

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COMCAST CABLE COMMUNICATIONS, LLC,
Petitioner,

v.

ENTROPIC COMMUNICATIONS, LLC,
Patent Owner.

Case IPR2024-00446
Patent 8,223,775

**DECLARATION OF DR. SAYFE KIAEI IN SUPPORT OF PETITIONER'S
REPLY TO PATENT OWNER'S RESPONSE**

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I, Sayfe Kiaei, declare that I have personal knowledge of the facts set forth in this declaration and, if called to testify as a witness, could and would do so competently.

I. INTRODUCTION

1. I have been retained as an expert witness on behalf of the Petitioner, Comcast Cable Communications, LLC, for the above-referenced *inter partes* review proceeding.

2. I provided a previous declaration (Ex. 1002) in support of the petition filed in this matter. I have been asked to provide an additional declaration responding to points raised by the Patent Owner with its Patent Owner Response (“Response”) and in the accompanying declaration of its expert, Dr. Russ.

3. I am being compensated at my usual consulting rate or testimony rate of \$685 per hour. My compensation is in no way dependent upon my opinions or testimony or the outcome of this proceeding. I have no financial interest in the party or in the outcome of this proceeding.

II. MATERIALS REVIEWED

4. In connection with my study of this matter and reaching the opinions stated herein, I have reviewed the following documents in addition to those identified in my previous declaration (Ex. 1002) in support of the petition:

- (A) Patent Owner’s Preliminary Response and its accompanying exhibits (POPR);
- (B) the Institution Decision (ID);
- (C) Patent Owner’s Response and its accompanying exhibits (POR);
- (D) Second Declaration of Samuel H. Russ, Ph.D. (Exhibit 2008);
- (E) Transcript of the Deposition of Samuel H. Russ, Ph.D. taken on March 7, 2025 (Exhibit 1021);
- (F) All other documents referenced herein.

III. UNDERSTANDING OF APPLICABLE LEGAL STANDARDS

5. Although I am not an attorney, I have a general understanding of the applicable legal standards pertaining to the patentability issues presented in this proceeding. I have set forth that understanding in my previous declaration (Ex. 1002).

IV. RESPONSE TO PATENT OWNER’S PROPOSED CLAIM CONSTRUCTION

6. Many of Patent Owner’s (PO) substantive arguments about Rabenko rely on its insistence that the claimed “DOCSIS controller” must control DOCSIS functions—but only the DOCSIS functions that are unrelated to VoIP, no doubt because Rabenko discloses its voice and data processor 136/213 (VDP) performing those VoIP-related DOCSIS functions. *See* Patent Owner’s Response (POR) 6-7,

11-14. I disagree with PO's construction of the DOCSIS controller for the following reasons.

7. It is my understanding that in the parallel district court litigation, PO PO's construction of DOCSIS controller had no carve-out induced by Rabenko, whereby certain functions are DOCSIS functions that render a controller a "DOCSIS controller" but anything related to VoIP is not. *See generally*, Ex. 1023. Similarly, it is my opinion that the claimed DOCSIS controller should not be limited as PO suggests in the present proceeding as the intrinsic record does not support PO and Dr. Russ position.

8. Claim 18 does not recite "DOCSIS functions" or limit what the "DOCSIS controller" is or does beyond that it is a part of the cable modem engine that is bypassed in order to boost downstream throughput ("the DOCSIS MAC processor configured to process downstream PDU packets and forward the processed packets directly to the data networking engine *without the involvement of the DOCSIS controller* in order to boost downstream throughput"). *See* Ex. 1001, 7:33-8:28. Thus, a POSITA would have understood the claimed DOCSIS controller as a broad term.

9. I understand that PO and Dr. Russ incorrectly suggest a complete dissociation between Voice over IP (VoIP), for example, implemented by Rabenko's VDP (Ex. 1005, [0034], [0045]-[0047], [0074], [0085]-[0087]; Pet. 5-6,

23, 25, 31, 39-40, 49, 53-54; Ex. 1002, ¶¶136-139) and DOCSIS. POR 13-14; Ex. 2008, ¶¶47-48. PO and Dr. Russ posit that there may be DOCSIS networks that have no VoIP services, and VoIP can be implemented outside of DOCSIS networks. POR 13-14; Ex. 2008, ¶¶47-48. Therefore, PO and Dr. Russ suggest, VoIP and DOCSIS are mutually exclusive. POR 13-14; Ex. 2008, ¶¶47-48. However, PO and Dr. Russ engage in a false dichotomy. As I describe in more detail below, simply because VoIP services are not always present in DOCSIS networks does not mean they are never implemented via DOCSIS. It has never been my position that VoIP can only be implemented via DOCSIS. My position has always been that Rabenko's VDP implementing **voice processing in its DOCSIS IP network** (e.g., VoIP), according to Rabenko's teachings, teaches the claimed "DOCSIS controller." Pet. 21-26, 31, 33, 70; Ex. 1002, ¶¶137, 105-119, 134-139, 141-143. Indeed, even though the '775 Patent states that the cable modem provides "DOCSIS and VoIP functionality" (Ex. 1001, 2:21-24, 2:6-11; POR 14; Ex. 2008, ¶¶ 47-48), the '775 Patent is clearly does not intend to draw a clear and full distinction between DOCSIS and VoIP, as PO contends. POR 13-14. Indeed, the '775 Patent itself recognizes that DOCSIS functions include those related to VoIP, contradicting PO's and Dr. Russ' position. The "BACKGROUND OF THE INVENTION" of the '775 Patent specification states, "[t]he gateway cable modem will incorporate a variety of functions . . . including

IP routing . . . and VoIP. **These functions need to utilize DOCSIS services . . .** for wide area network access.” Ex. 1001, 1:20-26 (emphasis added).

10. I understand that PO argues that the Board misapprehends PO’s position as seeking to limit “DOCSIS controller” to “the specific functions identified in the [’775 Patent] specification” (i.e., the functions of blocks 200-212 of ’775 Patent Figure 2). POR 6-7. To this, I understand PO responds that the “DOCSIS controller” “must ‘control’ some ‘DOCSIS’ functions and the specific DOCSIS functions identified in the specification are merely exemplary.” POR 7. But PO and Dr. Russ can provide no clear distinction of which functions, then, are DOCSIS functions and which are not, except to surmise that VoIP-related functions are not.

11. From the perspective of a POSITA, PO’s proposed construction does not clarify the claimed “DOCSIS controller,” but renders the term unclear and only operates to confuse the issue. PO and Dr. Russ argue that “a ‘DOCSIS controller’ has a plain meaning that is clear on its face. A ‘DOCSIS controller’ controls DOCSIS functions.” POR 11; Ex. 2008, ¶¶43-44. But, other than identifying blocks 200-212 as example DOCSIS functions, to which PO expressly does not wish to limit the claims (POR 7, 13-14), PO and Dr. Russ never tell us what a DOCSIS function is except to surmise that VoIP related functions are not. POR 13-14. At best, PO and its expert hint that a DOCSIS function would be defined in

the DOCSIS specification (Ex. 2011). POR 13 (“VoIP is not a DOCSIS function. Indeed, the DOCSIS specification does not define or provide for any VoIP functionality.”); Ex. 2008, ¶¶47-48. However, the DOCSIS specification never recites a list of “DOCSIS functions” nor includes the term “DOCSIS function.” *See generally* Ex. 2011. Further still, the PO-cited DOCSIS specification also does not define or recite a “DOCSIS controller.” *See generally*, Ex. 2011. More confusingly, as described above, PO argues that “VoIP is not a DOCSIS function” (POR 13), yet the PO-cited DOCSIS specification provides for Service Flows to “manage VoIP signaling” (Ex. 2011, p. 52).

12. The PO-cited DOCSIS specification, which PO and Dr. Russ allege does “not define or provide for any VoIP functionality” (POR 13; Ex. 2008, ¶47), states:

The **DOCSIS 2.0 RFI specification also provides** for dynamically created Service Flows. An example could be a set of dynamic Service Flows created by an embedded PacketCable Multimedia Terminal Adapter (MTA) **to manage VoIP signaling** and media flows.

Ex. 2011, p. 52 (emphasis added). In responding to PO’s attack on VoIP and DOCSIS, it is helpful to consider the CableLabs PacketCable specification, for example, invoked by the ’775 Patent (Ex. 1001, Abstract, 1:15-16, 2:17, 3:40-43, 3:57, 4:6-7, 4:20, 4:35), Rabenko (Ex. 1005, [0108], [0111]), and PO’s cited

DOCSIS specification (Ex. 2011, pp. 51, 52, 59). The PacketCable™ Multimedia Specification (Ex. 1025) describes that:

The intent of this specification is to support the deployment of general Multimedia services by providing a technical definition of several IP-based signaling interfaces that leverage core QoS and policy management capabilities native to DOCSIS 1.1. (Ex. 1025, p. 1).

...

Key features of the described Multimedia service delivery framework include: [] Simple, powerful access to DOCSIS® 1.1 QoS mechanisms (Ex. 1025, p. 1).

...

Since its inception the PacketCable initiative has been positioned as an IP-based Multimedia service deployment infrastructure, **exploiting and enhancing the underlying QoS capabilities of the DOCSIS 1.1 access network. Based on market demand and technology readiness, VoIP was chosen as the first IP-based service to leverage these unique broadband access network capabilities**, as the PacketCable 1.x suite of specifications simultaneously defines both a general QoS-based service delivery framework and a number of telephony-specific functional elements and mechanisms. (Ex. 1025, p. 2 (emphasis added)).

...

The result is a framework that provides IP-Based access to DOCSIS 1.1 access-network QoS mechanisms complemented by secure and robust authorization and audit mechanisms. (Ex. 1025, p. 2).

...

Service Flow management is performed through MAC-layer DOCSIS Dynamic Service Add/Change/Delete (DSA/DSC/DSD) messaging, which may be initiated either by the CM or by the CMTS. (Ex. 1025, p. 8).

...

[T]he DOCSIS 1.1 RFI specification defines the fundamental QoS mechanisms that form the core of the PacketCable DQoS model (Ex. 1025, p. 10).

