renken discloses selecting a second portion of a digitized signal wherein “modem controller is configured for tunably allocating at least one of the receivers [second portion]... for data communications between the cable network and the CPE, while leaving at least another one of the receivers as a currently idle receiver that is not allocated for the data communications, [first portion]” Ex. 1005, 4:28-34. Accordingly, the active receiver 21 via the MCCM 10 contains the “second portion of said digitized signal.” Ex. 1003, ¶71.

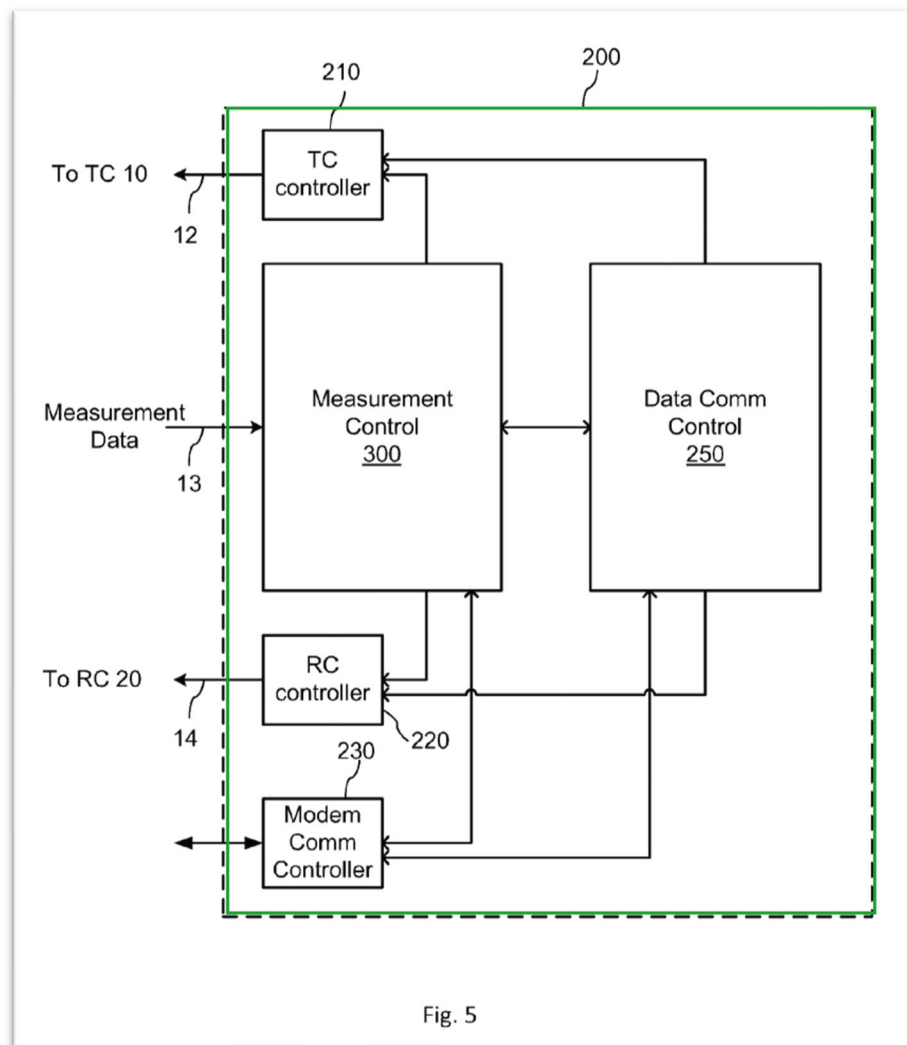
g. Claim 1f – processing said selected second portion of said digitized signal to recover information carried in said plurality of channels;

Renken discloses that the receiver in use by the MCCM containing the “second portion of said digitized signal” processes the digitized signal to baseband, where I and Q samples are converted to data for a specific downstream channel. Ex. 1005, 12:22-53 (“The DDC 22 is responsible for filtering out, i.e. selecting, a particular downstream channel, such as a DOCSIS 6 or 8 MHz wide channel, from the digital IF output of the ADC 25. In one embodiment, it converts a digitized real-valued signal centered at the intermediate frequency to a baseband complex signal centered at a zero frequency as known in the art. This complex baseband signal may be composed, for example, of an in-phase signal component I, and a quadrature signal component Q. The input to DDC 22 is the digital IF data from the ADC 25, which typically covers the entire downstream frequency span of the wideband tuner 26. The output of the DDC 22 are I and Q samples for a particular downstream channel within the wideband downstream frequency span. A DOCSIS 3.0 compatible CM typically has four to eight DDCs per downstream receiver circuit 20, one per channel receiver 21...The output signal of the DDC 22 is demodulated by QAM Demodulator 23, whereby the I and Q samples from the DDC 22 are converted into digital data corresponding to a particular digital channel.”). *See also Id.*, Fig. 3; Ex. 1010, p. 5 (“The QAM demodulator in a CM is responsible for demodulating an individual digital channel so that I/Q samples are converted into digital data.”), Fig. 2 at p. 4; Ex. 1003, ¶72. A POSITA would

recognize that the “digital data,” data packets 27, from the “active” channels are information “recovered” from the active channels and provided to the CPE 6 downstream. *See, e.g.* Ex. 1005, 8:18-26; Ex. 1003, ¶72.

h. Claim 1g— analyzing said selected first portion of said digitized signal to measure a characteristic of said received signal; and

Renken discloses that “QAM Demodulators 23 of the currently idle receiver or receivers 21 can be queried by the measurement controller 300 to perform a number of measurements, including measuring the following parameters known in the art: MER (modulation error ratio), EQ Stress, Group Delay, in-channel frequency response.” *Id.*, 12:53-58. Further, the DDC 22 of any idle receiver 21, may be used to perform various measurements. *See, e.g., Id.*, 12:22-48, 12:58-13:2, Fig. 5; Ex. 1010, Fig. 2, pp. 4-6.



Ex. 1005, Fig. 5.

The monitoring functionality in the MCL analyzes which receivers are idle and able to take a measurement. *Id.*, 14:50-64 (“The present invention further provides the MCL 300 within the modem controller 200 for supporting network measurement and monitoring functionality of the MCCM 100. Functions of the MCL 300 may include a) identifying which of the receivers 21 and transmitters 31 are currently idle and are available for measurements, b) conducting the

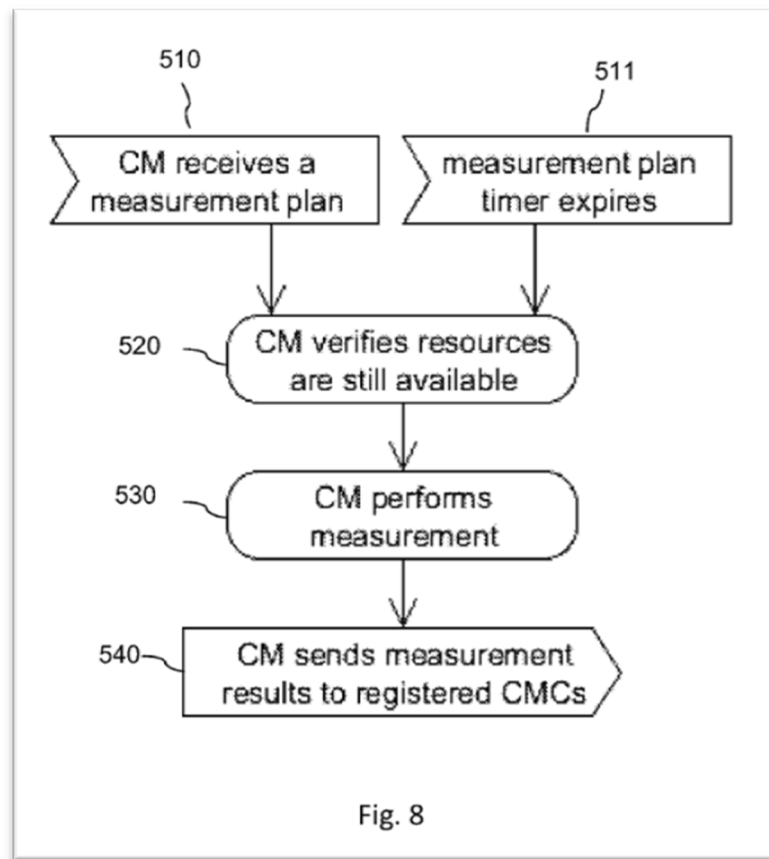
measurements using the currently idle receivers and transmitters in according with a measurement plan, and c) optionally receiving, processing and/or storing measurement data 13 from the RC 20. For this purpose, the MCL 300 is operatively coupled to one or both of the TCC 210 and RCC 220 for controlling the currently idle receivers 21 or transmitters 31 during the measurement, which may include setting the respective central frequencies, modulation formats, tuner bandwidth, receiver filter bandwidth, transmit power, etc.”). *See also, id.*, 15:10-13.

Thus, Renken discloses this element. Ex. 1003, ¶¶73-74.

- i. Claim 1h – controlling the transmission of network management messages back to said headend based on said measured characteristic of said received signal, wherein said measured characteristic is different than said network management messages.**

Renken discloses that an MCCM reports its measurement results via the transmission of network (i.e., IP) messages pursuant to a request from the Central Management Controller (CMC) sent to the MCCM by the CMTS. *See, e.g.*, Ex. 1005, 22:3-23:33, Fig. 17; Ex. 1010, pp. 8-11. Ex. 1003, ¶75. Specifically, Renken discloses that the “the CMC signals the MCCM via internet protocol messaging to perform specific measurements with the unused receivers and/or transmitters.” Ex. 1010 p. 1, Ex. 1005, 8:45-45 (“the CMC 7 schedules and instruct[s] MCCMs 100 to perform real time measurements and then collects, evaluates and stores

measurement results received from the MCCMs 100, for the purpose of remotely performing automated end-of-line diagnostics.”). Renken notes that the flowchart illustrated as Fig. 8 details triggering a new plan from the headend, checking resources, executing the measurement plan if resources (idle receivers or transmitters) are available, sending a measurement report to the headend, then waiting for a new plan/timer expiration/change in measurement capabilities. Ex. 1005, 17:59-18:17 (“The measurement may be initiated by receiving a new measurement plan from the CMC 7 or the LMC 8 in step 510, or at scheduled time instances or time intervals, or when a measurement plan timer expires.”). A POSITA would recognize that after completing the measurement,” “CM receiving a measurement plan,” or” measurement plan timer expires” satisfy “controlling the transmission.” Ex. 1003, ¶75.



