

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: IPR2024-00430

U.S. PATENT NO. 8,284,690

PATENT OWNER'S RESPONSE

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Ex. 2001:	Joint Claim Construction and Pre-Hearing Statement (Case 2:23-cv-01049-JWH-KES)
Ex. 2002:	Deposition Transcript of James Bertonis
Ex. 2003:	U.S. Patent No. 8,146,125 by Grinkemeyer
Ex. 2004:	U.S. Patent No. 8,228,910 by Wu
Ex. 2005:	U.S. Patent No. 8,634,498 by Mueller
Ex. 2006:	DOCSIS 3.1 MAC and Upper Layer Protocols Interface Specification
Ex. 2007:	Expert Declaration of John Holobinko

I. INTRODUCTION

Patent Owner, Entropic Communications, LLC (“Entropic”), submits this Patent Owner Response (“Response”) pursuant to 37 C.F.R. § 42.120 to the *Inter Partes* Review (“IPR”) petition (“Petition”) filed by Comcast Cable Communications, LLC (“Comcast”) for claims 1-24 of U.S. Patent No. 8,284,690 (“’690 Patent”) and the Board’s Decision Granting Institution (Paper 8). The Board should find that all of the challenged claims are valid over the prior art.

The ’690 Patent is directed to improvements in the communication between network nodes, for example in a data-over-cable network. *See* Ex. 1001, Abstract, 4:20-24; *see also* Ex. 2007, ¶¶ 38–41. Networks may explore the characteristics of communication links within them by sending probes over the links. Such “probes” may be “sent between nodes of the network in order to allow a receiving node on the network to determine some of the characteristics of the channel between the receiving node and the transmitting node.” Ex. 1001, Abstract, 1:40-54. Before the inventions of the ’690 Patent, this method employed “predetermined probe[s]” that were inflexible in their ability to characterize the communications channel. *Id.*, 1:58. This inflexibility arose “because it is critical to the process that the receiving node knows the precise form of the transmitted probe.” *Id.*, 1:60-62.

The ’690 Patent addressed these inflexibility problems by teaching systems and methods for a “receiver determined probe,” as the Patent’s title conveys. *See*

also id., 2:5, 2:20. In short, the intended receiver of the probe is allowed to influence the nature of the probe instead of being forced to accept a predetermined probe. As described by the '690 Patent, a first network node expecting or desiring to receive a probe can send a probe request to a second network node, the request specifying parameters for the “form” of the probe. *Id.*, 2:3-6.

The key element of the '690 Patent—and what the Petition fails to address—is that a “probe” is not just any message. A “probe” is a particular kind of message used to characterize the communication channel between two nodes. That is a basic known fact in the art that even Petitioner's expert, Mr. Bertonis, had no choice but to admit during his deposition. *See* Ex. 2002, 10:5–10 (Mr. Bertonis agreeing in his deposition that a probe is “a signal used to assess the communications path”), 17:24–25 (agreeing that not all messages are probes), 25:18–26:10 (generally agreeing that the probes in the '690 Patent are used to determine characteristics of the channel). Yet Petitioner treats the claims as if “probe” just means “message” and takes the flawed approach of relying on prior art references involving basic network management messages that do nothing to *characterize* the communication channel. Instead, those messages are for negotiation of communication parameters between two nodes. The distinction is critical: probes are used for determining what the communication channel between two nodes is like; the messages of the prior art cited by the Petition are about negotiating the manner in which the two nodes will

communicate with each other. No POSITA, including Petitioner's expert, would consider the messages of Petitioner's prior art to be "probes." For example:

- In Grounds A through C and J through M, the Petition relies on (portions of) the WiMAX and DOCSIS-2.0 technical standards that relate to "ranging," an entirely different process from "probing." *See* Ex. 2007, ¶¶ 63–64. Ranging is not used to *characterize* anything about the communications channel but instead—as agreed by both experts in this matter—is used to adjust the timing offset and power levels of the messages sent between two nodes. *See* Ex. 2007, ¶¶ 61, 64, 98, 102; *see also* Ex. 2002, 70:17–25 (Mr. Bertonis agreeing that ranging can be understood as a negotiation of communications parameters between two nodes). As a result, ranging is not concerned with the nature of the communications link, including noise or distortions, but instead with distance (and timing and other problems caused by distance). Ranging is thus a simple message exchange that does not involve characterizing the channel. *See* Ex. 2007, ¶¶ 64–67. Petitioner and its expert, Mr. Bertonis, fail to address these crucial differences in the two fields of art.
- In Grounds D through I, the Petition's reliance on Waxman is insufficient for similar reasons. Although Waxman uses the word "probe," the only payload that Waxman discloses its "probe" can have is a simple

acknowledgement message. Waxman does not disclose any message that is used to determine channel characteristics. *See* Ex. 2007, ¶ 89. Thus, it is impossible for Waxman to disclose a probe request that “specif[ies] content payload of the probe and a second node.” *See* Ex. 1001, cl. [1A]; *see also id.*, cl. 17[A]; *see also* Ex. 2007, ¶¶ 81–85.

Because all of the grounds fail to render obvious the independent claims of the '690 Patent, the entirety of the Petition should be rejected. *See Hartness Int'l Inc. v. Simplimatic Eng'g Co.*, 819 F.2d 1100, 1108 (Fed. Cir. 1987) (prior art that fails to demonstrate an independent claim as unpatentable similarly fails to demonstrate a dependent claim as unpatentable).

II. SUMMARY OF THE '690 PATENT

A. Background of the '690 Patent

The '690 Patent issued on October 9, 2012, and is entitled “Receiver Determined Probe.” The '690 Patent was filed on December 10, 2009, and claims priority to U.S. Provisional Application No. 61/122,687 (filed December 15, 2008) and U.S. Provisional Application No. 61/179,454 (filed May 19, 2009).

The '690 Patent is directed at aiding in the diagnosis of “problems with subscriber services.” Ex. 1001, 1:31-34; Ex. 2007, ¶¶ 38–41. The '690 Patent explains that there has been an “increase in the number of services and devices” offered through home networks which “increases the complexity of coordinating

communication between the network nodes as each node may experience different access conditions along its portion of the network.” Ex. 1001, 1:25-29. “This increase in complexity, further increases the likelihood that network problems may develop,” and the content providers typically must “send[] a technician to the physical location of the home network to personally assess the network and diagnose the problem.” *Id.* at 1:30-36. “[A]s the number of homes with subscriber services incorporated into their home networks increases, so does the amount of resources a service provider must devote to technical support and network maintenance.” *Id.* at 36-40.