Similarly, the PacketCable™ Multimedia Architecture Framework Technical Report describes:

The PacketCable Multimedia initiative defines an IP-based platform for delivering QoS-enhanced multimedia services over DOCSIS® 1.1 access networks. (Ex. 1026, Abstract).

...

The PacketCable project is aimed at defining interface specifications used by the vendor community to develop interoperable equipment capable of providing IP-based voice, video and other highspeed multimedia services over hybrid fiber coax (HFC) cable systems which

conform to the DOCSIS 1.1 broadband access network specifications. (Ex. 1026, p. 1).

...

Voice over IP (VoIP) was the first such service identified for delivery over the PacketCable platform. (Ex. 1026, p. 1).

...

In order to address these needs for VoIP services, PacketCable currently defines dynamic Quality of Service (DQoS) signaling mechanisms that allow voice applications to request and obtain bandwidth from the DOCSIS 1.1 data link layer. (Ex. 1026, p. 1).

...

PacketCable Multimedia provides access to the full set of CMTS upstream scheduling algorithms as defined in DOCSIS 1.1. (Ex. 1026, p. 13).

...

The primary focus of PacketCable 1.x is residential telephony services. As a part of this effort, the Dynamic Quality of Service (DQoS) specification was developed, defining the mechanisms necessary to deliver QoS on the DOCSIS-based access portion of the IP network. (Ex. 1026, p. 34).

13. Rabenko describes that “GCP logic implements the NCS features of the PacketCable 1.0 specification.” Ex. 1005, [0108]; Pet. 33. Accordingly,

although DOCSIS networks may exist that do not implement VoIP, when VoIP is implemented in a DOCSIS network, for example, via PacketCable, and as described by Rabenko, it is a DOCSIS operation.

14. The PO-cited DOCSIS specification (Ex. 2011) was released on April 7, 2004 (after the earliest priority date of the '775 Patent of September 30, 2003). However, earlier releases of the DOCSIS specification similarly provide for dynamically created Service Flows created by a PacketCable MTA to manage VoIP. *See, e.g.,* Ex. 1024, p. 30 (“The DOCSIS 1.1 RFI specification also provides for dynamically created Service Flows. An example could be a set of dynamic Service Flows created by an embedded PacketCable Multimedia Terminal Adapter (MTA) to manage VoIP signaling and media flows.”). Additionally, the PacketCable specification (Ex. 1025) was released (on June 27, 2003) prior to the '775 Patent date.

15. Thus, by the time of the '775 Patent, a POSITA would have understood that VoIP implemented in a DOCSIS network, for example, via PacketCable, and as described by Rabenko, includes DOCSIS operations and, for this additional reason, a POSITA would have understood Rabenko's VDP implementing VoIP in Rabenko's DOCSIS network to teach the claimed “DOCSIS controller.” Thus, it is my opinion that a POSITA would find PO's and Dr. Russ'

construction, that the DOCSIS controller must control DOCSIS functions which cannot be VoIP functions, confusing rather than clarifying.

16. At least for the above reasons, both the intrinsic evidence and the DOCSIS standard refute PO's contentions and construction. And, a POSITA would find PO's and Dr. Russ' proposed construction confusing rather than clarifying. Therefore, I disagree with PO's proposed construction of the claimed "DOCSIS controller" and it is my opinion that the claimed "DOCSIS controller" should not be limited as PO suggests.

V. RABENKO TEACHES THE CLAIMED "DOCSIS CONTROLLER"

17. Whether "DOCSIS controller" is construed according to its ordinary and customary meaning or according to PO's proposed construction, at least for the reasons I recite below, it is my opinion that Rabenko's VDP teaches the claimed "DOCSIS controller."

A. Rabenko's VDP Processes Packet-Based DOCSIS signals Received from Port 104 and Routed to it

18. I understand that the Board, in its Institution Decision, found that "Rabenko's [VDP] teaches the 'DOCSIS controller' recited in limitation [18E] and performs DOCSIS functions." ID 38. Nonetheless, I also understand PO subsequently argues that my contention and Petitioner's contention that Rabenko's VDP teaches the claimed "DOCSIS controller" is conclusory and unsubstantiated.

POR 8. “Indeed,” PO argues, “**Petitioner fails to even prove that Rabenko’s [VDP] has anything to do with DOCSIS.**” POR 7 (emphasis added). I disagree. As described in the Petition and as I describe in my first declaration, Rabenko’s gateway 102 is configured to exchange voice and data packets via DOCSIS. Pet. 4-5, 21-26, 31; Ex. 1005, [0002], [0004], [0005], [0034] (“In the exemplary residential gateway, a cable modem is used as described by the CableLabs DOCSIS specification”), [0045]-[0047], [0074], [0098], [0122]; Ex. 1002, ¶¶62-64, 106, 135-139. Rabenko describes that its VDP “is used for **processing and transporting voice over packet-based networks.**” Pet. 31, 21-26; Ex. 1005, [0074]. A POSTIA would have understood that Rabenko describes only one type of “packet-based network”—a DOCSIS network. Ex. 1005, [0002], [0032], [0033], [0044]-[0045], [0047], [0050]. As I previously explained and as described in the Petition, the “proxy gateway 142 and voice/data processor 136/213. . . are implemented . . . according to the CableLabs [DOCSIS].” Ex. 1002, ¶106; Pet. 21; Ex. 1005, [0034]. Further still, Rabenko describes that the MTA call client (located within the VDP) provides all signaling required to support voice over the DOCSIS network and “receives and mediates call-signaling information between the DOCSIS network and a PSTN.” Ex. 1005, [0097]-[0098]; Ex. 1002, ¶¶108, 210. The Petition and I clearly prove that Rabenko’s VDP controls the

transmission of voice data in Rabenko's DOCSIS network, and teaches the claimed "DOCSIS controller." ID 33-35; Pet. 31, 21-26.

19. I understand that PO and Dr. Russ discuss the differences between Plain Old Telephone System (POTS) and DOCSIS and argue that Rabenko's "[VDP] has nothing to do with DOCSIS" but "processes signals over [POTS]." POR 15, 16-21; Ex. 2008, ¶¶51, 50-58. Initially, I agree that POTS and DOCSIS implement different protocols. However, as I reiterate below, (for multiple different reasons) Rabenko describes its VDP operating within DOCSIS.

20. In support of their argument, PO and Dr. Russ annotate Rabenko's Figure 1b (reproduced below) and fabricate a second utilities interface for "incoming . . . POTS services". POR 19-20; Ex. 2008, ¶57.

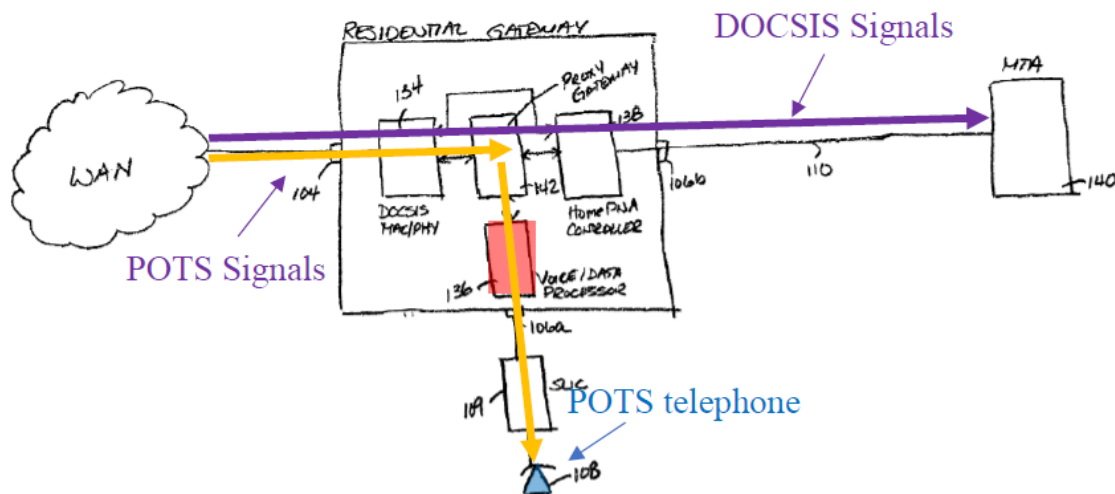


FIG. 1b

Ex. 1005, Fig. 1b (as annotated by PO and Dr. Russ)

21. However, Rabenko does not describe a second POTS service input interface. *See generally* Ex. 1005. Indeed, Rabenko never describes upstream analog POTS services arriving at its gateway. Rabenko describes a single utilities interface—network port 104—for communicating via IP packet-based DOCSIS only and converting the IP packets, via the VDP, to analog signals for delivery to the POTS telephone. Pet. 17-18, 21-23, 31, 70; Ex. 1005, [0002], [0032], [0033], [0050], Figs. 1a, 1b. As Rabenko describes, “[t]he present invention relates to . . . telecommunications systems **supporting voice and data services on a shared medium**.” Ex. 1005, [0002] (emphasis added). A POSITA would have understood that Rabenko’s “shared medium” is clearly and repeatedly its IP network implemented via DOCSIS. Ex. 1005, [0002], [0004], [0005], [0034], [0045]-[0047], [0050], [0074], [0098], [0122]. As Rabenko describes, “one port 104 can provide a network pipe to communicate with a WAN [], such as an IP [] network that is capable of delivering IP services to the home.” Ex. 1005, [0032]; Pet. 17-18. “In the described exemplary embodiment, a DOCSIS [] network is used for delivery of broadband services, such as IP services over the IP network (an HFC network), to the network port 104.” Ex. 1005, [0033]; Pet. 17-18, 22, 70.