Id., Fig. 8. In response to the request from the CMC the MCCM completes the requested measurements and then “the MCCM 100 may send the measurement result to CMC 7 over the TCP/IP network 2, for example utilizing a DOCSIS connection to the CMTS 3.” *Id.*, 9:8-18. Additionally, Renken discloses that the “the CMC 7 receives a message from the MCCM 100 that contains the measurement capability list 350, or a measurement report.” *Id.*, 22:58-60; *see, also*, 23:11-15. A POSITA would understand that measurements are sent via IP messages from the MCCM to the CMC. Ex. 1003, ¶76.

2. Dependent claim 2 – *The method of claim 1, wherein said network management messages indicate whether a parameter is outside of acceptable bounds.*

Renken discloses that analysis measurements are taken from MCCMs 100, compared to each other, where abnormally high or low signals for an MCCM 100 (in comparison to the system or to some pre-determined value) may generate an error report. *See, e.g.*, Ex. 1005, 22:22-39; Ex. 1010, p. 11 (“Parse the measurement results to determine if a network error has been detected. If a problem has been detected, the CMC could indicate this problem to the user.”). If a signal is abnormal when compared to a pre-determined value, a POSITA would understand that parameter to be outside of acceptable bounds. Ex. 1003, ¶77. Further, a POSITA would understand that the network management messaging would indicate that an error is detected (a parameter is outside of acceptable bounds). Ex. 1003 ¶77; *see, also*, Ex. 1005, Fig. 17, Ex. 1010, Fig. 4, p. 10 (“CMC indicates error detected to the user interface”).

3. Dependent claim 3 – *The method of claim 2, wherein said parameter is a modulation parameter of said received signal.*

Renken discloses that measurements, including modulation error ratio, “MER”) may be performed with QAM demodulators. Ex. 1005, 12:38-13:15; Ex. 1010, p. 5; Ex. 1003, ¶78.

4. Dependent claim 4 – *The method of claim 2, wherein said parameter is a transmit power of said received signal.*

Renken discloses that the MCL 300 within the modem controller 200 may conduct “measurements using the currently idle receivers and transmitters in according with a measurement plan... [where measurements] may include setting the respective central frequencies, modulation formats, tuner bandwidth, receiver filter bandwidth, *transmit power*, etc.” Ex. 1005, 14:40-15-9 (emphasis added); Ex. 1010, p. 2 (“Digital measurements such as Level, MER, Pre- and Post-Forward Error Correction (FEC) Bit Error Rate (BER), DQI (Digital Quality Index, defined in US Patent 7,792,183), Errored Seconds, Constellation, and Ingress under the carrier”), p. 5 (“Any extra unused DDCs can be used to perform measurements such as: Analog or digital channel level”); Ex. 1003, ¶79.

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

Renken discloses that measurements are performed as specified by a measurement plan. Ex. 1005, Abstract (“[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.”).

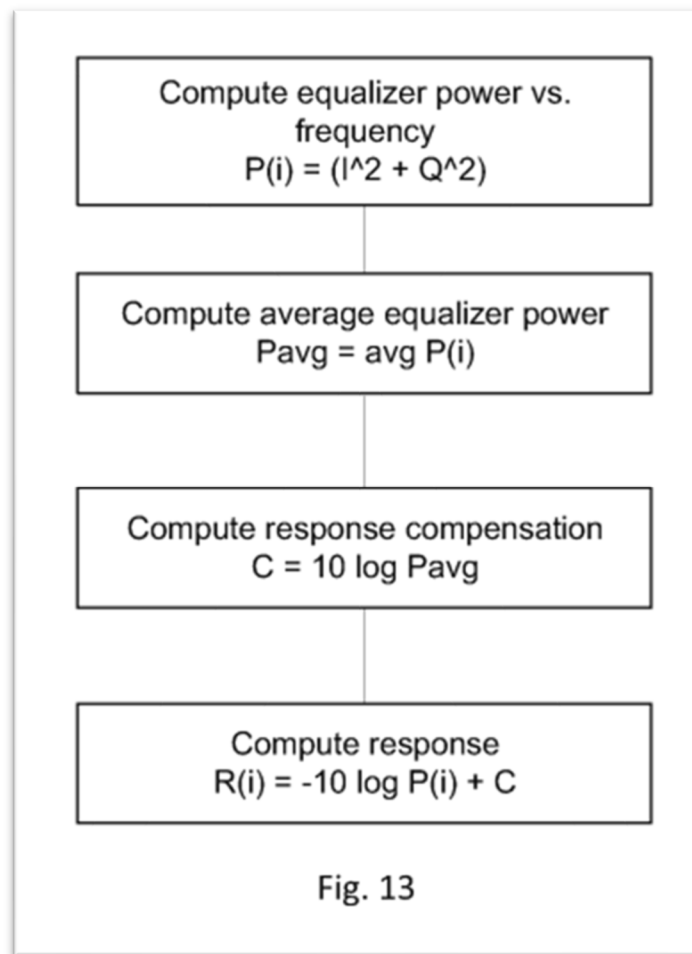
Further, the MCCM measures information to compute downstream (and upstream) signal strength on a frequency-by-frequency basis, i.e., “signal power v. frequency” via a measurement request from the downstream measurement system

(DMS) located at the network's headend. Ex. 1005, 22:15-18 ("the measurement plan generator 740 may send measurement requests to UMS 9 and/or DMS 128, or query them to coordinate their respective measurement plans with the measurement plans being generated by CMC 7. "); *see, e.g.*, Ex. 1005, 22:22-39 ("a downstream measurement system (DMS) 128 (provided at the location of the CMTS) 'perform[ing] downstream spectral measurements, that is to measure the cable network transmission characteristics in dependence on channel frequencies, i.e. on channel per channel basis. ... [T]he DMS 128 performs level measurements on DOCSIS downstream channels generated by the CMTS and/or the analog and digital TV channels generated by the CATV transmitters 129, and reports these measurements to the [central measurement controller] CMC.' Ex. 1005, 20:27-36."); Ex. 1010, p. 5 ("The ADC allows for measuring level and spectrum style measurements within the frequency span covered by the analog IF input"); Ex. 1003, ¶81.

Additionally, the QAM demodulators 23 may determine in-channel frequency responses which are related to peak-to-valley power difference of a channel or frequency range. Ex. 1005, 12:38-13-15. ("QAM Demodulators 23 of the currently idle receiver or receivers 21 can be queried by the measurement controller 300 to perform a number of measurements, including measuring the following parameters known in the art: MER (modulation error ratio), EQ Stress,

Group Delay, in-channel frequency response. Depending on the MCCM hardware, the QAM demodulator 23 may also be queried by the measurement controller 300 to provide the following measurements: I/Q samples that can be used by the measurement controller 300 to generate constellation plots, Ingress under the carrier, DQI™ (Digital Quality Index).”). A POSITA would understand the in-channel frequency responses may be defined by signal power v. frequency. Ex. 1003, ¶82.

Additionally, when measurements are taken accessing each demodulator’s 23 equalizer tap values, “in-channel frequency response from the equalizer's complex frequency response is computed.” Ex. 1005, 5:64-65, Fig. 13; Ex. 1010, p. 5 (“Any extra unused QAM Demodulators can be used to perform measurements such as...In-channel frequency response”).



Ex. 1005, Fig. 13, Ex. 1003, ¶83.

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

Renken discloses a signal to noise ratio estimate may be determined from the QAM demodulator 23, while the MPEG/DOCSIS decoder 24 may have rate counters and packet error counters that can be read by the controller 200 to measure Bit Error Rate (BER). Ex. 1005, 12:38-13:15; Ex. 1010, pp. 5-6. Further,

Digital Measurement Capabilities ...may indicate whether the MCCM 100 is capable of performing the following non-exclusive list of digital measurements: Carrier level, MER, BER, DQI™, Ingress under the carrier, IQ sampling, Errored Seconds, Digital Hum. Here IQ sampling means capturing pairs of I and Q amplitudes at symbol times from the output of the DDC 22 in order to display or analyze a QAM constellation. The values at the symbol time may be Interpolated between values taken at periodic sample times. Errored Seconds is an error performance indicator that refers to a counter of one-second intervals in which uncorrected bit errors are detected in the output of QAM demodulator, and which can be obtained by querying the MPEG/DOCSIS decoder 24.

Ex. 1005, 17:31-43, Ex. 1010, pp. 1-2. A POSITA would understand how to calculate/derive SNR, noise levels, and average signal power from MER. Ex. 1003, ¶85. Further a POSITA would have realized that decades earlier, common solutions existed to determine SER separately from both BER and QAM demodulators. Ex. 1003, ¶85.

7. **Dependent claim 9 – The method of claim 1, configuring, by said one or more circuits, a bandwidth and/or center frequency of said selected first portion of said digitized signal.**

Renken discloses that in configuring the system that either a 6 or 8 MHz wide downstream channel is selected from the digital IF output of the ADC 25. Ex. 1005, 12:22-37; Ex. 1003, ¶86. *See also*, Ex. 1005, 11:19-12:5; Ex. 1010, p. 5.

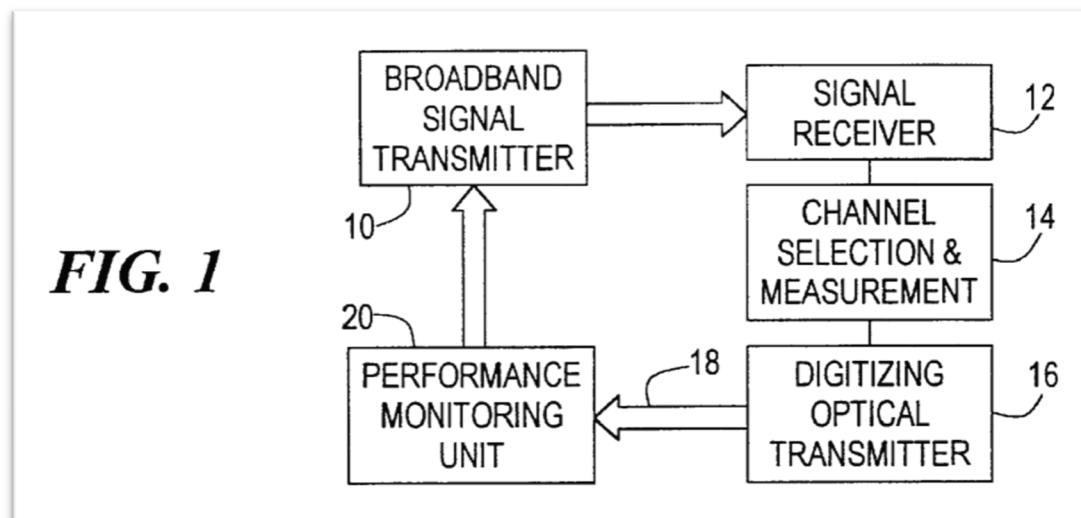
B. Ground 2: Claims 1, 2, 3, 4, 6, 8, and 9 are unpatentable as obvious over Maycock in view of Kidambi and further in view of the knowledge of a POSITA

The combination of Maycock's signal monitoring system and Kidambi discloses claims 1-4, 6, 8-9, which renders the challenged claims obvious. Ex. 1003, ¶87.