To help aid in the diagnosis of “problems with subscriber services” (*id.* at 1:31-34), the ’690 Patent describes the use of probes to “characterize the communication channel over which data is to be sent between nodes in a network,” including “various embodiments” in which “nodes on a network are programmed to generate a probe transmission in response to a request from the node that will be receiving the probe.” *Id.* at Abstract, 1:41-43.

The ’690 Patent explains that probes are used by the node receiving the probe to determine characteristics of the communications channel by comparing a known reference at the receiving node to the “actual received probe.” *Id.*, 1:54-57. The receiver node needs to be able to discern what was sent, so that it knows what it must compare to the actual received signal. This is why, in the world of probes, “the

receiving node knows before reception what reference signal was transmitted.” *Id.*, 1:52-54. In turn, it was thought in the prior art that this requirement “that the receiving node knows the precise form of the transmitted probe” (*id.*, 1:60-62) meant that probes had to be “well-defined” and “predetermined.” *Id.*, 1:52-53, 1:57-59. But because the probes were predetermined, the prior art suffered from a lack of flexibility. *Id.*, 1:57-59.

The '690 Patent broke out of this paradigm by allowing the receiver of a probe to tailor the probes it will receive to its needs. The result is a “receiver determined probe” which is possible, for example, because “[t]he receiving node may generate a probe request that specifies a plurality of parameters to be used in such a ‘receiver determined’ probe to generate a probe having the ‘form’ specified by these parameters.” *Id.* at 2:3-6. Upon receiving the request, the transmitting node generates a responsive probe “base[d] upon one of the parameters of the probe request or based upon information that previously existed within the transmitting node.” *Id.* at 6:42-45. The probe is transmitted (e.g., to the node that initiated the probe request) where it “may be used for OFDMA sub-channel assessment” or “for off-site network diagnosis.” *See id.* at 2:22-27; *see also id.* at 4:25-27. This is shown in Figure 4:

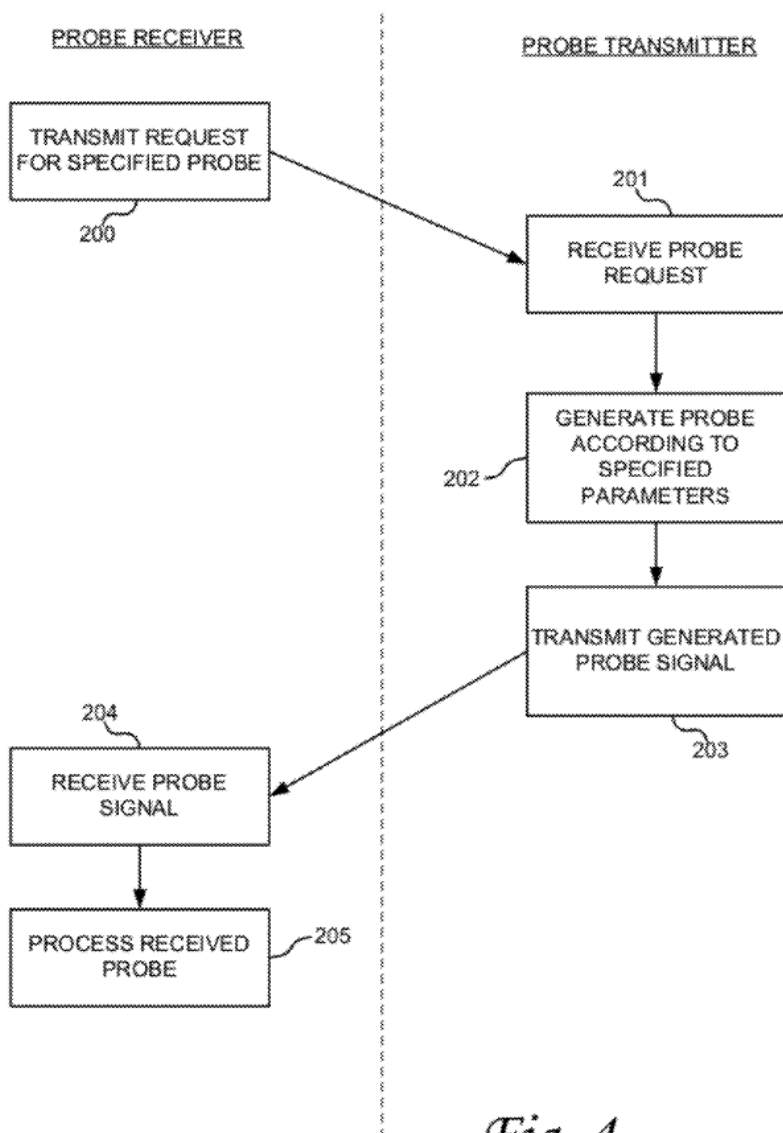


Fig. 4

Ex. 1001, Fig. 4.

Claim 1 of the '690 Patent recites:

1. A method comprising:
 - a) receiving in a first node, a probe request specifying a first plurality of parameters associated with the generation and transmission of a probe, wherein the first plurality of parameters at least specify content payload of the probe and a second node;
 - b) determining a second plurality of parameters associated with generation and transmission of the probe;
 - c) generating the probe in accordance with the first plurality of parameters and the second plurality of parameters, wherein the probe has a form dictated by the first plurality of parameters; and
 - d) transmitting the probe from the first node to the second node.

Ex. 1001, cl. 1. Broadly, this claim recites a method for receiving a probe request and then generating, and transmitting, a probe defined by the parameters specified in that probe request. As claimed, the first node: receives a probe request with parameters that at least specify content payload of the probe and a second node, *id.*, cl. 1[A]; determines parameters associated with generation and transmission of the probe, *id.*, cl. 1[B]; generates the probe in accordance with these parameters so that it has a form dictated by the first set of parameters, *id.*, cl. 1[C]; and transmits the probe to the second node, *id.*, cl. 1[D]. Independent claim 9 has similar elements, with a few differences, such as the fact that the “first node” of claim 9 is now the node that receives the probe, and the “second node” is now the node that transmits the probe, that the probe is specified as a “physical layer probe,” and that the probe request additionally specifies “a modulation profile for the probe.” *Id.*, cl. 9.

Independent claim 17 recites a system with similar elements as claim 1, but further includes additional elements required by that system. *Compare id.*, cl. 17 with *id.*, cl. 1.