22. PO and Dr. Russ apparently confuse Rabenko’s description of compatibility of its gateway 102 with downstream POTS wiring infrastructure and terminal devices (e.g., POTS telephone 108) as a description of receiving upstream

POTS signals. POR 19-20; Ex. 1005, [0003]-[0005], [0032]-[0033], [0041], [0080]. Indeed, it is my opinion that PO and Dr. Russ fail to appreciate Rabenko's discussion of "packets." Rabenko's gateway operates in a DOCSIS network environment. Ex. 1005, [0002], [0004], [0005], [0034], [0045]-[0047], [0050], [0074], [0098], [0122]. DOCSIS is a protocol for a digital **packet-based** network. Ex. 1005, [0034], [0044]-[0047], [0083]; Ex. 1021, p. 48, ll. 14-18 ("IP packets transmitted, for example, in a DOCSIS network are digital; is that correct? . . . [Dr. Russ:] Yes."). Rabenko describes sending/receiving **packets** according to the DOCSIS protocol. Ex. 1005, [0002], [0004], [0005], [0034], [0045]-[0047], [0050], [0074], [0098], [0122]. POTS is not packet-based. POTS signals are **analog**. Ex. 1005, [0045]; POR 16-17; Ex. 2008, ¶¶52-54; Ex. 1021, p. 49, ll. 11-17 ("Isn't it true, Dr. Russ, that traditional POTS signals—that's plain old telephone signals—are analog? . . . [Dr. Russ:] Yes. Yes. The interface over a POTS connection is analog. For example, voice is analog."). Rabenko does not describe its gateway 102 receiving analog voice signals. Indeed, Dr. Russ and PO's position appears confused on this point. Dr. Russ describes, **tellingly without citation to Rabenko**, that "Rabenko's purpose is to separate multiple types of signals entering a house and direct each one to its respective destination." Ex. 2008, ¶55; POR 18. "Thus," Dr. Russ concludes, Rabenko's "residential gateway processes, separates, and directs **incoming . . . POTS services** to their

intended destinations.” Ex. 2008, ¶57 (emphasis added); POR 18-20. But Dr. Russ and PO also point out that Rabenko’s VDP “‘**decompresses and depacketizes’ voice packets to generate an ‘analog signal’ for a POTS telephone.**” Ex. 2008, ¶72; POR 16, 27. If Rabenko’s gateway received analog “incoming . . . POTS” and not digital IP-packets via DOCSIS, why would its VDP decompress/depacketize voice packets and generate an analog signal for its POTS telephone? *See* Ex. 1021, p. 52, ll. 14-20 (“The analog signal can be compressed and decompressed in its analog form? . . . [Dr. Russ:] In the context of POTS, **it could be converted to digital and compressed**, for example; and then on the other end, decompressed and converted back to analog.”) (emphasis added); p. 53, ll. 8-13 (“[I]n the context of POTS, isn’t it true that the analog waveform itself is not packetized and depacketized? . . . [Dr. Russ:] I believe that’s correct, yes.”).

23. Rather, instead of receiving incoming analog POTS signals, Rabenko describes that its “residential gateway 102 provides a mechanism to **convert** the physical media and protocols used for the IP network [(i.e., DOCSIS including VoIP)] to the physical media and protocols used on the home wire pairs” (e.g., POTS). Ex. 1005, [0033] (emphasis added), [0034] (“[T]he exemplary residential gateway 102 may include high voltage circuits and processing elements to convert packetized voice delivered over IP network[*sic*] to the continuous analog voltages

used for POTS.”); Pet. 17-18, 22, 70. Rabenko details how its VDP facilitates the integration of existing POTS devices with the DOCSIS network:

All packets that arrive to or leave from the residential gateway via the WAN must go through the DOCSIS MAC/PHY 134. . . .

In the downstream direction, the DOCSIS MAC/PHY 134 determines whether the packet payload is voice or data. . . [I]f the DOCSIS MAC/PHY 134 determines the packet payload is voice, the packet is routed to a proxy gateway 124 The proxy gateway 142 further determines whether the packet is destined for the HomePNA LAN 110 or the POTS telephone 108. If the packet is destined for the POTS telephone, **the packet is routed to the voice and data processor 136 for decompression and depacketization The voice and data processor 136 generates an analog signal from the decompressed signal and delivers the analog voice signal to the POTS telephone 108** via the SLIC 109.

Ex. 1005, [0044]-[0045], [0047] (emphasis added); Pet. 22-23, 25, 32, 17-18, 47.

24. In short, as described, DOCSIS uses a digital “packet based network” (Pet. 31; Ex. 1005, [0074], [0085], [0087]) and POTS signals are analog (POR 17; Ex. 2008, ¶53; Ex. 1005 [0045]-[0047]). Rabenko describes its VDP receiving

voice packets (DOCSIS packets) and “**decompress[ing] and depacketize[ing]**” the voice packets (e.g., voice packets in its DOCSIS network environment) and “**generat[ing] an analog** signal from the decompressed signal” for delivery to the POTS telephone. Pet. 23-24; Ex. 1005, [0045] (emphasis added). PO and Dr. Russ’ contention that “Rabenko’s [VDP] is on **an entirely separate path from DOCSIS signals and is thus irrelevant to DOCSIS**” is, in my opinion, misguided. POR 20; Ex. 2008, ¶¶56-57 (emphasis added).

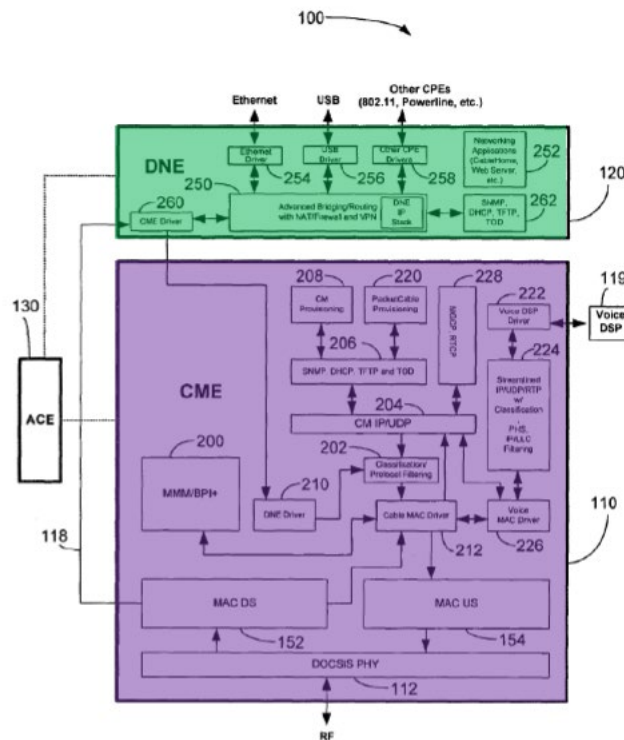
25. Further still, in addition to fundamentally misrepresenting Rabenko’s teachings, PO’s and Dr. Russ’ annotated Figure 1b (reproduced above) contradicts its own conclusions. I previously indicated that “Rabenko discloses DOCSIS MAC 134/212 . . . , a proxy gateway 142 and voice/data processor 136/213 . . . (together, the claimed ‘cable modem engine’).” Ex. 1002, ¶106. Rabenko states, as I cite in my first declaration, “[i]n the described exemplary embodiment, the voice and data processor 213 includes the proxy gateway function described in connection with FIG. 1b.” Ex. 1005, [0074], [0097]; Pet. 24-26; Ex. 1002, ¶108. PO’s and Dr. Russ’ annotated figure shows DOCSIS signals traversing the proxy gateway of Fig. 1b. Thus, PO and Dr. Russ describe Rabenko’s VDP receiving/sending DOCSIS signals.

B. Even According to PO's Claim Construction, Rabenko's VDP Still Teaches the Claimed "DOCSIS controller"

26. As described above, PO makes a flawed claim construction argument that the "DOCSIS controller" must control DOCSIS functions (other than VoIP DOCSIS functions). POR 11-14. As I describe above (¶¶ 12-14), when VoIP is implemented in a DOCSIS network, for example, via PacketCable, and as described by Rabenko, it is a DOCSIS operation. Further still, PO and Dr. Russ admit that the '775 Patent functional blocks 200-212 of Fig. 2, "list several example of possible DOCSIS functions." POR 12; Ex 2008, ¶44. One such example is functional block 206 performing "SNMP, DHCP, TFTP, and TOD functionality." Ex. 1001, 3:33-35 (emphasis added). Similarly, Rabenko describes that the "proxy gateway functions can be implemented in the voice and data processor" and can include MTA call client 520. Ex. 1005, [0097], Fig. 5b; Ex. 1002, ¶108. MTA call client 520 implemented in the VDP includes "SNMP logic 540," "DHCP logic 542," and "TFTP logic 546." Ex. 1005, [0103]-[0105], Fig. 5b. Therefore, even according to PO's construction of "DOCSIS controller," Rabenko's VDP still teaches it.

VI. RABENKO TEACHES “A “DATA NETWORKING ENGINE” AND “CABLE MODEM ENGINE” IN “SEPARATE” “FIRST” AND “SECOND” “CIRCUITS” WITH “COMPLETELY PARTITIONED” FUNCTIONS.”

27. Patent Owner argues that “a ‘data networking engine’ (‘DNE’) implemented in a ‘first circuit’ and a ‘cable modem engine’ (‘CME’) implemented in a ‘second circuit,’ ‘the second circuit being *separate* from the first circuit’” are “clearly reflected in the ’775 Patent’s disclosure which clearly illustrates a **DNE implemented in a first circuit** that is separate and partitioned from a **CME implemented in a second circuit**” and that “[t]his is particularly clear in the ’775 Patent’s Figure 2:



POR 21-22. *See also*, Ex. 2008, ¶¶61-62.

28. Figure 2 of the '775 Patent is described as “a functional block diagram implementing the cable modem architecture of FIG. 1.” Ex. 1001, 2:44-45. In my opinion, a POSITA would have understood Figure 2 of the '775 Patent as illustrative functions that may be implemented as part of the cable modem architecture of Figure 1. The written specification of the '775 Patent lacks use of the term “circuit” except for its inclusion in the independent claims: 1, 14, and 18. A review of the prosecution history shows that the original disclosure, including the originally filed claims, lacked the term “circuit” entirely. Ex. 1004, pp. 2-23. Upon my review, I determined that “circuit” was first added during prosecution, specifically in an AMENDMENT AND RESPONSE TO OFFICE ACTION filed on May 19, 2009, in response to a non-final Office Action mailed on February 19, 2009. Ex. 1004, pp. 67-70.