1. Independent claim 1

a. Claim 1 Preamble – A method comprising:

To the extent that it is limiting, Maycock discloses the preamble, Ex. 1006, Title, Abstract (“Apparatus for and a method of ...”), 2:52-54, Fig. 1, claim 18.



Ex. 1006, Fig. 1, Ex. 1003, ¶88. To the extent Maycock does not disclose the preamble Kidambi does. *See, e.g.*, Ex. 1007, claim 14, Ex. 1003, ¶88.

b. *Claim 1a – performing by one or more circuits of a receiver coupled to a television and data service provider headend via a hybrid fiber coaxial (HFC) network:*

In the background section, Maycock describes various conventional cable television systems, including systems that measure various parameters associated with the transmitted signal, and then identifies problems with those conventional systems.” Ex. 1006, 1:11-2:17. Figure 1 of Maycock illustrates “video signal transmission headend 10 . . . provides analog video signals which are received . . . by a signal receiver 12.” Ex. 1006, 3:2-5. Thus, Maycock discloses “a television . . . service provider headend.” Ex. 1003, ¶89.

Maycock further discloses that the video may be “transmitted through, for example, a co-axial cable, an optical fiber cable, a terrestrial microwave or a satellite system.” Ex. 1006, 1:7-9, *see also, Id.*, Abstract. Moreover, Maycock discloses a network using a combination of optical fiber and coaxial cables, and, thus, discloses a hybrid fiber coaxial (HFC) network. *Id.*, 3:29-39; 4:1-4. Maycock notes that its system may be used “with suitable modification, for compressed digital signals of the future and satellite frequency modulated signals in both analog and digital formats.” *Id.*, 2:41-46. Further, Maycock discloses that a signal

carrying multiple channels is sent from the headend to a signal receiver. Ex. 1006, Figs. 1, 1A, 2, 3, 1:12-15, 1:47-50, 3:60-4:6, 7:28-30, 8:1-25.

Additionally, Kidambi discloses communicating television, voice, and data over a cable network via a “hybrid fiber/coaxial cable television (CATV) network” from provider’s headend to be received by a receiver, such as a cable modem, set-top box, and cable gateway which in turn provide data to customer premises equipment, including a television. Ex. 1007, ¶¶82-83. Thus, the combination of Maycock and Kidambi disclose this limitation. Ex. 1003, ¶¶89-91.

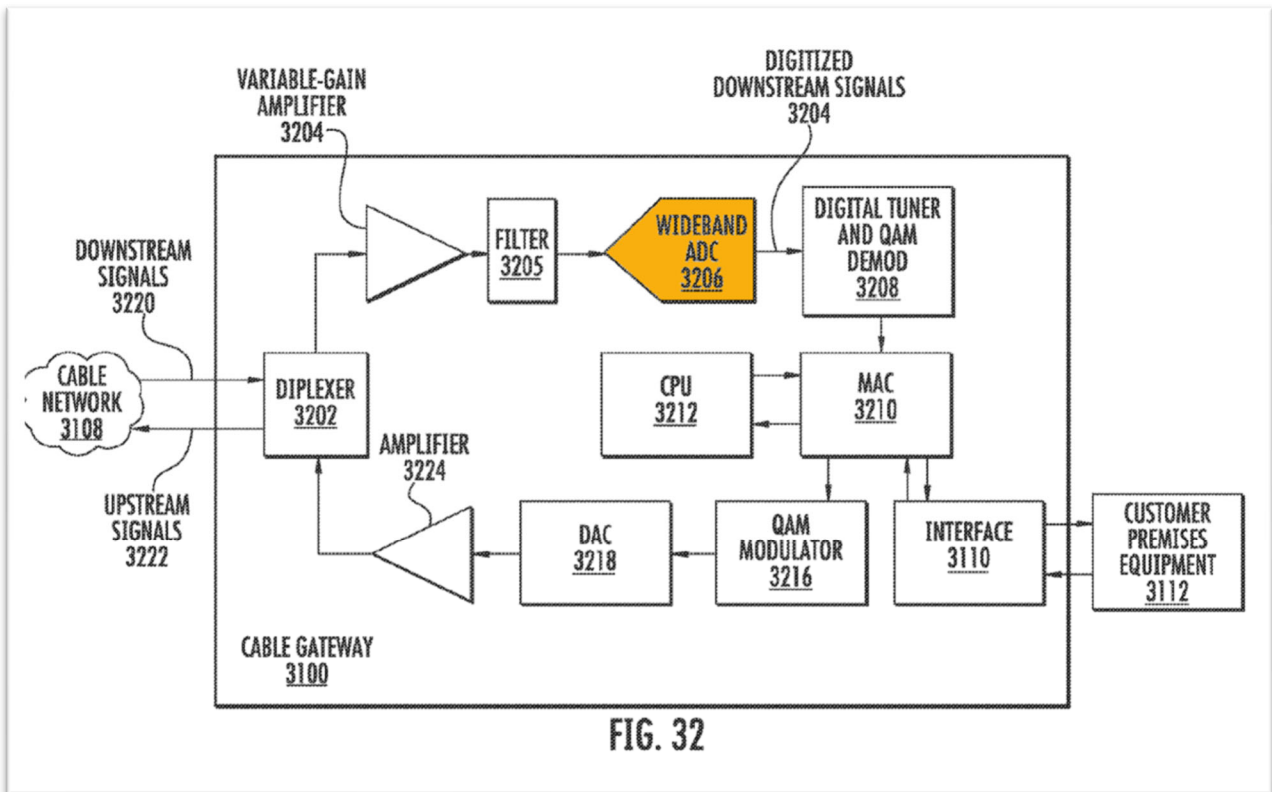
c. *Claim 1b – receiving, via said HFC network, a signal that carries a plurality of channels, wherein said channels comprise one or both of television channels and data channels;*

Maycock notes that conventional fiber optic cable television technology is capable of transmitting “over 80 channels of audio and video programming over 200 km.” Ex. 1006, 1:48-50. Maycock further discloses that this signal is sent via the HFC network from the headend to a receiver. *Id.*, 3:1-4; 3:60-4:6. Thus, Maycock discloses receiving “a signal that carries a plurality of channels, wherein said channels comprise one *or* both of television channels and data channels.” Ex. 1003, ¶¶92.

Further, Kidambi discloses transmitting and receiving television, voice, and data signals over an HFC cable network between provider’s headend and a receiver

at a customer's location, such as a cable modem, set-top box, and cable gateway.

Ex. 1007, ¶¶83-84.



Ex. 1007, Fig. 32. Kidambi explains that “communication system receivers such as that used in cable modem and set-top-box systems are trending toward processing more channels to provide faster broadband access and more video services to the home. One alternative to having a tuner for each channel is to digitize the entire bandwidth of the cable system. Once this is achieved, the number of channels decoded from the spectrum is completely defined in the digital domain.” *Id.*, ¶82.

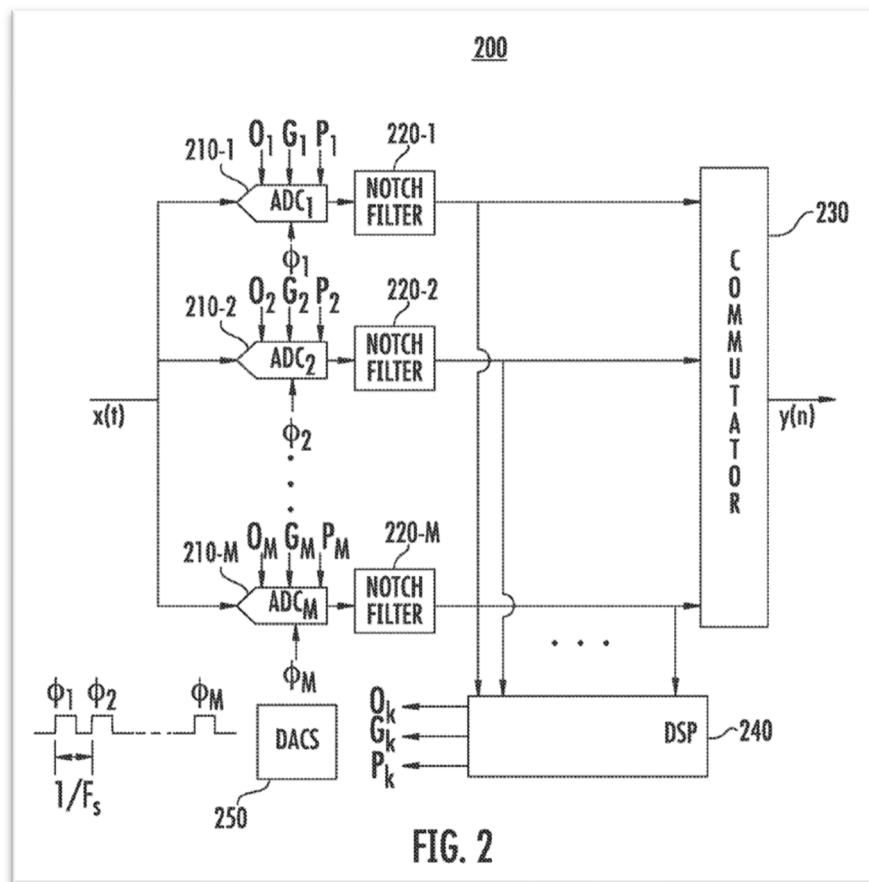
Thus, the combination of Maycock and Kidambi discloses this limitation.

Ex. 1003, ¶¶92-94.

d. *Claim 1c – digitizing said received signal to generate a digitized signal;*

Both Maycock and Kidambi disclose digitizing the received signal to generate a digitized signal. *See e.g.*, Ex. 1006, 3:2-28, 3:60-67, 4:25-58, 6:2-37, Fig. 2. Claim 1; Ex. 1007, ¶¶ 43-45, 52-53, 58-60, 85, Figs. 2, 4, 8, 12, 32, Claim 1.