B. Claim Construction

The Petition was filed after November 13, 2018, and, as such, the proper claim construction standard to be applied is articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc), in accordance with 37 C.F.R. § 42.100(b). *Apple Inc. v. Firstface Co.*, No. 2021-1001, 2021 WL 4156323, at *1 n.1 (Fed. Cir. Sept. 13, 2021).

The terms of the '690 Patent were construed in a related proceeding, *Entropic Communications, LLC v. Charter Communications, Inc.*, No. 2:22-cv-125-JRG (E.D. Tex.). *See* Ex. 1005, 78-89. Specifically, the District Court for the Eastern District of Texas construed the plain and ordinary meaning of “probe” and “probe request” to mean what follows:

Term	Construction
“probe”	“a signal transmitted to a network node that the network node can compare to a reference signal having a known form in order to determine characteristics of the channel on which the signal was transmitted”

Term	Construction
“probe request”	“a request, sent by one network node to another network node, that specifies the form of a probe to be generated and transmitted”

Ex. 1005, 104-105. The court also ruled that other terms in the '690 Patent would have their plain meanings, but did not specify those meanings. *Id.*

Patent Owner recognizes that the Board did not adopt the *Charter* constructions in its Institution Decision, but, for clarity, the Board need not adopt the *Charter* constructions to rule in Patent Owner's favor in its Final Written Decision.¹ Specific discussions of the construction of “probe” and, separately, “physical layer probe,” follow.

¹ If the Board adopts the same constructions as the *Charter* Court, however, the Petition necessarily fails on all Grounds because it is evident that Petitioner did not apply these constructions. Nowhere is there any analysis of how the alleged prior art “probes” are “compare[d] to a reference signal.” And in fact, Petitioner's expert Mr. Bertonis admitted that he did not treat this as a requirement of the claim language. *See* Ex. 2002, 36:15–37:2 (Mr. Bertonis admitting that his analysis “wasn't requiring a reference signal”).

1. “Probe”

What matters for this proceeding is that both expert witnesses agree on the salient construction of “probe”: it must be a signal or message that is used to *characterize (or assess) the communications channel (or path) between the two nodes*. See Ex. 2007, ¶¶ 47–48, 54–55; see also Ex. 2002, 10:5–10 (Mr. Bertonis agreeing in his deposition that a probe is “a signal used to assess the communications path”), 17:24–25 (agreeing that not all messages are probes), 25:18–26:10 (generally agreeing that the probes in the ’690 Patent are used to determine characteristics of the channel). This is how probes are described in the ’690 Patent itself:

In some instances, *probes are sent* between nodes of the network in order to allow a receiving node on the network *to determine some of the characteristics of the channel* between the receiving node and the transmitting node.

...

In various embodiments, these receiver determined probes may be used in a variety of applications. For example, the probes may be used to reach or discover hidden nodes; in networks employing orthogonal frequency division multiple access (OFDMA), *the probes may be used for OFDMA subchannel assessment*; or in networks accessible by content providers, the probes may be used for off-site network diagnosis.

...

In block 204, the requesting node receives the probe generated according to its earlier probe request. The received probe may then be used in further processing in block 205. In one embodiment, the received *probe may be used in channel analysis* to determine a bitloading table, FEC and other communication parameters for OFDM or OFDMA signals for future transmissions from the probe transmitter. In another embodiment, post reception processing might comprise generating a report from the probe and transmitting this probe report to the requesting node or to a designated entity.

Ex. 1001, 1:48-52, 2:20-27, 6:59-7:11; *see also* Ex. 1005, 79-84; Ex. 2007, ¶ 49.

The '690 Patent emphasizes that its probes are “channel assessment probes.” Ex. 1001, 1:12-14; Ex. 2007, ¶ 49. That is because they are used to, as the disclosures above explain, “characterize the communication channel over which data is to be sent between nodes of the network.” Ex. 1001, 1:41-43. They can thus be “used to diagnose problems” within the network, “replicate a potential problem, reach or discover a distant or previously undetected node on the network, or assist with network admissions procedures.” *Id.*, 4:34-38.

The Board need not take Messrs. Holobinko's or Bertonis's word for it, though. Extrinsic evidence contemporaneous with the priority date of the '690 Patent confirms that a “probe” was a signal or message used to characterize a channel. *See* Ex. 2007, ¶¶ 50–53. For example, U.S. Patent No. 8,146,125 (Ex. 2003) describes probes that are used in Multimedia Over Coax Alliance (MoCA)

networks, and it states that “devices on a network regularly send physical-layer ‘probe’ messages to each other to evaluate the physical network between them.” Ex. 2003, 6:19–21.² Other examples of extrinsic evidence refer to “transmitting probe messages formed using a predetermined bit sequence and length from one node to another node to estimate the channel characteristics between the node” (Ex. 2004, 2:46–50) and using error vector probe packets to “estimate[] channel characteristics such as signal-to-noise ratio, data capacity, etc.” (Ex. 2005, Abstract). Thus, both the intrinsic and extrinsic evidence support the plain meaning of a “probe” as a signal or message that characterizes the channel.³

2. “Physical Layer Probe”

While claims 1-8 and 17-24 recite a “probe,” claims 9-16 recite a “physical layer probe.” Because claims 9-16 use “physical layer probe” instead of “probe,” the two terms are presumed to have a different meaning absent evidence to the

² Mr. Bertonis did not consider MoCA probes, and he admitted that he is unfamiliar with that technology standard. *See* Ex. 2002, 125:21–126:10.

³ It should come as no surprise then that this same requirement of characterizing the channel appears in the *Charter* Court’s construction as well. Ex. 1005, 104-105 (“in order to determine characteristics of the channel on which the signal was transmitted”).

contrary. *See Comark Communication, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998) (“There is presumed to be a difference in meaning and scope when different words or phrases are used in separate claims.”) (quoting *Tandon Corp. v. United States Int’l Trade Comm’n*, 831 F.2d 1017, 1023 (Fed. Cir. 1987)). Petitioner and Mr. Bertonis present no evidence to the contrary yet treat the two terms as if they had identical meaning. That is problematic under the law, fails to meet Petitioner’s burden, and cannot carry the day for the Board’s Final Written Decision.

While Mr. Bertonis’s declaration is at least ambiguous as to how he construes “physical layer probe,” *see* Ex. 2007, ¶¶ 68, 87, during deposition, he confirmed that he treated “physical layer probe” as synonymous of “probe” and was unable to provide an example of a probe that would not be a physical layer probe. *See* Ex. 2002, 39:8–21, 40:3–40:13, 40:21–41:8 (characterizing a “physical layer probe” as a probe that is transmitted in the physical layer, but admitting that this is generally true of all probes); *see also* 41:10–14 (Mr. Bertonis admitting that he generally “[took] ‘physical layer probe’ to have the same meaning as the word ‘probe’ by itself”); *see also* Ex. 2007, ¶ 88. Nowhere does the Petition or Mr. Bertonis’s declaration explain why they believe “physical layer” essentially has no meaning, contrary to the established precedent cited above.