29. In my opinion, reviewing the disclosure of the '775 Patent, a POSITA would have known that the functional block diagram of Figure 2 is not necessarily a diagram showing the details of a circuit. Figure 2 is described as a functional block diagram. Ex. 1001, 2:44-45. The '775 Patent shows an example including the use of ARM processors, but there are no details on what is in the software. In my opinion, these are only examples. In my opinion, a POSITA would have understood that the functional block diagram of Figure 2 of the '775 Patent are functions that could be implemented in a number of manners including by one or

more circuits using a combination of hardware and software. As independent claim 18, and similarly claims 1 and 14, of the '775 Patent specifies, the claimed DNE is “implemented in a first circuit” and the claimed CME is “implemented in a second circuit,” with “the second circuit being separate from the first circuit.” In my opinion, a POSITA would have understood that the independent claims of the '775 Patent do not require a division into structures that are identical to Figure 1 or Figure 2 of the '775 Patent. Accordingly, I agree with the Board in its Institution Decision on this same point. ID 25.

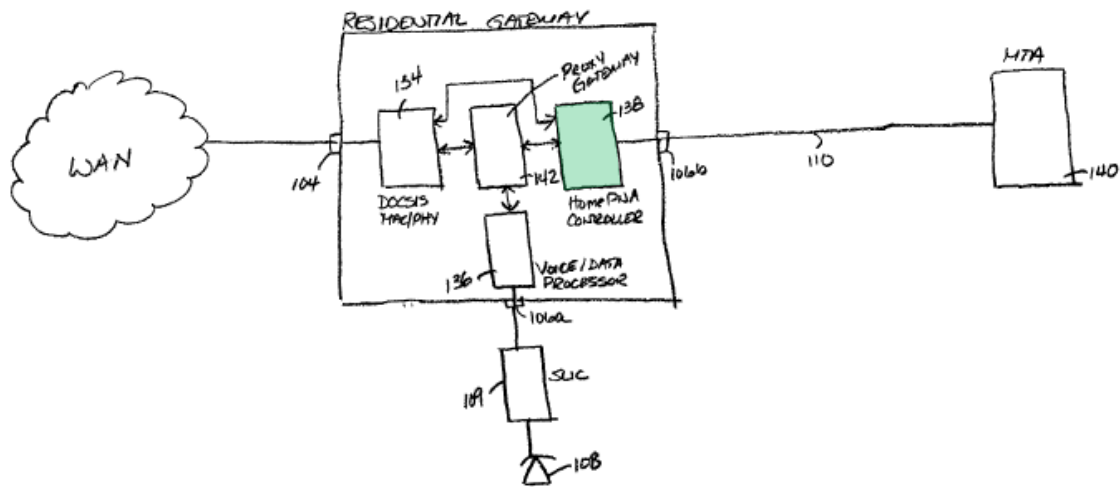
30. Patent Owner and Dr. Russ contend,

Whereas the '775 patent clear identifies a DNE in one circuit that is separate and partitioned from a CME implemented in a second circuit, there is no such delineation in Rabenko. Rabenko discloses neither a DNE nor a CME much less a DNE and CME implemented in separate circuits with the cable modem functions completely partitioned from the data networking functions.

POR 23-24 citing Ex. 2008, ¶65. But as previously determined by the Board for the same reasons, this is incorrect.

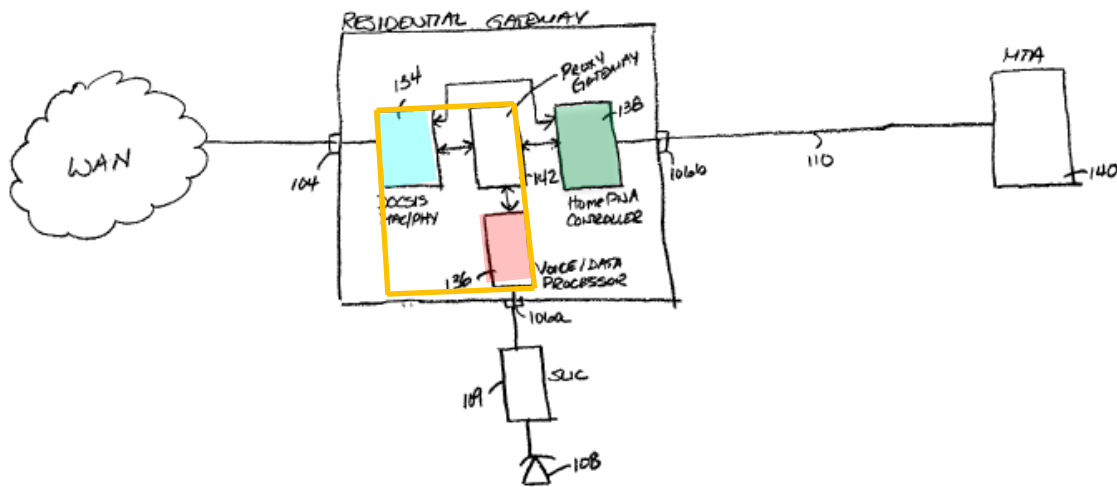
31. As I stated in my first declaration (Ex. 1002), Rabenko describes the HomePNA controller 138 (green), along with the AFE 226, functions as the claimed “data networking engine” implemented in the claimed first circuit. Ex. 1005, Fig. 1b. Rabenko describes that the HomePNA controller 138 (green) can be

a fully integrated MAC/PHY device. Ex. 1005, [0080]. Further, the HomePNA controller 138 provides bi-directional communication with (claimed “home networking functions including interfacing with”) customer equipment/devices such as, for example, HomePNA phone 126, computer 128, etc. (claimed “customer provided equipment”) (e.g., via subscriber port 106b), operating on a HomePNA local area network (LAN) 110. Ex. 1005, [0080], Fig. 2. A POSITA would have understood that providing bi-directional communications between the WAN and HomePNA phone 126 is providing a first “home networking function[] including interfacing with customer provided equipment.” A POSITA would have further understood that providing bi-directional communications between the WAN and computer 128 is a second “home networking function[] including interfacing with customer provided equipment.” Accordingly, it is my opinion that Rabenko describes that the HomePNA controller 138 “perform[s] home networking functions including interfacing with customer provided equipment,” as claimed.



Ex. 1005, Fig. 1b (annotated)

32. As I further stated in my first declaration (Ex. 1002), it is my opinion that a POSITA would have understood that Rabenko's DOCSIS MAC/PHY 134/DOCSIS MAC 212 (blue), proxy gateway 142, and voice/data processor 136/213 (red), together, the claimed "cable modem engine," (orange) which are implemented in a second circuit performing cable modem functions according to the CableLabs Data Over Cable Service Interface Specification (DOCSIS). Ex. 1002, ¶¶105-119; Ex. 1005, [0034], [0044]-[0047], Fig. 1b. This same architecture in Rabenko matches the description of the cable modem engine in the '775 Patent. Ex. 1001, 2:6-11.



Ex. 1005, Fig. 1b (annotated)

33. As I further stated in my first declaration (Ex. 1002), as shown in Figure 1b above, Rabenko discloses that DOCSIS MAC/PHY 134/DOCSIS MAC 212 (blue), proxy gateway 142, and voice/data processor 136/213 (red) (claimed “second circuit”) are separate from HomePNA controller 138 and AFE 226 (claimed “first circuit”). Ex. 1005, Fig. 1b.; Ex. 1002, ¶114.

34. Finally, as I stated in my first declaration (Ex. 1002), it is my opinion that a POSITA would have understood that Rabenko’s cable modem functions performed by the cable modem engine are completely partitioned from the home networking functions performed by the data networking engine as claimed when respective functions are localized in respective processors/devices. Ex. 1002, ¶155. Rabenko teaches that the cable modem functions performed by the DOCSIS MAC/PHY 134/DOCSIS MAC 212 and/or voice/data processor 136/213 (and/or MIPS core 228) (claimed “cable modem engine”) are completely partitioned from

the home networking functions performed by the HomePNA controller 138. Ex. 1002, ¶157.

35. Patent Owner argues that the “Petitioner resorts to arbitrarily identifying certain elements of Rabenko and proclaiming them to be a DNE and CME, respectively.” POR 24. Patent Owner further argues that the Petition and my first declaration (Ex. 1002) lack any foundation to reach the conclusions. Yet the specific components I note in the preceding paragraphs for the data networking engine and the cable modem engine were not arbitrarily identified. Rather, these components in Rabenko correlate to the elements that perform the data networking functions and cable modem functions required by the independent claims.

36. For example, claim 18 recites “home networking functions including interfacing with customer provided equipment” and “cable modem functions other than the home networking functions performed by the data networking engine, the cable modem functions including interfacing with cable media.” Thus, in my opinion, a POSITA would have understood that the cable modem engine and the data networking engine that correlate to the functions would have to be identified. Accordingly, in my first declaration (Ex. 1002) I identified the components of Rabenko that perform the claimed home networking functions and the claimed cable modem functions as noted above. As yet another example, Rabenko describes IP security module 248. Ex. 1005, [0064]. Rabenko’s IP security module

248 supports “single DES (CBC and ECB modes) triple DES (CBC and ECB modes) MD-5 and SHA.” Ex. 1005, [0064], *see also id.*, [0065]-[0067]. Thus, in my opinion, a POSITA would not have identified Rabenko’s IP security module in components that are the data networking engine and the cable modem engine.

37. Once again, Patent Owner and Dr. Russ continue this main theme that “Rabenko simply never mentions or suggests that these components are a part of any engine or are specific circuits.” POR 25. Yet as I previously noted above, a review of the prosecution history shows that the original disclosure, including the originally filed claims, lacked the term “circuit” entirely for the ’775 Patent. Ex. 1004, pp. 2-23. The term was only added during prosecution. Ex. 1004, pp. 67-70. In my opinion, a POSITA would have understood that, lacking any specific teachings in the ’775 Patent to the term “circuit,” when interpreting the claims, the ordinary and customary meaning would apply. Ex. 1019, p. 3; Ex. 1020, p. 3. In my opinion, a POSITA would have applied the same to the teachings of Rabenko, especially in light of the description in paragraph [0268] reproduced below and noted numerous times in my first declaration including Ex. 1002, ¶¶89-90, 99, 120, 123.