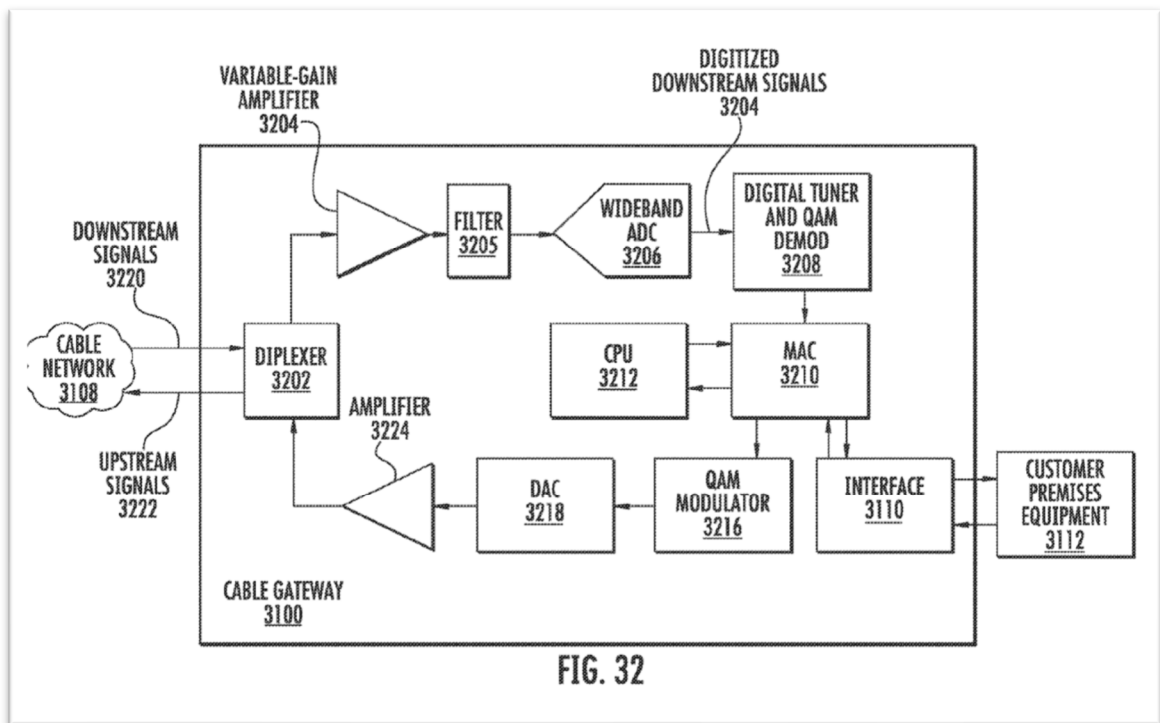
Kidambi discloses input signal, $x(t)$, with M channels digitized by M ADCs 210, where the digital outputs are processed in DSP 240. *Id.*, ¶¶ 5, 45, Fig. 2.



Ex. 1007, Fig. 2. Further, Kidambi expressly discloses digitizing the entire bandwidth of the received signal via wideband ADC 3206. *Id.*, ¶82.

Kidambi discloses a wideband capture technique where an “entire bandwidth of [a] cable system” is digitized at once, which provided the benefit of reducing the incremental cost of adding additional channels. Ex. 1007, ¶82. Referring to Figure 32, Kidambi discusses a cable gateway 3100 that receives television signals from a cable network 3108. Ex. 1007, ¶83. The received signals are sent to a wideband analog-to-digital converter 3206 which “digitizes the received signal.” Ex. 1007,

¶85, Fig. 32. Wideband ADC 3206 digitizes the “entire bandwidth of the cable system,” which is useful to tune multiple channels at the same time. Ex. 1007, ¶¶82-83.



Ex. 1007, Fig. 32.

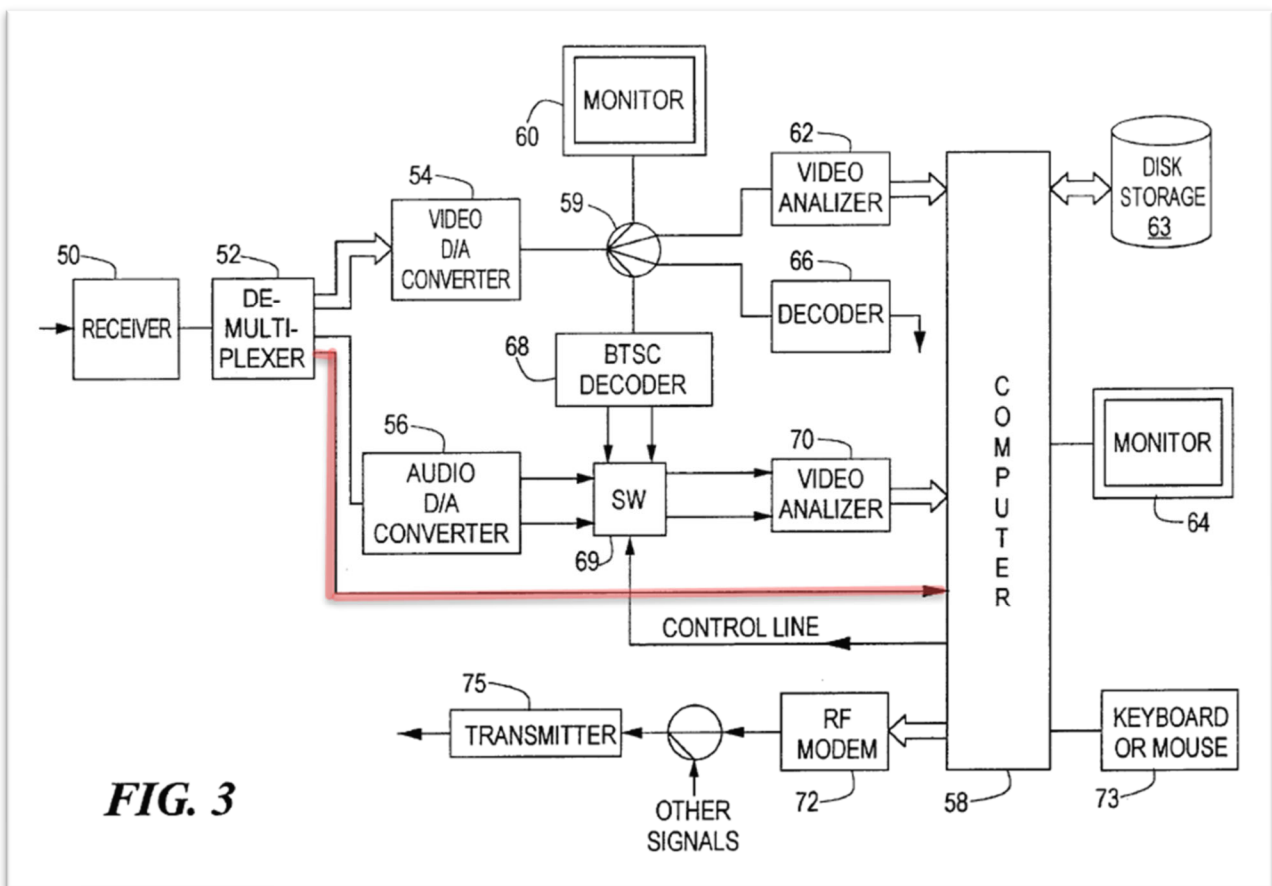
Further, Maycock also discloses digitizing a received signal. For example, Figure 1 depicts signal receiver 12 that receives multiple broadband channels, spanning a “useable frequency range” from a broadband signal transmitter (*e.g.*, cable headend, etc.). Ex. 1006, 3:1-16. Signal receiver 12 is “an optical receiver, an antenna, or any other device which enables the capture of a broadband signal.” Ex. 1006, 3:5-9. Maycock further teaches that channel selection & measurement 14,

also depicted in Maycock's Figure 2 as channel selector 14a, selects an individual analog channel from the multi-channel input and outputs the analog channel to analog to digital convertors (ADC) (e.g., ADCs 38, 37a, 37b) for digitizing the channel. Ex. 1006, 3:60-67, 4:25-58, Fig. 2. Multiple digitized signal components are thereby created, combined into one digital signal at multiplexer 43, and transmitted to a performance monitoring unit for analysis. Ex. 1006, 5:23-35, 5:38-47, Figs. 3 and 4. Maycock, therefore, teaches an ADC operable to digitize a received signal as recited in this limitation. Ex. 1003, ¶99.

A POSITA therefore would have known to replace Maycock's ADC with Kidambi's high-speed ADC to digitize the incoming signal more efficiently. Ex. 1003, ¶99. The combination of Maycock and Kidambi, thus, meets this element. Ex. 1003, ¶¶95-99.

e. Claim 1d – selecting a first portion of said digitized signal;

Maycock describes that in the operation of the monitoring unit a first portion of a digitized signal is selected wherein demultiplexer 52 outputs “a third data bit bus [of a 10 bit output bus] goes directly to a control computer 58 for analysis of the digitized performance information.” Ex. 1006, 6:6-7, Ex. 1003, ¶100.



Ex. 1006, Fig. 3 (annotated).

In claim 18, Maycock discloses the steps of “receiving the video signal. . .; employing a control signal to select a channel of the received video signal [and] digitizing and serializing the thus-selected channel as a digital video signal.” Ex. 1006, 10:48-52. Further Maycock explains that certain components, such as demultiplexer 52 and splitter 59, operate to separate portions of incoming signals into channels. Ex. 1006, 5:65-6:7, 6:12-14.

Alternatively, Maycock explains that splitter 59 outputs four legs (“four paths”) going to the various locations. Ex. 1006, 6:12-14, Figure 3. *See, also, e.g.,*