In contrast, Mr. Holobinko has given the differences in the terms due account—he explains that a POSITA would understand the plain meaning of a

physical layer probe to mean a probe that characterizes attributes of the physical layer of the communications channel. *See* Ex. 2007, ¶¶ 56–58. The Board should adopt this construction because it gives meaning to the term “physical layer probe” that is distinct from the broader “probe.”

III. THE PETITION FAILS TO SHOW THAT ANY OF THE CHALLENGED CLAIMS ARE INVALID

The “probes” of the ’690 Patent are used to characterize the communications channel between the nodes. Most of the Grounds raised in the Petition fail on a basic level because they rely on generic network management messages that are not probes. The prior art reference that does at least recite “probes” (Waxman) relates to a kind of probing that is fundamentally different from what is claimed. Accordingly, Petitioner has failed to meet its burden on any of the many Grounds it asserts.

A. Grounds A and B: WiMAX Fails to Anticipate or Render Obvious the Challenged Claims

Petitioner’s use of IEEE-802.16 (“WiMAX”) does not anticipate or render obvious the challenged claims for at least two reasons:

First, WiMAX does not disclose a “probe” or a “probe request” because its ranging procedure is no more than a message exchange between network nodes to negotiate communication protocols and parameters between them. Ex. 2007, ¶¶ 63–68. Nothing about WiMAX’s ranging procedure involves characterization of the

communications channel between the nodes. Instead, one of the nodes already knows the characteristics of the channel and has otherwise told the other node about those characteristics using yet another, separate, message. Ex. 2007, ¶¶ 65–66. The ranging process of WiMAX simply measures the timing delay of message transmissions to adjust the timing offset for communications between two nodes. *Id.* at ¶¶ 61–62, 64. WiMAX ranging is far from the “probe” and “probe request” recited in the challenged claims. *See also* Ex. 2002, 131:17–132:18 (Mr. Bertonis unable to identify anything other than his own testimony that refers to ranging as probing).

Second, WiMAX’s ranging request message does not specify content payload of the ranging response message (what Petitioner says is the recited “probe”). Ex. 2007, ¶¶ 69–74. This is a technical consequence of the fact that, in ranging, there is no characterization of the channel. *See id.* at ¶¶ 64–67. There is no need to specify anything about the payload of a ranging message, which is being used only to measure a travel time for transmission adjustments for future communications. *See id.* Nevertheless, Petitioner forges ahead with two arguments, both wrong. First, the WiMAX ranging message connection identifier (CID) parameter is not part of the message *payload* but part of the message *header*. Ex. 2007, ¶¶ 71–72. Second, the Petition fails to point to any disclosure in WiMAX of the “ranging code index” being “specif[ied]” by parameters in the ranging request message. Ex. 2007, ¶ 73. Because Petitioner has identified the ranging request message as the recited “probe

request,” and because Petitioner does not show how the “ranging code index” is part of that message, Petitioner cannot meet its burden on this claim element, either.

1. Overview of IEEE-802.16 (“WiMAX”)

The IEEE-802.16 (“WiMAX”) standard relates to a wireless communication interface between a base station (BS), *e.g.* a cellular or wireless tower, and one or more subscriber stations (SS), *e.g.* a mobile phone or a wireless access point. Ex. 1013, 1-2, 7, 11; Ex. 2007, ¶¶ 61–62. WiMAX includes a ranging procedure, where an SS sends a ranging request (RNG-REQ) to a BS, and the BS sends a ranging response (RNG-RSP) back to the SS.⁴ Ex. 1013, 49-51, 174-182, 199-213; Ex. 2007, ¶¶ 61–62. Ranging is crucial because WiMAX is an OFDMA-enabled system where many SSs will be expected to transmit on the uplink to the base station. Those transmissions need to be aligned in time when they are received, or else the Fourier transforms involved in OFDMA will not work. Because the various SSs may be located at different distances from the BS, and because each SS is meant to communicate with the BS in a specific time slot, ranging is crucial to allow timing alignment among a BS and its various connected SSs. Therefore, WiMAX’s ranging procedure is arranged so the SS can “acquir[e] the correct timing offset and power

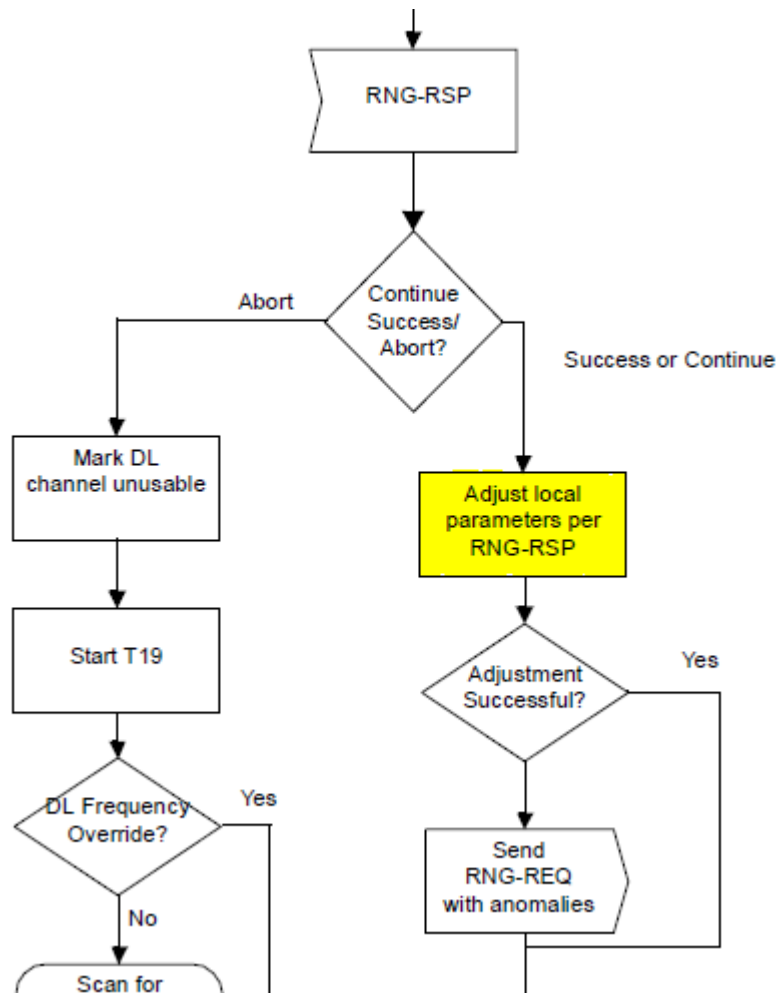
⁴ The Petition describes the RNG-REQ/RNG-RSP process backwards, as saying that “the SS receiv[es] a Ranging Request from the BS.” Petition, 8.

adjustments such that the SS's transmissions" are aligned with the time slots/frames and thresholds expected by the BS. Ex. 1013, 174; Ex. 2007, ¶¶ 61, 64. After the SS sends a ranging request, the base station responds with the RNG-RSP message to control the SS timing by "indicating the required changes" the SS should make to its "ranging parameters." Ex. 1013, 478; Ex. 2007, ¶ 62.