Those of skill in the art would understand that the various illustrative logical blocks, modules, circuits, and algorithm steps described in connection with the embodiments disclosed herein may be implemented in any number of way including electronic hardware,

computer software, or combinations of both. The various illustrative components, blocks, modules, circuits, and steps have been described generally in terms of their functionality. Whether the functionality is implemented as hardware or software depends upon the particular application and design constraints imposed on the overall system. Skilled artisans recognize the interchangeability of hardware and software under these circumstances, and how best to implement the described functionality for each particular application.

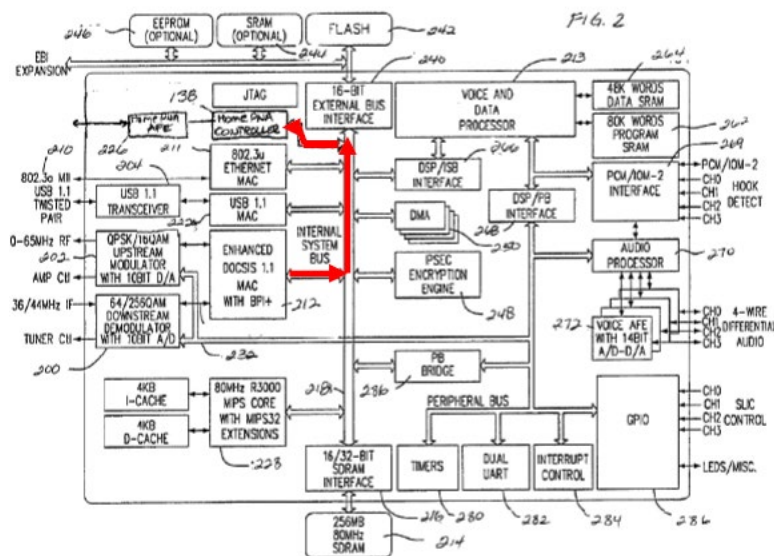
Ex. 1005, [0268].

38. In my opinion, if a POSITA could have understood the disclosure of the '775 Patent to teach first and second circuits, which are separate, as claimed, such a POSITA would have understood the same teachings are found in Rabenko. In my opinion, a POSITA looking at claim 18 would have understood that each of the claimed circuits would include a processor, software, and any other components that together perform the functions required. Similarly, in my opinion, a POSITA would have understood that the data networking engine and the cable modem engine teachings in the '775 Patent are described in Rabenko, Rabenko-Kim, Rabenko-Gaspar, and Rabenko-Gaspar-Kim.

39. While continuing to maintain the notion that Rabenko fails to teach a POSITA as to circuits, Patent Owner and Dr. Russ contend that because the Petition identified the DOCSIS MAC/PHY and the voice and data processor as components of the claimed “second circuit,” then the same logic carries that

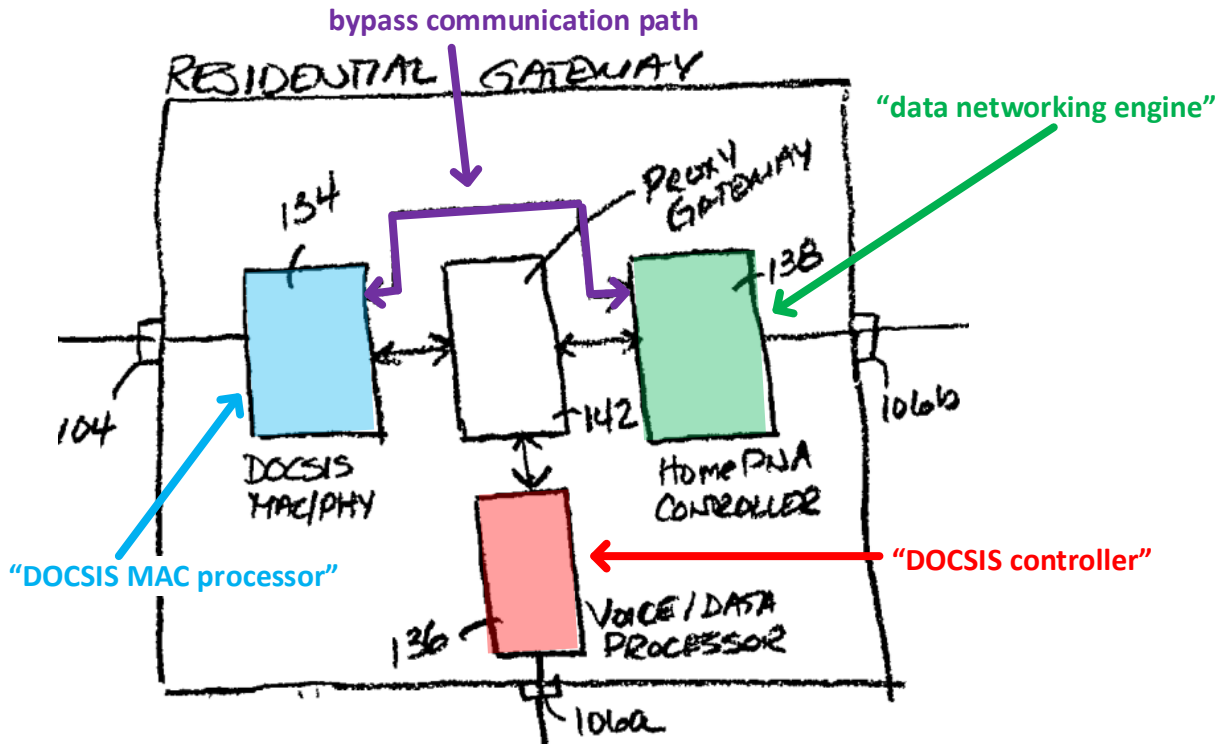
Rabenko's HomePNA controller is also part of the second circuit. Yet this just shows that the Patent Owner and Dr. Russ fail to understand Rabenko.

40. First, as noted above, the components of Rabenko's first and second engines and first and second circuits were identified based upon the claim language, the '775 Patent specification, and the teachings of Rabenko. Second, Patent Owner and Dr. Russ's depiction of a direct connection in Rabenko's Figure 2 between the ENHANCED DOCSIS 1.1 MAC WITH BPI+ 212 and the HomePNA controller 138 is both accurate and representative of the same operation with the examples in the '775 Patent's specification. Patent Owner cites a paragraph from Dr. Russ' second declaration (Ex. 2008) and provides the following annotated Figure 2 of Rabenko.



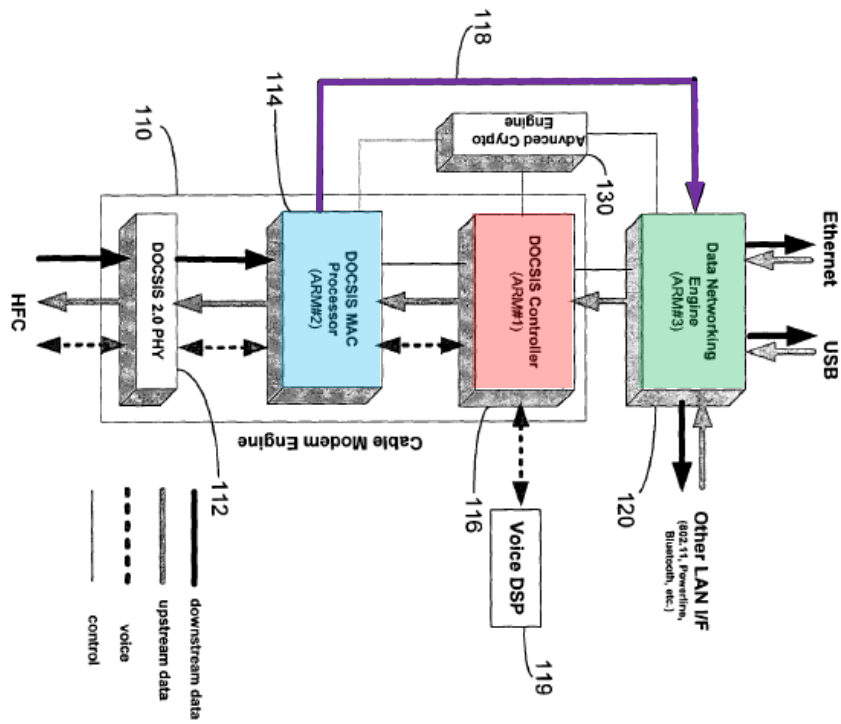
POR 31; Ex. 2008, ¶75.

41. The annotated Figure 2 of Rabenko above shows the path taken for downstream PDU packets. Specifically, as I stated in my first declaration (Ex. 1002), Rabenko describes that the DOCSIS MAC/PHY 134/DOCSIS MAC 212 (blue) (claimed “DOCSIS MAC processor”) translates (claimed “configured to process”) the arriving packets (claimed “downstream . . . packets”). Ex. 1005, [0044]. Further, “[i]f the packet payload is data, then the DOCSIS MAC/PHY 134 routes the packet directly to [(via control flow line in purple below)] a HomePNA controller 138” (green) (claimed “forward the processed packets directly to the data networking engine without the involvement of the DOCSIS controller”). Ex. 1005, [0045] (emphasis added), Fig. 1b. Figure 1b (reproduced and annotated below) shows that voice/data processor 136/213 (red) (the claimed “DOCSIS controller”) is bypassed (claimed “without the involvement of the DOCSIS controller”) when a packet received by DOCSIS MAC/PHY 134/DOCSIS MAC 212 is a data packet. Ex. 1005, [0045], [0221], Fig. 1b.