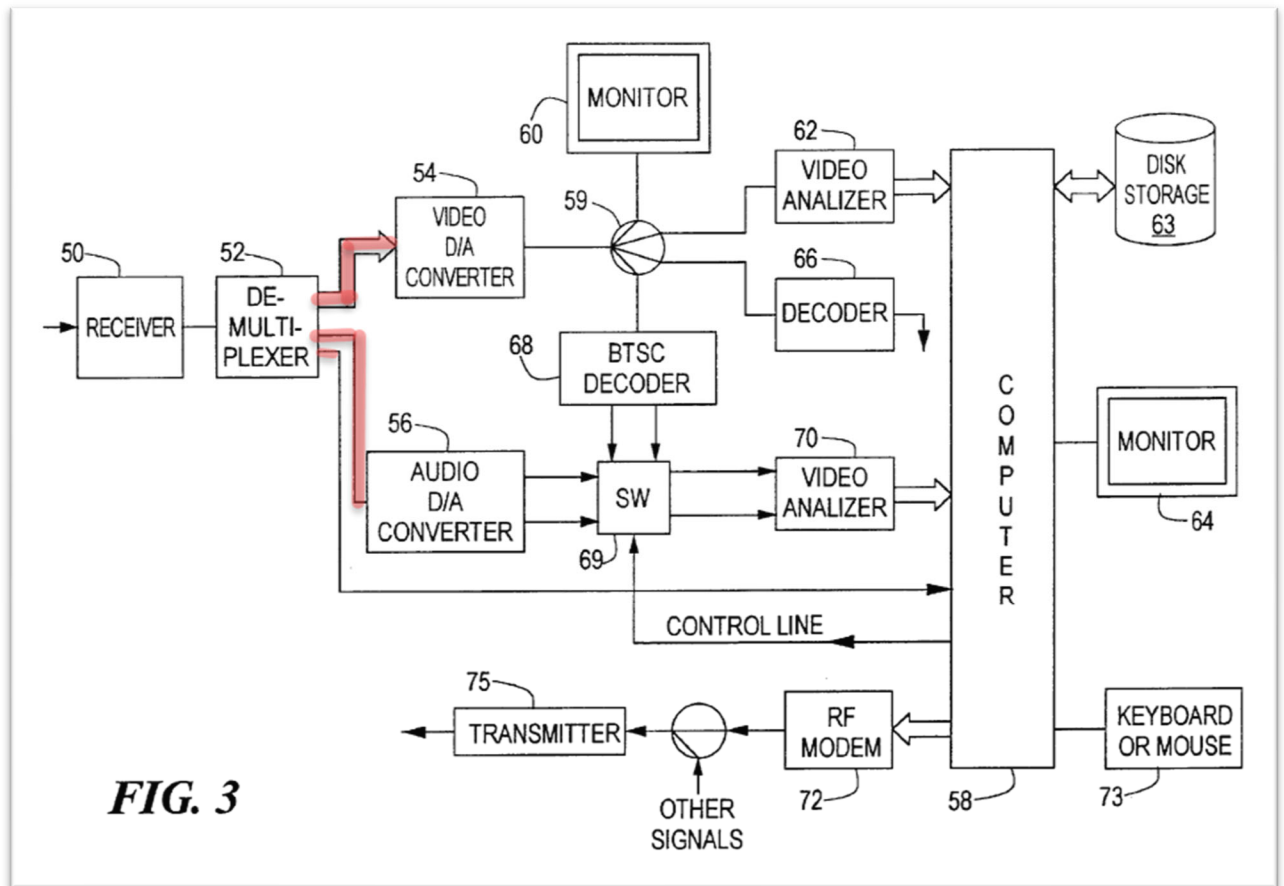
Ex. 1006, 6:49-51 (detailing that the audio bit bus traffics signal(s) comprising two audio channels), Ex. 1006, 6:12-47 (discussing where each of the four legs from the splitter are fed), Fig. 3; In this case, the signal travelling to video analyzer 62 constitutes the “first portion.” Ex. 1003, ¶102. A POSITA would understand both demultiplexer 52 and splitter 59 operate as channelizers, as they create multiple channel outputs from a single incident signal. Ex. 1003, ¶102.

In the event Maycock does not disclose this element, Kidambi does. Ex. 1003, ¶103. Kidambi teaches that “[t]he time-interleaved ADC 3206 digitizes the received signal, then passes the digitized downstream signals 3240 [sic] to a digital tuner and quadrature-amplitude-modulation (QAM) or other type demodulator 3208[.]” Ex. 1007, ¶85. ADC 3206 is comprised of a plurality, M, of ADCs which “convert[] an input signal to a set of M digital outputs as M values[.]” *Id.*, claim 1. A POSITA would recognize that any of the separated M outputs, would constitute the “first portion.” Ex. 1003, ¶¶100-104.

f. Claim 1e – selecting a second portion of said digitized signal;

Maycock discloses “[e]ight bits of a 10 bit output bus of the demultiplexer 52 go to a video digital-to-analog converter 54 to reconstitute the video signal and its sub-carriers.” Ex. 1006, 6:2-4. These nine bits, specifically the eight bits to

video D/A converter 54 and the one bit to audio D/A converter 56, are the selected second portion of the digitized signal. Ex. 1003, ¶105.



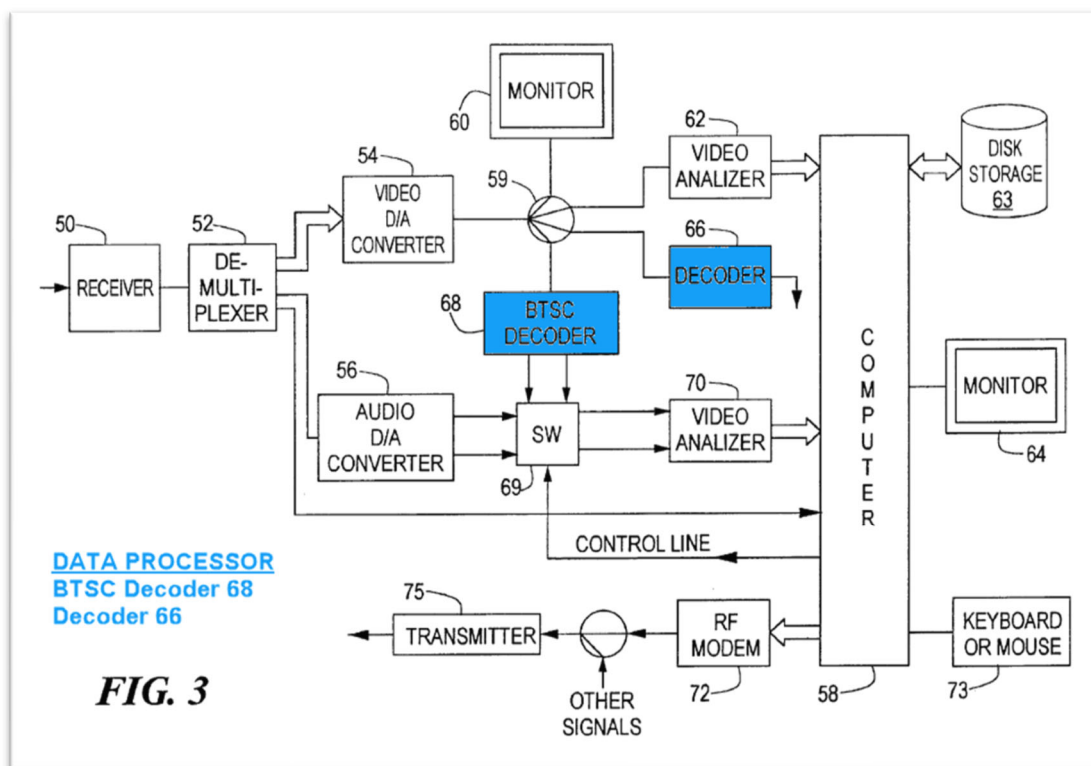
Ex. 1006, Fig. 3 (annotated). Alternatively, selecting the second portion of the signal is met by the leg traveling to decoder 66. Ex. 1003, ¶105.

In the event that Maycock does not disclose this element, Kidambi discloses a plurality, M, of signals wherein any of the signals not selected as the “first portion” may be considered the “second portion.” Ex. 1007, ¶85; Ex. 1003, ¶106.

g. Claim 1f – processing said selected second portion of said digitized signal to recover information carried in said plurality of channels;

Maycock explains that certain components, such as a BTSC decoder 68 and a decoder 66, process television channels to recover content, e.g., extracting the data carried on the television channels. Ex. 1006, 6:38-44, 6:45-47; Ex. 1003, ¶107. A POSITA would understand that the phrase “to recover information carried in the plurality of channels” to be extracting the information carried on the television channels. Ex. 1003, ¶107. At least decoder 66 extracts information carried by the signal when it “demodulate[s] information encoded in the video signal, for example channel insertion (used for advert deletion and substitution), scrambler and set top information.” Ex. 1006, 6:38-41. A POSITA would read this description and understand that decoder 66 processes television channels to recover content. Ex. 1003, ¶107.

Additionally, regarding the BTSC decoder 68, Maycock teaches that “a baseband signal output which contains both video and audio information ... is split by a splitter 59 into four paths” and that one of those paths “is fed to a BTSC stereo audio decoder 68 which recreates the left and right audio channel from the BTSC standard signal.” Ex. 1006, 6:9-14, 6:45-47. From this description, a POSITA would understand that BTSC decoder 68 processes television channels to recover content (*i.e.*, right and left audio channel content). Ex. 1003, ¶107.



Ex. 1006, Fig. 3 (annotated). Maycock therefore discloses all limitations of this element.

In the event that Maycock does not disclose this element, Kidambi discloses that “the digital tuner and QAM demodulator 3208 tunes and demodulates the amplified, filtered, and digitized downstream signals 3240 in accordance with either 64-QAM or 256-QAM techniques *to recover the underlying information.*”

Ex. 1007, ¶85. Ex. 1003, ¶¶107-108.

- h. Claim 1g— analyzing said selected first portion of said digitized signal to measure a characteristic of said received signal; and**

Maycock discloses measuring a characteristic of the first portion of a received signal wherein the first portion of the digitized signal is one bit (of ten) directly transmitted to control computer 58. Ex. 1006, 5:65-6:7. Maycock's Figure 3 illustrates the "components of [Maycock's] monitoring unit 20" and shows receiver 50 receiving a digitized signal and transmitting that signal to demultiplexer 52. *Id.*, 5:39-42, 5:65-6:2. Demultiplexer 52 separates the 10-bit digitized signal into three different signal parts: 8 video bits are transmitted to video digital-to-analog converter 54, a single audio bit is transmitted to audio digital-to-analog converter 56, and a bit is transmitted directly to control computer 58 "for analysis of the digitized performance information." Ex. 1006, 6:2-7.

The 8 video bits are converted to analog by video D/A converter 54 and then analyzed by video analyzer 62, which measures various signal quality parameters including but not limited to "[s]ignal-to-noise ratio, differential gain, differential phase and other video parameters" *Id.*, 6:24-29. Similarly, the audio bit is converted to analog by audio D/A converter 56 and then analyzed by audio analyzer 70, which measures "parameters such as signal-to-noise ratio and harmonic distortion," as well as "digitized performance information" Ex. 1006, 6:49-61. Maycock's signal quality parameters (e.g., SNR, differential gain, and harmonic distortion) are the same examples of "a characteristic" as the

characteristics described in the '826 Patent. (*Compare* with '826 patent, 3:45-57 (identifying “characteristics” such as SNR and various frequency functions).)

Limitation *Ig* simply requires “analyzing said selected first portion of said digitized signal to measure a characteristic of said received signal.” The limitation does not impart a temporal requirement and thus the signal need not be in a digitized form when the signal analysis occurs. Rather, the claim simply requires that the signal monitor receives a digitized signal and performs signal analysis to determine a signal characteristic regardless of whether the signal varies between analog and digital form. Ex. 1003, ¶111.

Maycock’s performance monitoring unit 20 receives a 10-bit digitized signal, performs various processing techniques, and analyzes this digital signal. Hypothetically, if performance monitoring unit 20 was a black box, a POSITA would understand that a digitized signal is the input and that the unit outputs signal characteristics to computer 58. Ex. 1003, ¶112; *see also* Ex. 1006, 5:65-6:2, 7:4-13, 7:21-35. Therefore, Maycock’s performance monitoring unit 20 analyzes and determines characteristics of the incoming digitized signal, as determined by the video analyzer 62, the audio analyzer 70, and/or the computer 58.