2. WiMAX Does Not Disclose a "Probe" or, Consequently, a "Probe Request" As Required by Each Challenged Claim

WiMAX fails to anticipate or render obvious any of the challenged claims because it fails to disclose two elements present in each independent claim of the '690 Patent: a "probe" and, consequently, a "probe request." The Petition contends that WiMAX's RNG-RSP message is a "probe" and its RNG-REQ message is a "probe request" (Petition, 8), but neither contention is true.

When a WiMAX SS receives a RNG-RSP (the alleged "probe"), there is nothing about the message that is being used to characterize the channel; the SS simply adjusts its "local parameters" in accordance with what the RNG-RSP tells it to do. Ex. 1013, 178-179; Ex. 2007, ¶ 64. The RNG-RSP is simply a message that "indicat[es] the required changes" the SS has to make to its "ranging parameters," specifically relating to timing offset and power. Ex. 1013, 478; Ex. 2007, ¶¶ 61–62, 64. The right-most portion of Figure 61 of WiMAX depicts this quite clearly:



Ex. 1013, 179 (highlighting added). Similar variations of this same theme are disclosed elsewhere in WiMAX, all which confirm that the RNG-RSP is not a “probe.” *Id.*, 199-213 (discussing “Downlink burst profile management,” “Uplink periodic ranging,” and “OFDMA-based ranging”); *id.*, 478-479 (discussing “Initial Ranging in AAS Systems”).

WiMAX also describes its “ranging” procedure (which utilizes the RNG-REQ and RNG-RSP messages) as “the process of acquiring the correct timing offset and power adjustments such that the SS’s transmissions are” aligned with the time

slots/frames and thresholds expected by the BS. Ex. 1013, 174. In short, the ranging procedure is used for the SS and BS to negotiate power thresholds and timing offsets for the messages to be exchanged between them and for the SS to move to a different downlink frequency and/or uplink channel ID—neither of which involves characterizing the channel. *Id.*, 174-177; Ex. 2007, ¶ 64; *see also* Ex. 2002, 70:17–25 (Mr. Bertonis agreeing that ranging can be understood as a negotiation of communications parameters between two nodes).

The SS and BS of WiMAX have no mechanism, and no need, to use ranging for channel assessment because WiMAX has separate processes (not relied on by Petitioner and fundamentally different from the challenged claims) for the BS to tell the SS about channel characteristics. Ex. 2007, ¶ 65. First, WiMAX discloses that the BS determines the characteristics of a communications channel on its own and tells the SS about those characteristics through a different message that is not part of the ranging procedure, the uplink channel description (UCD) message. Ex. 1013, 174; Ex. 2007, ¶ 65. Second, the SS already determines the characteristics of a channel through non-ranging means (again, not relied on by Petitioner) ***before it even sends the RNG-REQ message***. Ex. 1013, 174 (describing the “First” step in the ranging procedure as the SS “synchroniz[ing] to the downlink and learn[ing] the uplink channel characteristics through the UCD MAC management message”); *id.*, 175-176 (describing as later steps that “the SS shall put together a RNG-REQ

message” and the BS “return[ing] a RNG-RSP message”); *see also id.*, 199 (describing the CINR monitoring feature of the SS); Ex. 2007, ¶¶ 65–66. In another related disclosure about ranging, WiMAX discloses that the SS monitors CINR (carrier to interference-plus-noise ratio), and if CINR “goes outside of the allowed operating regions,” then the SS takes action and “requests a change to a new burst profile” by sending a RNG-REQ message to the BS. Ex. 1013, 199; *see also id.* (“The SS applies an algorithm [before sending the RNG-REQ message] to determine its optimal burst profile in accordance with the threshold parameters established in the DCD message in accordance with Figure 81); *id.*, 201 (Figure 81); Ex. 2007, ¶ 66. In other words, ranging is a process that occurs *after* the characterization of the channel CINR; it does not itself characterize the channel.

None of this is discussed by Petitioner or Mr. Bertonis because both treat “probe” as if it meant nothing more than “message.” But as admitted by Mr. Bertonis during deposition and supported by Mr. Holobinko’s declaration, a “probe” is much more than just a “message.” Under the plain meaning of that term as agreed by both experts—which requires a probe to be used to characterize a channel—there should be no doubt that Petitioner has failed to meet its burden. Neither Petitioner nor Mr. Bertonis make any real effort to argue that the RNG-RSP is used to characterize the channel. That is a critical failure that dooms Grounds A through C, especially Ground A, a ground asserting anticipation over WiMAX.

Even if the RNG-RSP could be considered a probe, Petitioner and Mr. Bertonis do not explain why it would be a *physical layer* probe, as required by claim 9. Mr. Bertonis opines that the Ranging Response is a physical layer probe simply because it is configured to “ensure the correct timing and preferred power for transmissions over the PHY layer.” Ex. 1002, ¶ 191. However, he does not explain how the RNG-RSP actually *characterizes* the physical layer. And as Mr. Holobinko explains, the RNG-RSP instructs the SS to make certain timing and power adjustments only *after* the SS has already characterized the channel through other means. *See* Ex. 2007, ¶ 68.

In the end, because the Petition has failed to demonstrate that the RNG-RSP message is a “probe,” the Petition has also failed to demonstrate that the RNG-REQ message is a “probe request,” under any construction. The Petition thus has failed to meet its burden as to Grounds A through C.