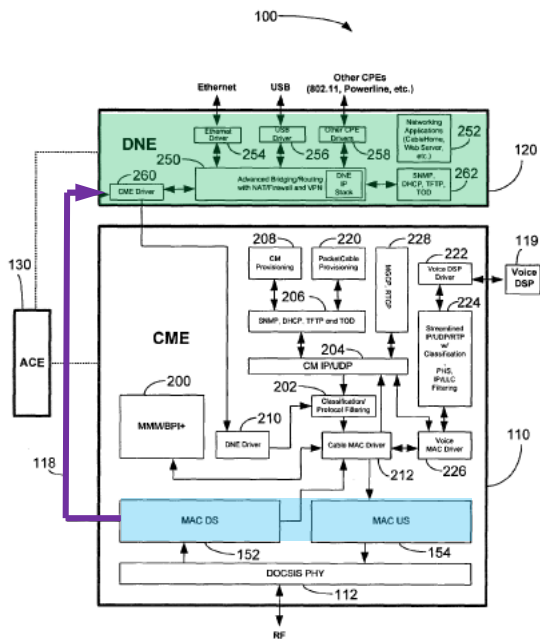


Ex. 1005, Fig. 1b (annotated)

42. Although I annotated in **purple** above with respect to Rabenko's Fig. 1b, Patent Owner's above annotated Figure 2 in Rabenko shows the same bypass just when applied with respect to Figure 2. And this configuration is no different from the '775 Patent since the language of claim 18 itself recites "the **DOCSIS MAC processor configured to process downstream PDU packets and forward the processed packets directly to the data networking engine** without the involvement of the DOCSIS controller in order to boost downstream throughput" (emphasis added).



Ex. 1001, Fig. 1 (rotated and annotated)



Ex. 1001, Fig. 2 (annotated)

43. A POSITA would have understood that the '775 Patent teaches a direct connection from the DOCSIS MAC Processor 114/MAC DS 152 to the data networking engine 120 via path 118. As shown in the annotated Figures above, both by Patent Owner for Figure 2 and myself for Figure 1b, Rabenko includes quite literally the same bypass.

44. Next Patent Owner tries to frame a portion of my deposition as indicating that I “was unable to identify how many circuits were present in the Figure 2 system block diagram [of Rabenko] because it allegedly did not necessarily illustrate hardware and instead could represent ‘purely [] software.’ *See* Ex. 2009 [Kiaei-Depo.] 39:8-40:12, 40:24-41:9.” POR 33. First, a review of the two cited portions from my deposition shows that I was never even asked “how many circuits were present in the Figure 2 system block diagram [of Rabenko].” I was asked about whether enhanced DOCSIS 1.1 MAC 212 in Rabenko’s Figure 2 is a circuit. My response was based on the teachings of Rabenko in paragraph [0268] (noted above in paragraph 36) that a POSITA would have understood that the various illustrative logical blocks, modules, circuits, and algorithm steps described in connection with the embodiments disclosed in Rabenko may be implemented in any number of way including electronic hardware, computer software, or combinations of both. Ex. 1005, [0268]. So yes, according to Rabenko, Figure 2 could be implemented as purely software. However, my first

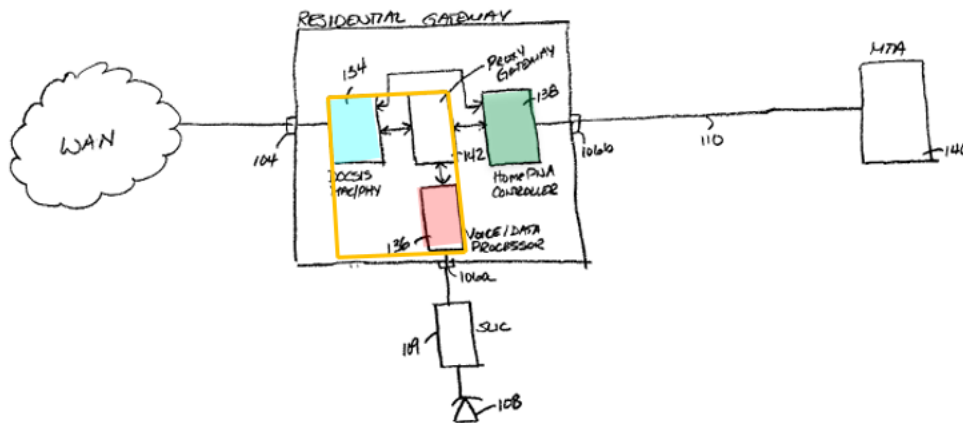
declaration (Ex. 1002) never relies on a purely software teaching of Rabenko when applied to the engines and circuits of independent claim 18.

45. Patent Owner further pushes a narrative that I or the Petition never made. Following the “purely [] software” argument, Patent Owner states while referencing Rabenko,

As Dr. Russ explains, Figure 1b in fact reveals a direct connection between the DOCSIS MAC/PHY (allegedly a part of the CME) and the proxy gateway (allegedly a part of the DNE) and only an indirect connection between the DOCSIS MAC/PHY and the voice and data processor (which together allegedly form the CME) that run through the proxy gateway.

POR 34.

46. However, the Petition and my first declaration (Ex. 1002) consistently make clear and maintain that the proxy gateway shown in Rabenko’s Figure 2 is part of the claimed cable modem engine (CME), not “allegedly part of the [data networking engine] DNE” as the Patent Owner contends. For example, *see* Ex. 1002, ¶¶106 (“DOCSIS MAC/PHY 134/DOCSIS MAC 212 (**blue**), a proxy gateway 142 and voice/data processor 136/213 (**red**) (together, the claimed ‘cable modem engine’ (**orange**)”), 108, 114-115.



Ex. 1005, Fig. 1b (annotated)

47. Patent Owner then argues,

Why too would a POSITA conclude that the DOCSIS MAC forms a circuit with the voice and data processor that is “separate” from the HomePNA controller when both the DOCSIS MAC and the HomePNA controller are indirectly connected to the voice and data processor through the proxy gateway?

POR 35. First, Patent Owner misses the fact that Rabenko states that the proxy gateway may be part of the voice and data processor. As I previously noted in my first declaration (Ex. 1002), Rabenko describes the function of the proxy gateway in some embodiments being in the voice and data processor 213 or the MIPS core 228:

In the described exemplary embodiment, the voice and data processor 213 includes the proxy gateway function described in connection with FIG. 1b. Alternatively, the proxy gateway function could be implemented in the MIPS core 228.

Ex. 1005, [0074]; Ex. 1002, ¶108. Accordingly, the “indirect” connection argument by Patent Owner, besides being meaningless to the claim language of the ’775 Patent, is not an indirect connection.

VII. RABENKO AND RABENKO-KIM TEACH A CME CONFIGURED TO ENABLE SOFTWARE UPGRADES INDEPENDENT OF THE DNE

A. Rabenko/Kim teach “the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine”

48. As I previously explained in detail, Rabenko-Kim renders obvious “the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine,” as recited in claim 18. Ex. 1002, ¶¶120-133.

49. Rabenko teaches the claimed CME (via its DOCSIS MAC/PHY 134/DOCSIS MAC 212, proxy gateway 142 and voice/data processor 136/213, collectively) and DNE (via its HomePNA controller 138 and AFE 226, collectively). Ex. 1005, [0034], [0044]-[0047], Fig. 1b; Ex. 1002, ¶¶85-119. Rabenko further teaches that its CME and DNE are separate, independent components of separate circuits. Ex. 1005, Fig. 1b; Ex. 1002, ¶¶88, 106, 112-119.

50. Like Rabenko, Kim is directed to a home-based telecommunications system that includes a residential gateway. Ex. 1007, Abstract, [0001]-[0014].

Kim’s residential gateway is “modular-type” such that one or more of its individual components, such as its HomePNA controller and its ADSL controller, are partitioned to enable their independent upgrading. Ex. 1007, [0026]; Ex. 1002, ¶¶126-127. Kim makes explicit the benefits of its modular components – modularity enables independent upgrading of each of the components, wherein the *upgrading* obviously improves the total performance of the home gateway device and that the upgrading is *independent* reduces cost and increases user convenience. Ex. 1007, [0001]-[0008], [0026]; Ex. 1002, ¶¶126-128.

51. It has been, and still is, my opinion that it would have been obvious to a POSITA to implement Rabenko’s home gateway using independently upgradeable modular partitioned components, as taught by Kim. Ex. 1002, ¶¶128-129. In this combination, Rabenko’s components, such as its CME and DNE, would be implemented using independently upgradeable modular partitioned components, which would allow the efficient updating of those modular components. Ex. 1002, ¶¶128-129. A POSITA would have found this combination to be obvious, would have been motivated to make this combination, and would have had the skillset required to make this combination. Ex. 1002, ¶¶129-131.

52. PO argues that the Rabenko-Kim combination fails because Kim does not teach a CME and the Petition “suggests nothing at all with respect to its alleged CME.” POR 39-40. I never alleged that Kim taught a CME. Instead, as I

previously explained in detail, *Rabenko* teaches a CME (and DNE). Ex. 1002, ¶¶85-104 (DNE), 105-119 (CME). And it rightfully followed that in the Rabenko-Kim combination, I only relied on the *modularity* of Kim's components – I did not rely on Kim's components themselves. Ex. 1002, ¶¶129-131. Thus, I find PO's arguments to be immaterial because they are based on a factual misrepresentation of the proposed combination.

53. PO then argues that the Rabenko-Kim combination fails because the Petition only considers the independent upgrade of Rabenko's HomePNA controller. PO is again factually mispresenting the combination. As noted above, my analysis relied on the modularity of Kim's components – I did not rely on Kim's components themselves. Ex. 1002, ¶¶129-131. Indeed, my analysis clearly stated "it would have been obvious to a POSITA...to make Rabenko's home gateway modular as taught by Kim such that its DOCSIS MAC/PHY and voice/data processor [CME] are separate from the HomePNA controller and AFE [DNE] so that the independent engines could be efficiently and independently upgradable (as expressly taught by Kim)," and that "[i]ncorporating the modular design of Kim in this way would allow the efficient updating of *any* of Rabenko's partitioned components." Ex. 1002, ¶¶128-130.

54. In sum, the proposed combination is to use Kim's modularity in Rabenko's home gateway, such that Rabenko's components (like its CME and

DNE) are modularly designed and independently upgradeable. Ex. 1002, ¶¶127-131. Thus, it is my opinion that PO's argument is unpersuasive because it is based on a factual misrepresentation of the proposed combination, and that the combination as actually proposed was obvious and taught "the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine."

55. PO argues that Kim only teaches replacing hardware, not software. POR 41. It is my opinion that a POSITA, reading Kim, would have understood it to teach upgrading hardware and software. A POSITA would have understood that Kim teaches both processors and controllers that perform software functionality and are upgradeable. Ex. 1007, [0038]-[0042].