Alternatively, if the monitoring must be performed exclusively on a digital signal, Maycock’s performance monitoring unit 20 still meets this requirement. Maycock explains that demultiplexer 52 creates a “third data bit bus” from an

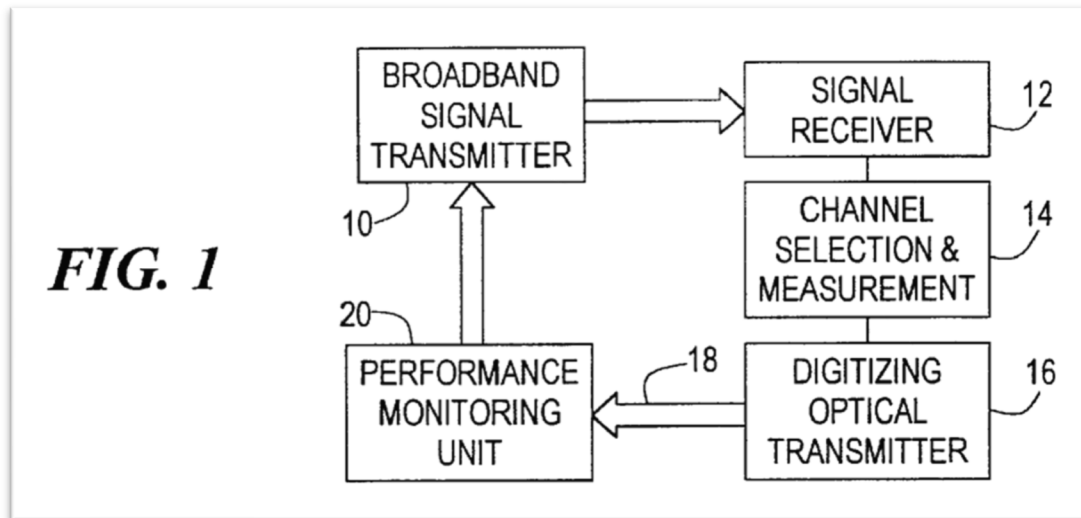
incoming digitized signal and transmits a third data bit bus “directly to a control computer 58 for analysis of the digitized performance information.” Ex. 1006, 6:4-7. Maycock further describes that this digitized performance information includes “digital carriers derived from the microprocessor” (*e.g.*, microprocessor 30, *see* Ex. 1006, 5:13-16) that “contain information such as video level, video carrier frequency, audio carrier level, audio carrier frequency plus other digitally encoded information,” corresponding to “characteristics,” as claimed in limitation 1*g.* Ex. 1006, 6:62-67. Maycock discloses limitation 1*g.* Ex. 1003, ¶113.

In the event that Maycock does not disclose this element, Kidambi discloses that “the digital tuner and QAM demodulator 3208 tunes and demodulates the amplified, filtered, and digitized downstream signals 3240 in accordance with either 64-QAM or 256-QAM techniques *to recover the underlying information.*” Ex. 1007, ¶85 (*emphasis added*), Ex. 1003, ¶114.

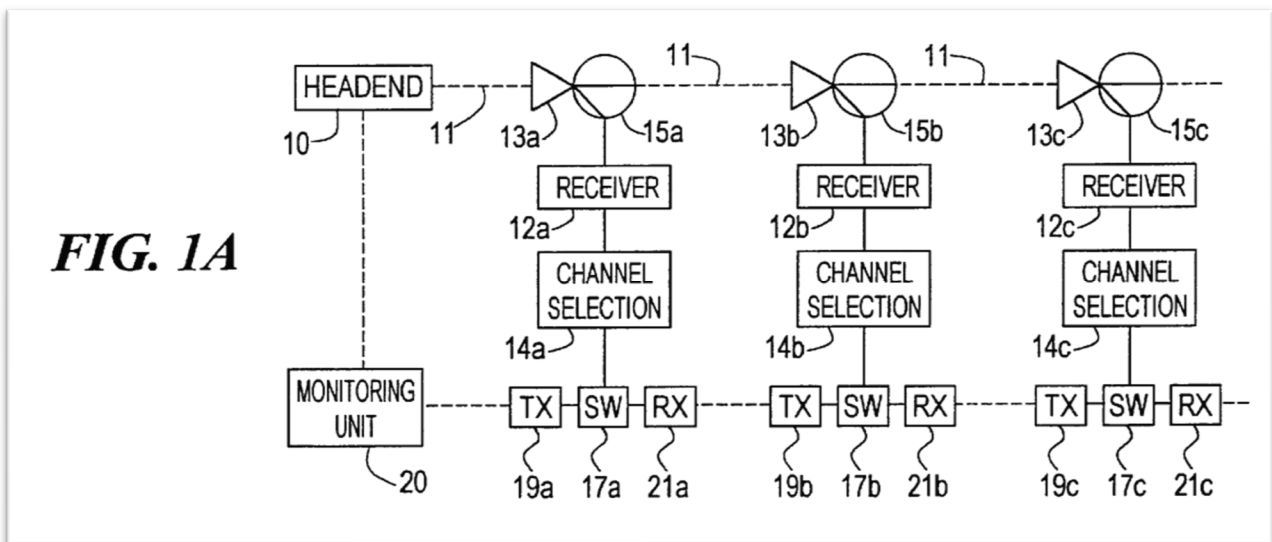
- i. **Claim 1h – controlling the transmission of network management messages back to said headend based on said measured characteristic of said received signal, wherein said measured characteristic is different than said network management messages.**

Maycock, alone or in view of the general knowledge of a POSITA, discloses controlling the transmission of network management messages from the digitizing optical transmitter 16 to performance monitoring unit 20 and transmitter 10, which

are located at the headend, based on the measured characteristic of the received signal. Ex. 1006, 3:2-17, Fig. 1, *see, also*, Fig. 1A; Ex. 1003, ¶115.



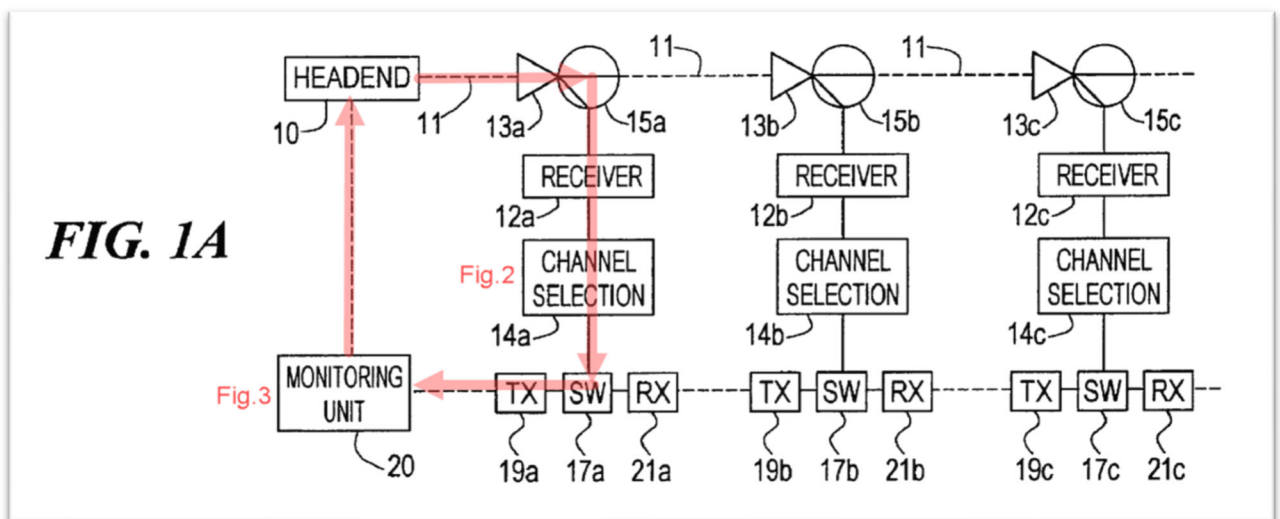
Ex. 1006, Fig.1.



Ex. 1006, Fig. 1A

As Maycock described, the goal of its system was to provide performance and signal quality monitoring as the signal passed through a single point in the

system, as opposed to monitoring the status of equipment at numerous points along the signal's transmission path, as was done by conventional systems. Ex. 1006, 1:31-44. This “performance monitoring,” as opposed to “status monitoring,” enabled a signal operator (*e.g.*, a controller of a source broadband signal like a cable television provider) to identify whether a signal itself was of poor quality. Ex. 1006, 1:14-23. Maycock’s simplified Fig. 1 shows a signal path from performance monitoring unit 20 to video head-end 10 – regardless of whether the monitoring unit is located at the headend or remote. Ex. 1006, Fig. 1, 3:14-16 (“a monitoring unit 20 at a monitoring location, which may be at the head end or some other location”); *Id.*, 5:32-35 (discussing signals from channel selector transmitting to headend) Ex. 1003, ¶116. A POSITA would understand that the purpose of the monitoring is to adjust the transmission and the red line is meant to illustrate results of the measurement flowing back to the headend. Ex. 1003, ¶116.

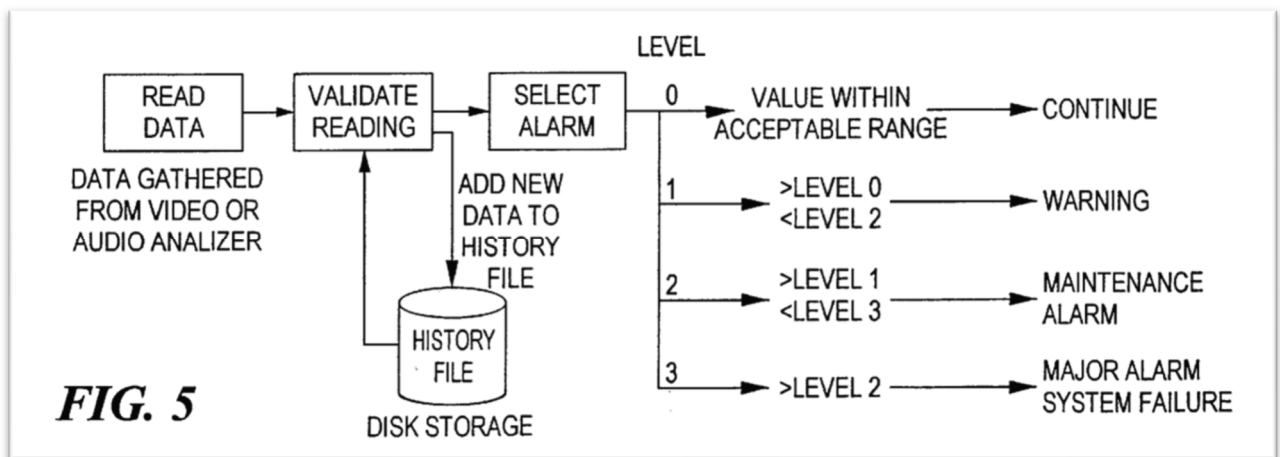


Ex. 1006, Fig. 1A (annotated).