3. WiMAX's RNG-REQ Does Not Specify a First Plurality of Probe Parameters That “Specify Content Payload of the Probe” (Claim 1) or “Compr[is]e ... a Payload Content for the Probe” (Claim 17)

Putting aside that the RNG-RSP of WiMAX is not a “probe” and the RNG-REQ of WiMAX is not a “probe request,” there are other reasons the Petition has failed to meet its burden. The first is that the RNG-REQ of WiMAX (the alleged “probe request”) does not “at least specify content payload of the probe” as required

by claim 1 or “compris[e] at least a payload content for the probe” as recited in claim 17. Petitioner hedges its arguments by relying on two parameters that allegedly specify a “payload” of the RNG-RSP message: a connection identifier (CID) and a ranging code index. *See* Petition, 15-16. Petitioner is wrong on both fronts, and the Board correctly determined in its Institution Decision that Petitioner failed to meet its burden under either argument. The Board should maintain that determination in its Final Written Decision.

As to Petitioner's CID-based argument, as an initial matter, the CID sent in the initial ranging procedure cannot be specified by the SS because the SS does not yet have a CID to specify. *See* Ex. 1013, 8 (describing “initial ranging connection identifier” as a “well-known CID” that is a “constant value within the protocol since an SS has no addressing information available until the initial ranging process is complete”). It is the BS that does the determination and assigns the SS with a CID, not the other way around as the Petition argues. *See also id.*, 33; Ex. 2007, ¶ 72. Yet there are other reasons still why the CID does not meet the challenged claims.

First, the CID is not part of the ***payload*** of the RNG-RSP message, and thus even if an RNG-REQ message “specified” the CID of the RNG-RSP, it would not be specifying a probe's “content payload” as claimed. Ex. 2007, ¶ 71. This is the reason the Board initially determined Petitioner failed to meet its burden, Paper 8 at 17-18, and there is no good reason to depart from that determination now. WiMAX

discloses that its RNG-REQ (and RNG-RSP) messages are both MAC management messages. Ex. 1013, 43 (listing example MAC management messages in Table 14); *see also* Petition, 12 (relying on the fact that the ranging request is “an example MAC Management message”). WiMAX also discloses that the connection identifier (CID) cited by Petitioner is a 16-bit value that identifies a connection to equivalent peers in the MAC of a base station and subscriber station. Ex. 1013, 7. The CID is located in the **header** of MAC management messages, like the RNG-REQ message, as illustrated in Figure 19 and Table 5 of WiMAX. Ex. 1013, 36-37; *see also* Petition, 12-13; Ex. 2007, ¶ 71.

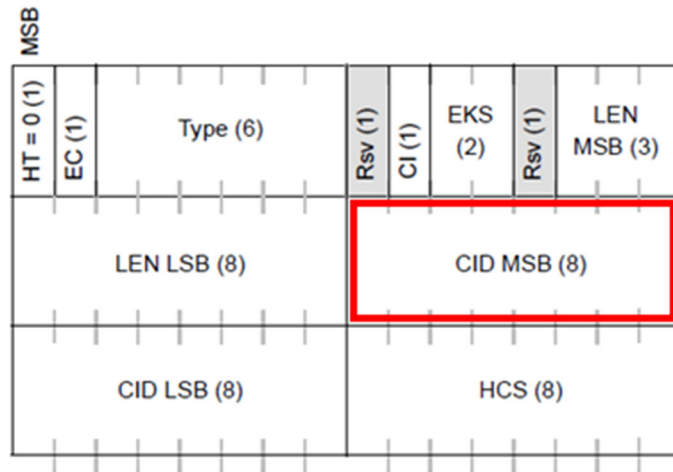


Figure 19—Generic MAC header format

Ex. 1013, 36 (red annotation added).

Table 5—Generic MAC header fields

Name	Length (bits)	Description
CI	1	CRC Indicator 1 = CRC is included in the PDU by appending it to the PDU Payload after encryption, if any 0 = No CRC is included
CID	16	Connection identifier
EC	1	Encryption Control 0 = Payload is not encrypted 1 = Payload is encrypted
EKS	2	Encryption Key Sequence The index of the Traffic Encryption Key (TEK) and Initialization Vector used to encrypt the payload. This field is only meaningful if the EC field is set to 1.
HCS	8	Header Check Sequence An 8-bit field used to detect errors in the header. The transmitter shall calculate the HCS value for the first five bytes of the cell header, and insert the result into the HCS field (the last byte of the MAC header). It shall be the remainder of the division (Modulo 2) by the generator polynomial $g(D = D^8 + D^2 + D + 1)$ of the polynomial D^8 multiplied by the content of the header excluding the HCS field. (Example: [HT EC Type]=0x80, BR=0xAAAA, CID=0x0F0F; HCS should then be set to 0xD5).
HT	1	Header Type. Shall be set to zero.
LEN	11	Length. The length in bytes of the MAC PDU including the MAC header and the CRC if present.
Type	6	This field indicates the subheaders and special payload types present in the message payload.

Ex. 1013, 37 (red annotation added).

The problem for Petitioner is that the claims require that the ranging request “specify content *payload*,” and WiMAX plainly discloses that a MAC message *header* is distinct from a MAC message *payload*. *Id.*, 35 (“Each PDU shall begin with a fixed-length generic MAC header. The header may be followed by the Payload of the MAC PDU”); Ex. 2007, ¶ 71. WiMAX further explains that “MAC PDUs shall be of the form illustrated in Figure 18.” *Id.*

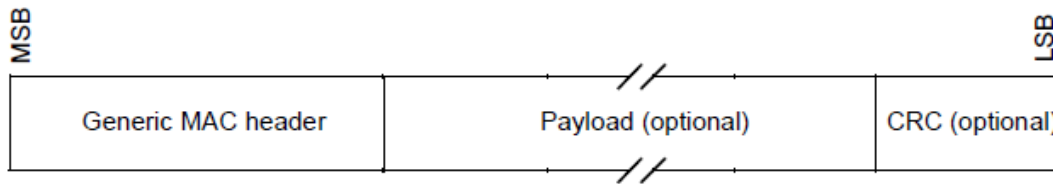


Figure 18—MAC PDU formats

Ex. 1013, 35. Figure 18 of WiMAX clearly differentiates the “Generic MAC header” (which contains the CID) and the “Payload.” In short, WiMAX discloses that the CID of the RNG-REQ and RNG-RSP messages is not “content payload” because it is, instead, header information. Ex. 2007, ¶ 71.