56. Kim residential gateway includes a HomePNA controller and an ADSL (Asymmetric Digital Subscriber Line) controller. Ex. 1007, [0001], [0007], [0011], [0026], [0028], [0061], Figs. 1-2; Ex. 1005, [0044], Fig. 1b. The ADSL controller "receives ADSL receiving signal from an access network, and performs ADC (Analog Digital Conversion) function, DMT (Discrete MultiTone) demodulation function, ATM (Asynchronous Transfer Mode) TC (Transmission Convergence) function, SAR (Segmentation And Reassembly) function, and PCMCIA signal conversion function." Ex. 1007, [0034]. The HomePNA controller "receives HomePNA receiving signal from a home network, and performs ADC []

function, QAM (Quadrature Amplitude Modulation)/FDQAM (Frequency Diverse QAM) demodulation function, IEEE 802.3 CSMA/CD (Carrier Sense Multiple Access with Collision Detection) MAC (Medium Access Control) function, and PCMCIA signal conversion function.” Ex. 1007, [0042]. A POSITA would have understood that both the HomePNA controller and the ADSL controller would comprise hardware and software in order to perform the aforementioned operations. Moreover, the hardware and software would be tightly intertwined to enable the co-functionality that would be needed to perform these operations, such that replacing the former would be performed in conjunction with replacing the latter to maintain this co-functionality.

57. PO argues that because Kim’s CME is merely replaced, it is not “configured to enable upgrades to its software.” POR 42. Again, the proposed combination neither alleged nor relied on any CME in Kim – it only relied on Kim’s modularity. And as I note above, Kim expressly states that the benefits of its modular components is the ability to independently replace said components in order to improve the total performance of the home gateway device. Ex. 1007, [0001]-[0008], [0026]; Ex. 1002, ¶¶126-128. A POSITA would have understood that replacing a component for the purpose of improving the total performance of the home gateway device is in fact “upgrading.”

58. PO's argument that upgrading via replacing does not teach "configured to enable upgrades to its software" assumes that the CME must independently self-upgrade. But the claim only requires that the CME be configured to *enable* its independent upgrade. And a POSITA would have understood that given that Kim's modularity is implemented specifically so that its modular components can be independently upgraded, Kim's independent upgrades are *enabled* by this modularity. Ex. 1007, [0001]. A POSITA would have understood that Kim's modular system uses a CPU for execution of program functions in software, and interfaces with various other blocks with upgrading capability. The CPU, ADSL controller, and HomePNA controller all execute programs in software and are fully programmable. Ex. 1007, [0044].

59. In fact, the specification of the '775 Patent teaches enabling independent upgrades using the same technique – decoupled (i.e., modular) components. Ex. 1001, 4:25-28, 3:58-61. This, in combination with the claims reciting "configured to *enable* upgrades to its software" rebuts any argument to the contrary regarding Kim's teaching of this limitation. Though POR contends that the '775 Patent results in a more flexible system (POR 44-45), this flexibility arises not from some unique component but is explicitly recited as a mere "**result** of the virtual de-coupling" of the CME's and DNE's functionality. Ex. 1001, 3:53-62, 4:25-28 (emphasis added). And given that Kim implements a similar modular

design structure to enable independent upgrades that improve system performance (and with lower costs and more efficiency compared to other upgrade processes), a POSITA would have understood that Kim also results in a more flexible system by virtue of its modular design. To the extent that the increased flexibility in the '775 Patent may arise from other factors, those factors are not recited in the claim and are thus irrelevant to Kim's teachings with respect to the claimed features.

60. PO also argues that Kim does not teach this feature because it merely teaches "replacing the hardware of the CME in some undefined way." POR 44. As I explain above, Kim's "replacing" is "upgrading" because it is done to improve the performance of its system. Ex. 1007, [0001]. As I further explain above, a POSITA would have understood that Kim's HomePNA controller and ADSL controller would comprise tightly intertwined and co-functioning hardware and software in order to enable the controllers to carry out their required operations, and so replacing hardware would be performed in conjunction with replacing software in order to maintain this co-functionality. Ex. 1007, [0034], [0042].

B. Rabenko/Kim teach "the cable modem engine configured to enable upgrades to its software in a manner that is independent of upgrades to the software of the data networking engine"

61. As I previously explained in detail, Rabenko renders obvious "the cable modem engine configured to enable upgrades to its software in a manner that

is independent of upgrades to the software of the data networking engine,” as recited in claim 18. Ex. 1002, ¶¶120-133.

62. Contrary to PO’s assertion, my analysis included a discussion of why Rabenko implicitly discloses independent software upgradeability. POR 46. Rabenko teaches that some of its components, such as its HomePNA controller, are standard-compliant with “the HomePNA Specification Version 2.0, the contents of which is expressly incorporated herein by reference as though set forth in full.” Ex. 1005, [0034]; Ex. 1002, ¶125. As I previously explained, “a POSITA would have understood that a standard-compliant device would have to be frequently updated or replaced in order to maintain compliance with such evolving standards.” Ex. 1002, ¶125.

63. As additional evidence for this statement, I specifically cited to the teachings of Gaspar. Ex. 1002, ¶125. Gaspar teaches that standard-compliant devices must be upgraded “as protocols change or standards evolve,” which can be “costly and time consuming.” Ex. 1006, [0005]. Therefore, I explained, Gaspar evidences what a POSITA would have known – that systems with standard-complaint devices need to enable convenient modifications of those devices. Ex. 1002, ¶125.

64. Because a POSITA reading Rabenko would already know this, the POSITA would have found it obvious to implement Rabenko’s system using

independently upgradeable modular components. Ex. 1002, ¶125. Thus, I provided ample explanation of why a POSITA would be motivated to modify Rabenko as proposed.

65. I also provided additional explanation as to Rabenko's implicit teaching of independent upgradeability. Ex. 1002, ¶¶123-124. Rabenko explicitly states "[s]killed artisans recognize the interchangeability of hardware and software under these circumstances, and how best to implement the described functionality for each particular application." Ex. 1005, [0268]. Rabenko teaches implementing its DNE on a first circuit and its CME on a second, separate circuit. Ex. 1002, ¶¶88, 106, 112-119; Ex. 1005, Fig. 1b. And as I explained, the combination of these two teachings explained why a POSITA would have understood that upgrades to components of its CME would have been independent of upgrades to components of its DNE. Ex. 1002, ¶¶121-123. A POSITA would have understood that Rabenko's CME and DNE, which were already implemented on separate circuits, would be independently upgradeable such that software updates to the former would be independent of software updates to the latter. Ex. 1002, ¶¶121-123.

66. PO also argues that the combination fails because there are an "uncountable" number of combinations for updating Rabenko's components and the Petition did not sufficiently state how the combination would be done. POR 58-

59. I disagree. Rabenko's system includes a plurality of components, including the recited CME and DNE. Ex. 1002, ¶¶85-119. The claim is concerned with updating only the CME and DNE. Thus, my analysis correctly explained that when designing Rabenko's system, a POSITA would have understood that its CME and DNE could be configured to be updated separately or together. Ex. 1002, ¶122. And given that these components are implemented on separate circuits (Ex. 1002, ¶¶88, 106, 112-119; Ex. 1005, Fig. 1b), a POSITA would have implemented separate upgradeability for a variety of reasons, including upgrade frequency, cost, and convenience. Ex. 1002, ¶¶121-123.

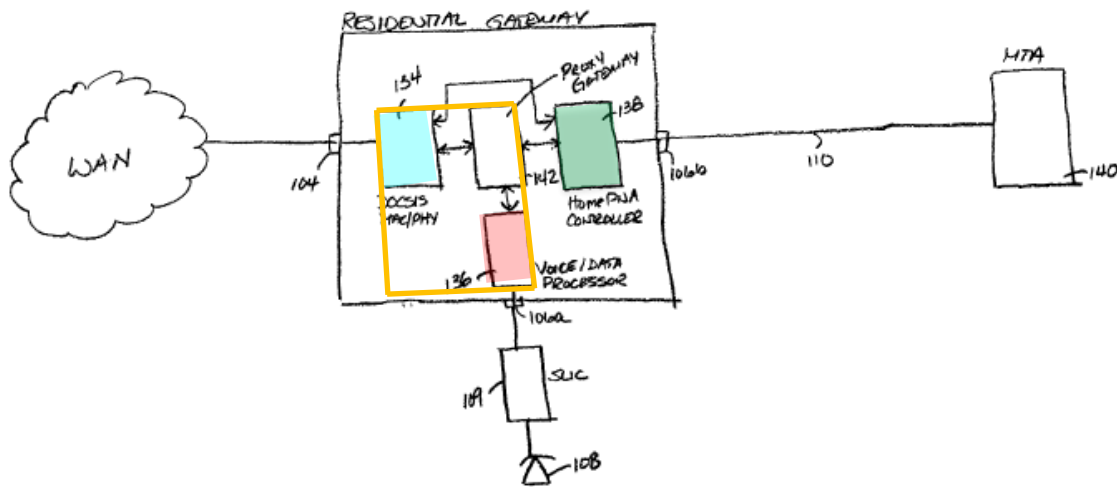
67. Moreover, a POSITA would have had a reasonable expectation of success. As I previously explained, Rabenko's CME and DNE use different protocols to perform different functions. Ex. 1002, ¶123. And "[a] POSITA would have understood that two different engines performing two different functions and using two different protocols (DOCSIS and PNA) should be separately upgradeable to address protocol changes independently." Ex. 1002, ¶123. Per Rabenko itself, a POSITA would have understood that each of these independent components "may be implemented in any number of way[s] including electronic hardware, computer software, or combinations of both . . . depend[ing] upon the particular application and design constraints imposed on the overall system." Ex. 1005, [0268]. And even if Rabenko's software was embedded (which is just one

option, with Rabenko thus contemplating non-embedded software (Ex. 1005, [0074])), this software would be upgradeable as per PO's own exhibits. Ex. 2008, ¶¶105-106; Ex. 2004, p. 8; Ex. 2005, p. 4

VIII. RABENKO TEACHES THE FEATURES OF CLAIM 19 AND SIMILARLY CLAIM 2

68. The Patent Owner and Dr. Russ attempt to undermine the Petition's identified cable modem engine in Rabenko by arguing that Rabenko's QPSK demodulator performs DOCSIS functions and thus should have been identified as part of the cable modem engine in order for its DOCSIS function to be localized in the cable modem engine. POR 60. I disagree.