Further, Maycock describes that the monitoring unit 20 controls the transmission of the measured characteristic of said received signal to the monitoring unit 20. Ex. 1006, 3:50-55 (“Upon command from the monitoring location ... the switch 17a, 17b ... 17n can select either this selected local signal from the respective channel selector 14a, 14b ... 14n or a signal from the respective receiver 21a, 21b ... 21n.”), *see, also*, Fig. 4, 7:22-35. Based on Maycock, a POSITA would understand that transmission of the characteristic would occur in a network management message where the measured characteristic would be different than the network management message. Ex. 1003, ¶117.

2. Dependent claim 2 – *The method of claim 1, wherein said network management messages indicate whether a parameter is outside of acceptable bounds.*

Maycock discloses bounds wherein measurements are compared with stored data to determine if the measurements are “within prescribed limits,” and wherein the measurements are “outside of limits for the baseline data,” or “outside of [the] range of [a] previous reading.” Ex. 1006, 7:37-53. That is, a “system performance parameter to be monitored is selected by programming.” The measurement is taken as previously detailed, “[i]n the monitoring unit 20 the signal is recovered ...and the measurement data is compared with reference data stored for the purpose,” the result is no communication, a warning, or an alarm. *Id.*, 3:18-21, Fig. 5.



Ex. 1006, Fig. 5. A POSITA would understand the validation procedure results include communicating a warning or alarm as a network management message. Ex. 1006, Table 1, Ex. 1003, ¶118.

3. Dependent claim 3 – *The method of claim 2, wherein said parameter is a modulation parameter of said received signal.*

Maycock discloses measurement of a modulation parameter wherein the modulation parameter may be as per video specification EIA RS-250. Ex. 1006, 6:24-27. It was well known decades prior to the time of the alleged invention that this specification and subsequent updates disclosed values for modulation parameters. Ex. 1003, ¶119.

4. Dependent claim 4 – *The method of claim 2, wherein said parameter is a transmit power of said received signal.*

Maycock discloses that one measured characteristic, as detected by the computer 58, video analyzer 62, and/or audio analyzer 70 (signal analyzer), is SNR. Ex. 1006, 6:24-29, 6:55-57. Maycock further discloses that the digital data

information on the third bit line comprises information such as “signal quality information indicative of the quality of the selected channel” and that this comprises power level, frequency, temperature, and other local status information. Ex. 1006, 4:59-5:16. Therefore, this limitation would be obvious in view of Maycock. Ex. 1003, ¶120.

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

Although the signal quality information does not expressly include measuring power vs. frequency, it would have been obvious in view of Maycock’s disclosure of measuring power and frequency to include power v. frequency data as part of the quality information in the “digital data information.” Ex. 1003, ¶121.

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

Maycock discloses determining signal to noise ratio. Ex. 1006, 4:29-38; Ex. 1003, ¶122. Similar to the analysis for claims 4 and 6, a POSITA would find measuring characteristics to determine peak-to-average ratio, noise levels, BER and SER as obvious. Ex. 1003, ¶122.

7. Dependent claim 9 – The method of claim 1, configuring, by said one or more circuits, a bandwidth and/or center frequency of said selected first portion of said digitized signal.

Maycock discloses using “baseband video and audio signals for both visual and quantitative measurement” wherein at least for the NTSC system, the relevant signal is between 0-6 MHZ. Ex. 1006, 2:37-41, 4:7-24. Ex. 1003, ¶123. A POSITA would recognize that NTSC, SECAM, and PAL signals may possess different frequency ranges – thereby configuring the bandwidth of the entire digitized signal, including the first portion. Ex. 1003, ¶123; see, e.g. Ex. 1006, 4:18-24.

C. Ground 3: Claims 1, 2, 3, 4, 6, 8, and 9 are unpatentable as obvious over Maycock in view of Zhang and further in view of the knowledge of a POSITA

The combination of Maycock’s signal monitoring system and Zhang discloses claims 1-4, 6, 8-9, which renders the Challenged Claims obvious. Ex. 1003, ¶124.

1. Independent claim 1

a. Claim 1 Preamble – *A method comprising:*

See VI.B.1, limitation 1 Preamble, supra.

To the extent Maycock does not disclose this limitation, Zhang discloses a “method and circuitry...” Ex. 1008, Abstract, Ex. 1003, ¶126.

b. Claim 1a – *performing by one or more circuits of a receiver coupled to a television and data service provider headend via a hybrid fiber coaxial (HFC) network:*

See VI.B.1, limitation 1[a], supra.

Zhang describes a multi-channel demodulator that receives one or more multi-channel analog RF signals, which can be sourced from a cable system. Ex. 1008, 3:13-19. One of skill in the art, would know that a cable system utilizes a hybrid fiber coaxial network to provide RF signals to a receiver in a subscriber's home. Ex. 1003, ¶128. Thus, the combination of Maycock and Zhang disclose this limitation. Ex. 1003, ¶128.

- c. ***Claim 1b – receiving, via said HFC network, a signal that carries a plurality of channels, wherein said channels comprise one or both of television channels and data channels;***

See VI.B.1, limitation 1[b], *supra*.

To the extent Maycock does not disclose this limitation, Zhang teaches using a “high-speed ADC” in a cable system to digitize “an entire signal band with n channels” as depicted in Figure 2. Ex. 1008, 3:62-63, 3:13-19, Ex. 1003, ¶130.

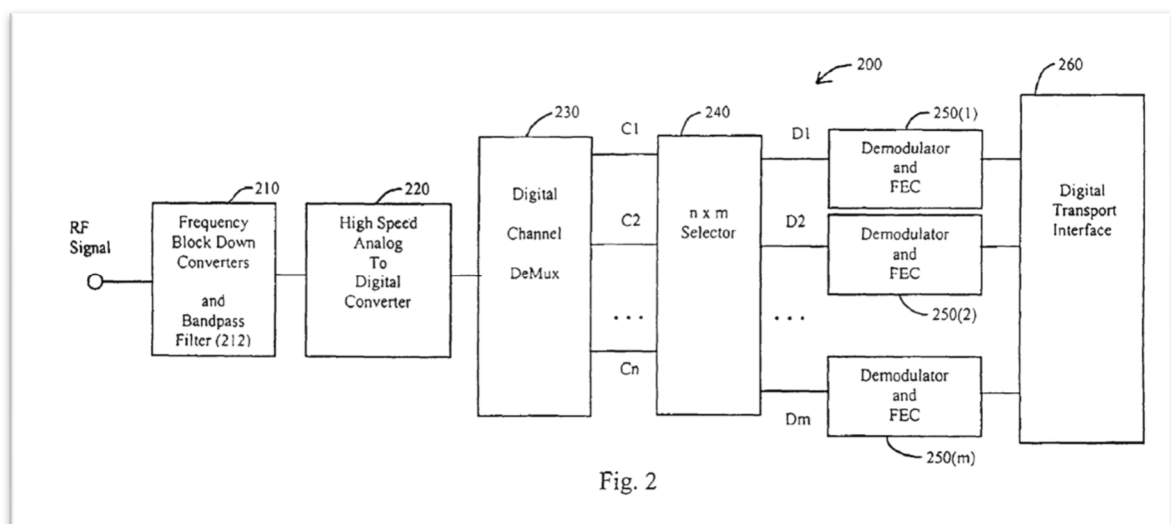


Fig. 2

d. Claim 1c – digitizing said received signal to generate a digitized signal;

See VI.B.1, limitation 1[c], *supra*.

To the extent Maycock does not disclose this limitation, Zhang discusses that a single ADC could be used to digitize incoming TV signals Ex. 1008, 3:49-53; Ex. 1003, ¶132. Specifically, Zhang’s ADC “receives [a] multi-channel analog RF signal ... and converts the multi-channel analog RF signal to a multi-channel digital RF signal.” Ex. 1008, 2:14-17; see e.g. 3:13-19; 3:60-64; Ex. 1003, ¶132.

If an incoming television signal surpasses the capabilities of a single ADC, Zhang ensures that the entirety of an incoming television signal is digitized by using multiple ADCs. Ex. 1008, 6:3-35, 6:52-61; Ex. 1003, ¶133. Thus, a POSITA would understand either Zhang’s High Speed Analog to Digital Converter 220 or the multiple ADCs (620a, 620b) may digitize the received network signals, resulting a digitized signal. Ex. 1003, ¶133.

e. Claim 1d – selecting a first portion of said digitized signal;

See VI.B.1, limitation 1[d], *supra*.

f. Claim 1e – selecting a second portion of said digitized signal;

See VI.B.1, limitation 1[e], *supra*.

- g. Claim 1f – processing said selected second portion of said digitized signal to recover information carried in said plurality of channels;**

See VI.B.1, limitation 1[f], supra.

- h. Claim 1g– analyzing said selected first portion of said digitized signal to measure a characteristic of said received signal; and**

See VI.B.1, limitation 1[g], supra.

- i. Claim 1h – controlling the transmission of network management messages back to said headend based on said measured characteristic of said received signal, wherein said measured characteristic is different than said network management messages.**

See VI.B.1, limitation 1[h], supra.

- 2. Dependent claim 2 – *The method of claim 1, wherein said network management messages indicate whether a parameter is outside of acceptable bounds.***

See VI.B.2, claim 2, supra.

- 3. Dependent claim 3 – *The method of claim 2, wherein said parameter is a modulation parameter of said received signal.***

See VI.B.3, claim 3, supra.

- 4. Dependent claim 4 – The method of claim 2, wherein said parameter is a transmit power of said received signal.**

See VI.B.4, claim 4, supra.

- 5. Dependent claim 6 – *The method of claim 1, wherein said characteristic is signal power vs. frequency.***

See VI.B.5, claim 6, supra.

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

See VI.B.6, claim 8, *supra*.

7. **Dependent claim 9 – The method of claim 1, configuring, by said one or more circuits, a bandwidth and/or center frequency of said selected first portion of said digitized signal.**

See VI.B.7, claim 9, *supra*.

VII. Secondary Considerations Cannot Overcome the Strong Evidence of Obviousness

Where, as here, a strong *prima facie* case of obviousness exists, secondary considerations may not dislodge the final conclusion of obviousness. *See, e.g., Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007). At the institution stage, in light of the “absence of a complete evidentiary record,” Petitioner need not further address secondary considerations. *Ranir, LLC v. The Procter & Gamble Co.*, IPR2017-01878, Paper 7 at 32 (Feb. 7, 2018); *accord 3Shape A-S v. Align Tech., Inc.*, IPR2019-00160, Paper 9 at 34 (June 11, 2019) (at the institution stage, “it is premature to determine how much weight to give to ... evidence of objective indicia”). This is particularly apposite here, where the Examiner did not rely on any evidence of secondary considerations in allowing the claims of the ’826 Patent. *See Zip Top, LLC v. Stasher, Inc.*, IPR2018-01216,

Paper 14 at 37 (Jan. 17, 2019). Petitioner reserves the right to respond to any evidence of secondary considerations that Patent Owner may proffer.