WiMAX’s distinction between headers and payloads is consistent with the disclosure of the ’690 Patent, which describes how in certain embodiments a physical layer packet comprises preambles and payloads. *See* Ex. 1001, 3:42-44; Ex. 2007, ¶ 71. Whereas “[a] PHY payload is used to transmit the data content of the packet,” “[a] PHY preamble is typically inserted at the beginning of each packet to assist receivers in detecting and acquiring the physical layer parameters to properly receive and decode the packet.” Ex. 1001, 3:44-47, 3:57-58. Based on the disclosures of both WiMAX and the ’690 Patent, Petitioner has failed to meet its burden to show that WiMAX anticipates claim 1 (for Ground A) or renders obvious claim 17 (for Ground B).

As to Petitioner’s ranging code index-based argument, Petitioner states only that “[t]he ‘ranging code index’ is another example of data that is in a Ranging

Request parameter and used for the Ranging Response payload.” Petition, 15. Yet the portions of the WiMAX standard cited by Petitioner (and by Mr. Bertonis) do not disclose that the ranging code index is sent *as part of the ranging request message*. See Ex. 1002, ¶ 149; Ex. 2007, ¶ 73. Rather, the Petition relies on a discussion about the RNG-RSP message on page 51 of WiMAX, not the RNG-REQ message. Compare Petition, 15 (citing Ex. 1013, 51) with Ex. 1013, 51 (“The following WirelessMAN-OFDMA PHY specific parameters shall be included in the RNG-RSP message ...”). Moreover, the cited portion of WiMAX does not say that the ranging code index came in a RNG-REQ message, it only discloses, vaguely, that the “ranging code index ... was sent by the SS.” Ex. 1013, 51; Ex. 2007, ¶ 73. However, the ranging code does not appear in any of the tables or figures dedicated to the format/encodings of the RNG-REQ message. See Ex. 1013, 49 (Table 19), 664 (Table 364); Ex. 2007, ¶ 73; see also Petition, 8-9.

Indeed, there are many messages and much data that is “sent by the SS” to the BS in WiMAX far beyond the RNG-REQ and RNG-RSP. Ex. 2007, ¶ 73. Petitioner, of course, does not point to any of those messages or data transmissions as supporting its Grounds since it has identified the alleged “probe” as the RNG-RSP alone and the alleged “probe request” as the RNG-REQ alone. Petition, 8. By way of example, WiMAX depicts a CDMA ranging procedure that involves the SS sending a “Ranging Code” and the BS responding with a RNG-RSP, but then later

(top of page 207) the SS separately sending a RNG-REQ to the BS. Ex. 1013, 206-207. This is but one example of the SS sending a ranging code *not as part of the RNG-REQ*.

Neither Petitioner nor Mr. Bertonis address this deficiency. There is no explanation of how WiMAX discloses the ranging code being included as a parameter in the RNG-REQ anywhere in WiMAX, let alone in the limited portions of it they rely on, nor any explanation of why a POSITA would understand that “sent by the SS” necessarily means *included in the RNG-REQ*. See Ex. 1002, ¶¶ 149, 192, 287. The Board correctly picked up on this failure in its Institution Decision, Paper 8 at 18, and should maintain its determination that Petitioner has failed its burden in its Final Written Decision for the same reasons. Therefore, Petitioner has failed to meet its burden to show that WiMAX discloses these elements of claims 1 and 17.

4. Dependent Claims 11 and 19: WiMAX Fails to Anticipate or Render Obvious Transmitting Two Probe Responses “Simultaneously Using OFDMA”

To the extent the Board concludes that WiMAX anticipates or renders obvious the independent claims, Petitioner has failed to show that dependent claims 11 and 19 are anticipated and/or obvious in view of WiMAX. Both of these claims recite transmitting multiple probe responses “simultaneously using OFDMA,” which stands for orthogonal frequency-division multiple access. Ex. 2007, ¶ 75.

Petitioner's explanation for how this claim element is supposedly present in WiMAX is based on pure conjecture. The Petition explains that a single SS might send multiple Ranging Requests to different BSs on different uplinks. Petition, 38. The timing at which each BS transmits its Ranging Response is independent and based on when the BS receives the request and when it has a slot available. *Id.* 37; Ex. 1002, ¶ 257. Petitioner argues from this that there would be situations in which two BSs happen to transmit their responses simultaneously, but this would be only by pure chance, and Mr. Bertonis confirmed that this was his opinion when questioned at deposition. Ex. 2007, ¶¶ 76–77; *see also* Ex. 2002, 84:12–16 (“Q. What you’re saying instead is that they are both transmitting and therefore, at some times at least, they might both transmit at the same time. Is that correct? A. I think that’s generally correct.”). Neither Petitioner nor Mr. Bertonis cite to anything in WiMAX affirmatively teaching or suggesting this hypothetical scenario. *See also* Ex. 1002, ¶ 249 (Mr. Bertonis admitting that WiMAX does not expressly disclose simultaneous transmission of Ranging Responses). Nor do they show that this claim element is inherent in the prior art. *See Therasense, Inc. v. Becton, Dickinson and Co.*, 593 F.3d 1325, 1332 (Fed. Cir. 2010) (“Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient.”); *see also Trintec Indus., Inc. v. Top-U.S.A. Corp.*, 295 F.3d 1292, 1295 (Fed. Cir. 2002) (“Inherent

anticipation requires that the missing descriptive material is necessarily present, not merely probably or possibly present, in the prior art.”). Therefore, WiMAX fails to anticipate or render obvious claims 11 and 19.

5. WiMAX Fails to Anticipate or Render Obvious the Other Challenged Claims Because It Fails to Anticipate or Render Obvious Claims 1, 9, and 17

As described above, the Petition has failed to carry its burden to show that claims 1 and 9 are anticipated by, or that claim 17 is rendered obvious by, WiMAX. By failing to anticipate or render obvious any independent claim, it follows that the Petition has also failed to anticipate or render obvious the dependent claims.

B. Ground C: Won Cannot Fix the Underlying Problems with WiMAX in Grounds A and B

The Petition asserts Ground C only for dependent claims 8, 16, and 24. Because independent claims 1, 9, and 17, from which 8, 16, and 24 depend, are not anticipated by or obvious over WiMAX, claims 8, 16, and 24 also are not obvious over Grounds C (WiMAX and Won).

C. Grounds D and E: Waxman Fails to Anticipate or Render Obvious the Challenged Claims

Like WiMAX, Waxman also does not anticipate or render obvious the challenged claims.