69. As I described in my first declaration (Ex. 1002), Rabenko describes its communication system including DOCSIS MAC/PHY 134/DOCSIS MAC 212 (blue), a proxy gateway 142 and voice/data processor 136/213 (red) (together, the claimed "cable modem engine" (orange)) which are implemented in a second circuit performing cable modem functions according to the CableLabs Data Over Cable Service Interface Specification (DOCSIS). Ex. 1005, [0034], [0044]-[0047], Fig. 1b.



Ex. 1005, Fig. 1b (annotated)

Ex. 1002, ¶106.

70. Referring to Figure 2, I also noted the QPSK demodulator in my first declaration (Ex. 1002) noting that Rabenko describes:

DOCSIS was developed to ensure that cable modem equipment built by a variety of manufacturers is compatible, as is the case with traditional dial-up modems. The described exemplary embodiment can provide integrated functions for communicating with a cable head (not shown) end via the network port 104. By way of example, a QPSK upstream modulator 202 is configured to transmit data to the cable head end, and a QAM downstream demodulator 200 is configured to receive data from the cable head end, and a QPSK out of band downstream demodulator 206 is configured to receive out of band MPEG-2 encoded messages from the cable head end.

Ex. 1005, [0050]; Ex. 1002, ¶109.

71. As a POSITA would have understood, the DOCSIS MAC/PHY 134, which I highlighted **blue** in the above annotated Figure 1b of Rabenko, is the combined MAC and physical layers. In my opinion, a POSITA would have known that DOCSIS MAC/PHY 134 in Figure 1b would include the physical layer components in Figure 2 and thus includes QPSK out of band downstream demodulator 206. Accordingly, the Petition and my first declaration identified DOCSIS MAC/PHY 134 in Figure 1b which performs QPSK out of band demodulation. Ex. 1002, ¶106.

72. As I previously discussed in my first declaration (Ex. 1002), it is my opinion that Rabenko's functions performed by the DOCSIS MAC/PHY 134/DOCSIS MAC 212 and/or voice/data processor 136/213 teach the claimed "all DOCSIS functions" in claim 19. Ex. 1002, ¶161. As I noted as well, Rabenko describes that DOCSIS MAC/PHY 134/DOCSIS MAC 212 performs cable modem functions according to the CableLabs DOCSIS. Ex. 1002, ¶161; Ex. 1005, [0034], [0044]. Rabenko describes that "[t]he DOCSIS MAC/PHY 134 *translates* the packet format from DOCSIS to an internal format that, at least in some embodiments, is protocol independent." Ex. 1005, [0044] (emphasis added). In my opinion, translation of the packet format is one "DOCSIS function" performed by the DOCSIS MAC/PHY 134/DOCSIS MAC 212 in Rabenko's cable modem engine. Ex. 1002, ¶161.

73. Further, Rabenko describes that “[i]n the downstream direction, the DOCSIS MAC/PHY 134 determines whether the packet payload is voice or data.” Ex. 1005, [0045]. Once again as I previously noted, determining whether a packet from the WAN has a payload that is voice or data is another “DOCSIS function” performed by the DOCSIS MAC/PHY 134/DOCSIS MAC 212 in Rabenko. Ex. 1002, ¶162. Accordingly, translation of the packet format and/or determination of whether a packet payload is voice or data are the claimed “all DOCSIS functions.” These functions are both performed by DOCSIS MAC/PHY 134/DOCSIS MAC 212 and are localized in Rabenko’s cable modem engine. Neither Patent Owner nor Dr. Russ rebut my arguments. Instead, Patent Owner and Dr. Russ appear to argue that additional DOCSIS functions described in Rabenko must be localized in the cable modem engine of Rabenko. POR 59-60; Ex. 2008, ¶119. However, in my opinion, I respectfully disagree that a POSITA would have thought such to be true. With respect to the two engines in claim 18, in my opinion, a POSITA would have understood that all DOCSIS functions are localized within the CME. If not, the claims and specification of the ’775 Patent contradict PO’s argument.

74. In my opinion, a POSITA would not have understood claim 19 as reciting additional DOCSIS functions in a cable modem system as claimed. The underlying reason is quite simple. As I describe below, the ’775 Patent both describes, and more importantly claims, a DOCSIS function that is performed by a

component of a cable modem system that is not in fact localized in the claimed cable modem engine. Shown in both Figures 1 and 2, the '775 Patent describes a component identified as the advanced crypto engine 130, which I show below in **red**. “FIG. 1 illustrates a cable modem system architecture 100 according to the present invention. System 100 comprises three major subsystems: cable modem engine 110; data networking engine 120; and advanced crypto engine 130. The functional sub-components of these three-subsystems are illustrated in greater detail in FIG. 2.” Ex. 1001, 2:49-54.

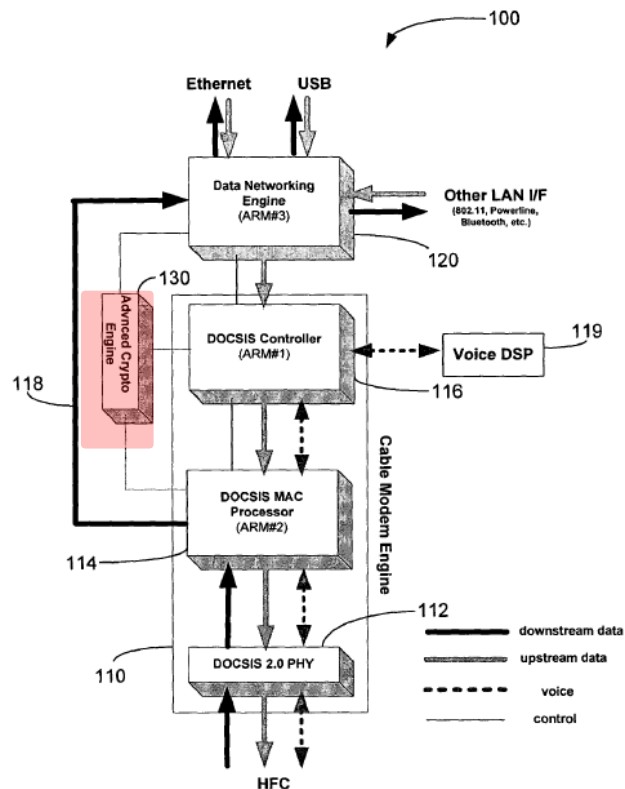


Figure 1

Ex. 1001, Fig. 1 (annotated)

link layer which authenticates the data in DOCSIS. *See*, e.g., Ex. 1022. For the '775 Patent, both the DNE and the CME use encryption.

76. The '775 Patent also claims the advanced crypto engine in dependent claim 4, which depends from claim 1. Specifically, dependent claim 4 recites, “[a] cable modem system as claimed in claim 1, and further comprising an advanced crypto engine configured to perform all crypto functions for both the data networking engine and the cable modem engine, the advanced crypto engine being separate from both the data networking engine and the cable modem engine.” Ex. 1001, 5:43-48. Notably, like shown above in the annotated Figures 1 and 2 of the '775 Patent, claim 4 recites that the claimed advanced crypto engine is separate from both the data networking engine and the cable modem engine. Accordingly, in my opinion, a POSITA would have understood that because the claimed advanced crypto engine in dependent claim 4 recites a “DOCSIS function” that is not localized in the cable modem engine, then Patent Owner’s argument conflicts with the description of an advanced crypto engine in the specification and claim 4 of the '775 Patent itself.

IX. THE PRIOR ART COMBINATIONS TEACH THE FEATURES OF CLAIM 12

77. As I stated in my first declaration (Ex. 1002), although Rabenko, Gaspar, Kim, or Lu specifically do not recite an ARM9TDMI-based RISC processor or an ARM940-based RISC processor, a POSITA would have found it

obvious to implement the functions of the DOCSIS MAC processor and DOCSIS controller using commonly known and available processors, based upon availability, prevalence, cost, quality of service requirements, geographic impairments, reliability, programmability, interchangeability, and/or any of a number of other factors for a particular use. Ex. 1002, ¶227. As I stated in my first declaration (Ex. 1002), a RISC processor was a commonly-known and utilized processor, even in the field of cable modem systems. Ex. 1002, ¶¶171-183, 227-231.

78. I noted in my first declaration (Ex. 1002) that a POSITA would have known that an ARM9TDMI-based RISC processor was a commonly known and used processor for accommodating digital logic processing functions, such as in Rabenko's DOCSIS MAC, in products that demand the highest levels of performance with small size, low cost, and low power consumption, as shown by Klein and that a POSITA would have found it obvious to utilize an ARM9TDMI-based RISC processor in the combined systems. Ex. 1016, [0008], [0009], [0024]; Ex. 1005, [0268]; Ex. 1002, ¶¶232-236.

79. I further noted in my first declaration (Ex. 1002) that a POSITA would have known that an ARM940-based RISC processor was a commonly known and used processor for offering high probability that each functional block having bus ownership can perform its operation compared to conventional

exclusive bus arbitration schemes as shown by Kim '678 and that a POSITA would have found it obvious to utilize an ARM940-based RISC processor in the combined systems. Ex. 1015, [0002], [0076], [0193]; Ex. 1005, [0268]; Ex. 1002, ¶¶232-236.

80. Accordingly, in my opinion, a POSITA would have found it obvious to utilize any of a number of known RISC processors in the combined systems as a design choice for “the particular application and design constraints imposed on the overall system” since “[s]killed artisans recognize the interchangeability of hardware and software under these circumstances, and how best to implement the described functionality for each particular application.” Ex. 1005, [0268].

X. CONCLUSION

81. All of the statements made in this declaration of my own knowledge are true. All statements made based on information and belief are believed to be true. Further, these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under § 1001 of Title 18 of the United States Code.

Date: March 18, 2025

A handwritten signature in cursive script, appearing to read "Sayfe Kiaei".

By:

Sayfe Kiaei