VIII. This Petition Should Not Be Discretionarily Denied

The *General Plastics* analysis is inapplicable here as the '826 Patent has not previously been the subject of a post-grant proceeding. Under the “*Fintiv* factors,” the Board asserted it may consider parallel litigation, including an early trial date, in determining whether to institute under 35 U.S.C. § 314(a). *NHK Spring Co., Ltd., v. Intri-Plex Technologies, Inc.*, IPR2018-00752, Paper 8 at 19–20 (PTAB Sept. 12, 2018) (precedential); *Apple v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 2–3, 6 (PTAB Mar. 20, 2020) (precedential). Those factors favor institution here.

Factor 1 - Whether the Court Granted a Stay or May Grant One if a Proceeding is Instituted. Neither party has requested a stay of the corresponding District Court case in this proceeding. Thus, the District Court has not ruled on this issue. This factor does not weigh for or against discretionary denial. *Apple v. Fintiv*, IPR2020-00019, Paper 15, 11–12 (informative).

Factor 2 - Proximity of the Court’s Trial Date to the Statutory Deadline for a Final Written Decision. “This factor looks at the proximity of the trial date to the date of [FWD] to assess the weight to be accorded a trial date set earlier than the expected [FWD] date.” *Shenzhen Carku Tech. Co., Ltd. v. The Noco Co.*,

IPR2020-00944, Paper 20 at 61 (PTAB Nov. 12, 2020). No trial date has been set in District Court – only a Markman Hearing date. *See* Ex. 1012.

Trial dates are notoriously unreliable and should be an insufficient basis upon which to deny institution. “A court’s general ability to set a fast-paced schedule is not particularly relevant,” especially where “the forum [i.e., WDTX] itself has not historically resolved cases so quickly.” *In re Apple*, No 20-135, slip op. at 16 (Fed. Cir. Nov. 9, 2020); *DISH Network L.L.C. v. Broadband iTV, Inc.*, IPR2020-01280, Paper 17 at 13-16 (PTAB Feb. 4, 2021). The Federal Circuit found error in the Board’s reliance on the case’s scheduled trial date. *In re Apple*, No 20-135, slip op. at 16. It would be error for the Board to speculatively rely upon the current schedule.

The Board has repeatedly been persuaded by the uncertainty in litigation timelines regardless of a set trial date, especially when within a few months of the expected FWD. *Sand Revolution*, Paper 24 at 8-9; see also IPR2021-00255, Paper 22 at 11-12 (PTAB Aug. 23, 2021) (declining to exercise discretionary denial when the trial date was set for only two months after the expected FWD). These same uncertainties are present and equally as persuasive here.

Factor 3 - Investment in the Parallel Proceeding by the Court and the Parties. The parties have made only minimal investment in this litigation to date. Plaintiff’s infringement contentions identifying the asserted claims were served on

September 15, 2023 and October 27, 2023. As the Board explained in *Fintiv*, where “the petitioner filed the petition expeditiously, such as promptly after becoming aware of the claims being asserted, this fact has weighed against exercising the authority to deny institution under *NHK*.” *Apple v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 1 (PTAB Mar. 20, 2020) (precedential). Further, opening claim construction briefing is due May 17, 2024, and no substantive orders have been issued. *See* Ex. 1012. This weighs in favor of institution. *See, e.g., Nokia of America Corp and Ericsson Inc. v. IPCOM, GMBH & Co. KG*, IPR2021-00533, Paper 10 at (PTAB Aug. 12, 2021) (“If, at the time of institution, the district court has not issued substantive orders related to the patent at issue in the petition, this fact weighs against exercising discretion to deny institution.”).

Factor 4 - Overlap Between Issues Raised in the Petition and in the Parallel Proceeding. Petitioner challenges all asserted claims of the ’826 Patent in this petition. Further, Petitioner stipulates that if the Board institutes the Petition, then Cox will not seek resolution in the District Court of any ground of invalidity relied upon herein. In so stipulating, Cox seeks to avoid multiple proceedings addressing the validity of the ’826 Patent based on any of the same grounds. This factor weighs in favor of institution.

Factor 5 - Whether the Petitioner and the Defendant in the Parallel Proceeding are the Same Party. The Parties are the same in the Underlying

Litigation. However, members of the Board have noted *Fintiv* addresses only the scenario in which the petitioner is unrelated to a defendant in a parallel proceeding, finding this should weigh against denying institution, but that *Fintiv* “says nothing about situations in which the petitioner is the same as, or is related to, the district court defendant.” *Cisco Sys., Inc. v. Ramot at Tel Aviv Univ. Ltd.*, IPR2020-00122, Paper 15, 10 (PTAB May 15, 2020) (APJ Crumbley, dissenting) (noting that disfavoring a “defendant in the district court” is “contrary to the goal of providing district court litigants an alternative venue to resolve questions of patentability”).

Factor 6 - Other Circumstances that Impact the Board’s Exercise of Discretion, Including the Merits. As discussed in detail above, every element of the challenged claims of the ’826 Patent is either expressly shown in the prior art or is obvious in view of well-known art. Director Vidal stated in her recent memorandum that the PTAB will not deny institution based on *Fintiv* if there is compelling evidence of unpatentability. Ex. 1013, 4-5.

IX. Conclusion

In view of the foregoing, a reasonable likelihood exists that Petitioner will prevail with respect to claims 1, 2, 3, 4, 6, 8, and 9 of the ’826 Patent. Accordingly, the Board should institute this IPR.

X. Mandatory Notices

A. Real Parties in Interest (37 C.F.R. § 42.8(b)(1))

Cox Communications, Inc.; Coxcom, LLC; and Cox Communications California, LLC are the real parties in interest for this Petition.

B. Related Matters (37 C.F.R. § 42.8(b)(2))

The '826 Patent is asserted against Petitioner in *Entropic Communications, LLC v. Cox Communications, Inc.*, et al., No. 2:23-cv-01049-JWH-KES (C.D. CA. Feb. 10, 2023) and is also asserted in *Entropic Communications, LLC v. Comcast Corporation, et al.*, No. 2:23-cv-01050-JWH-KES (C.D. CA. Feb. 10, 2023). The '826 Patent was previously asserted in *Entropic Communications, LLC v. Charter Communications, Inc.*, et al., No. 2:22-cv-00125-JRG (E.D. Tex. April 27, 2022), which was dismissed Dec. 10, 2023.

C. Payment of Fees (37 C.F.R. § 42.103)

This Petition requests review of 7 (1, 2, 3, 4, 6, 8, and 9) claims of the '826 Patent and is accompanied by payment of \$41,500, which includes the \$19,000 IPR request fee and the \$22,500 post-institution fee. *See* 37 C.F.R. § 42.15(a). Thus, this Petition meets the fee requirements under 35 U.S.C. § 312(a)(1). The Board is hereby authorized to charge any additional fees required by this action to Deposit Account No. 20-1430.

D. Power of Attorney (37 C.F.R. § 42.10)

Powers of attorney are filed herewith in accordance with 37 C.F.R. § 42.10(b).

**E. Designation of Lead and Backup Counsel (37 C.F.R. § 42.8(b)(3))
and Service Information (37 C.F.R. § 42.8(b)(4))**

<u>Lead Counsel</u>	<u>Backup Counsel</u>
John C. Alemanni Reg. No. 47,384 4208 Six Forks Road, Suite 1400 Raleigh, NC 27609 Office: 919.420.1724 Fax: 919.420.1800 jalemanni@kilpatricktownsend.com	Michael Turton Reg. No. 40,852 1100 Peachtree Street NE, Suite 2800 Atlanta, GA 30309-4528 Office: 404-815-6061 Fax: 404-541-3250 mturton@kilpatricktownsend.com

Petitioner may be served via email to its lead and backup counsel at the email addresses above and to: Cox-Entropic-IPR@ktslaw.com.

Respectfully submitted,

By: /John C. Alemanni/
John C. Alemanni
Registration No. 47,384
Lead Counsel for Petitioner

CERTIFICATE OF WORD COUNT

The undersigned certifies pursuant to 37 C.F.R. § 42.24(d) that the foregoing Petition for *Inter Partes* Review excluding any table of contents, table of authorities, certificates of service or word count, or appendix of exhibits or claim listing, contains 13,352 words according to the word-processing program used to prepare this paper (Microsoft Word). Petitioner certifies that this Petition for *Inter Partes* Review does not exceed the applicable type-volume limit of 37 C.F.R. § 42.24(a).

Dated: February 15, 2024

/John C. Alemanni/
Counsel for Petitioner

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of this Petition for *Inter Partes* Review of U.S. Patent No. 9,825,826, including its supporting Exhibits (1001-1013) has been served via USPS Priority Mail Express on February 15, 2024 upon Patent Owner's correspondence address of record for U.S. Patent No. 9,825,826:

McAndrews Held & Malloy, Ltd.
500 West Madison Street, Suite 3400
Chicago, IL 60661

The Petition has also been served via email to lead trial counsel for litigation at the following address:

Cassidy Young – Cassidy.young@klgates.com
Connor Meggs – connor.meggs@klgates.com
James Shimota – jim.shimota@klgates.com
Jason Engel – Jason.engel@klgates.com
Kyle Kantarek – kyle.kantarek@klgates.com
Peter Soskin – peter.soskin@klgates.com
Samuel Richey – samuel.richey@klgates.com
Kenneth Bridges – bridgesip@icloud.com

For the additional litigation counsel of record, the Petition has been served via email to the following email addresses:

KILPATRICK TOWNSEND & STOCKTON LLP
Mitchell Stockwell – mstockwell@kilpatricktownsend.com
Andrew N. Saul – asaul@kilpatricktownsend.com
April Isaacson – aisaacson@kilpatricktownsend.com
Christopher Leah – cleah@kilpatricktownsend.com
Courtney Dabbieri – cdabbieri@kilpatricktownsend.com

Petition for *Inter Partes* Review
U.S. Patent No. 9,825,826

Michael Turton – mturton@kilpatricktownsend.com
Rishi Gupta – rgupta@kilpatricktownsend.com
Sarah Kamran – skamran@kilpatricktownsend.com
Vaibhav Kadaba – wkadaba@kilpatricktownsend.com

Respectfully,

Dated: February 15, 2024

By: /John C. Alemanni/
John C. Alemanni
Registration No. 47,384
Counsel for Petitioner