First, independent claim 1 requires that “the first plurality of parameters [in the probe request] at least specify content payload of the probe and a second node,”

but Waxman has no such disclosure. Waxman discloses that its probe request specifies three parameters, all of which relate to the transmission scheme to be used by the access point (the alleged probe transmitter), and none of which relate to the content payload of the probe response or the recipient of the probe. Ex. 2007, ¶¶ 82–83. Independent claim 1 recites “wherein the first plurality of parameters at least specify content payload of the probe and a second node,” but Waxman has no such disclosure. Waxman’s probe response is optional and, if used, is just a simple “acknowledgement” that the probe request and its parameters were received. Ex. 2007, ¶¶ 80, 83. Waxman’s probe response thus has no “payload” that could be specified by the probe request. Petitioner relies on Mr. Bertonis to fill in the gap, but Mr. Bertonis improperly uses the disclosures of the ’690 Patent, specifically its detailed description of its inventive embodiments, as a reason a POSITA would find the claim language to be met. Using the challenged patent to invalidate itself is a cardinal sin that the Board should reject in full.

Second, Waxman discloses nothing about its probe response being a “physical layer probe,” nor does Waxman suggest this to be the case. Ex. 2007, ¶¶ 86–90. Petitioner again relies on Mr. Bertonis to fill the gap, but he fails to show that Waxman’s “probe” has any relation to physical characteristics of the channel. Indeed, his entire basis for Waxman disclosing a physical layer probe is that

Waxman's "probe" has a header and a payload—things that are present in *any* kind of network management message (even ones that are not probes).

1. Overview of Waxman

Waxman discloses a wireless access point (AP) and one or more communication stations. Ex. 1007, ¶ [0012]; Ex. 2007, ¶ 80. As part of an active scanning process—which might occur, for example, when a communication station seeks to initiate communications with the AP—the station transmits what Waxman calls a "probe request" to the AP. Ex. 1007, ¶ [0030]. This "probe request" is unlike the "probe request" of the '690 Patent because it seeks to set the parameters by which the AP will communicate with the station, not to divine anything about the channel between them. Specifically, Waxman's "probe request" only asks the AP to communicate with the station using (1) a "requested transmission scheme" (*e.g.*, an extended-range transmission scheme), (2) a "requested number of transmission antennas," and (3) "other attributes of a requested transmission scheme." *Id.*, ¶¶ [0030]-[0035], [0042]-[0048], [0052]-[0056], Figs. 2-3; Ex. 2007, ¶¶ 80, 82. Waxman's AP need not respond to the request at all, but it may optionally send "an indication acknowledging or approving the request." Ex. 1007, ¶ [0037]. Although Waxman labels this simple acknowledgement message as a "probe response," again, it is unlike the "probe" of the '690 Patent because Waxman does not disclose that

the response characterizes the communication channel between the AP and the station. *See* Ex. 2007, ¶ 89.

In short, while Waxman calls its registration-type messages “probe requests” and “probe responses,” they are not the “probes” of the ’690 Patent because they lack various features discussed below, not the least of which is that the Waxman “probe response” does not characterize physical characteristics of the channel.

2. Waxman Does Not Specify a First Plurality of Probe Parameters That “Specify Content Payload of the Probe and a Second Node” (Claim 1) or “Compr[is]e ... a Payload Content for the Probe” (Claim 17)

Claim 1 of the ’690 Patent recites “wherein the first plurality of parameters at least specify content payload of the probe and a second node” and claim 17 recites “wherein the first plurality of probe parameters comprising at least a payload content for the probe.” The Petition attempts to meet these elements by vaguely pointing to “numerous parameters” as meeting the “first plurality of [probe] parameters” recited in claims 1 and 17. Petition, 49, 55 (treating the analysis of claim 17 as identical to claim 1). The Petition goes on to identify the only three parameters that Waxman discloses are in the probe request, the (1) “requested transmission scheme,” (2) “requested number of transmission antennas to be used,” and (3) “other attributes of a requested transmission scheme.” *Id.*, 49; Ex. 1007, ¶¶ [0030]-[0035]. But all three of these parameters relate to the *transmission scheme* of the subsequent

messages to be exchanged between the AP and stations of Waxman; none of these parameters specify (i) *payload content* of the to-be-sent probe response or (ii) a *recipient of the probe response*, both of which are required for claim 1. Ex. 2007, ¶¶ 82–83. This is where the Board's Institution Decision found fault in Petitioner's arguments, and for the same reasons stated there (Paper 8 at 28), the Board should hold firm in its Final Written Decision and find Petitioner has failed to meet its burden for at least those same reasons.

The “requested transmission scheme” parameter refers to a request by the station that the AP transmit using, *e.g.*, an extended-range transmission scheme such as transmission antenna diversity scheme (TADS), space-time block codes (STBC), beam forming (BF), or the like. *See* Ex. 1007, ¶ [0054]; Ex. 2007, ¶ 82. Likewise, the “requested number of transmission antennas” simply refers to the number of physical antennas used to transmit messages from the AP to the station. Ex. 1007, ¶¶ [0020], [0032]–[0035]; Ex. 2007, ¶ 82. Neither of these relate to the content of Waxman's probe response, but rather the means by which the AP will transmit messages to the station. Ex. 2007, ¶ 83. Finally, there can be no dispute that “other attributes of a requested transmission scheme” relate to transmission schemes, not probe response content.

Waxman does not disclose or suggest any other parameters that could be part of the probe request other than those three identified by Petitioner, each of which is

insufficient to satisfy this element of claims 1 and 17 of the '690 Patent. Petitioner tries to hide this by citing to [0037], [0042], [0043], [0049], and [0056] for support (Petition, 49), but these citations relate to the probe *response*. They do not shed any light on what is being communicated in the probe request. For example, Petitioner's citation to [0042]-[0043] and [0056] is in relation to the "probe response having preamble and data portions," but Petitioner does not show how these parameters are specified by the probe request.⁵ Petitioner's reliance on [0037] and [0049] is just as meritless. Paragraph [0037] discusses Waxman's "probe response" but only discloses that it may "include an indication acknowledging or approving the request embedded in the probe request" and that it may be "transmitted by AP 105 using the transmission scheme requested in the probe request." *See also* Ex. 2002, 87:16–88:18 (Mr. Bertonis generally agreeing that the probe request is for requesting

⁵ In any event, these three paragraphs clearly discuss what happens between the AP and stations *after* the probe request has been transmitted. *See* Ex. 1007, ¶ [0042] ("based on the probe request transmitted by station 102, the AP 105 may transmit"); *id.*, ¶ [0043] ("based on the probe request transmitted by station 103, the AP 105 may transmit"); *id.*, ¶ [0056] (discussing "box 340" of Figure 3, which is shown as occurring after the probe request and probe response have been sent).

different communication parameters and that the probe response is an acknowledgement message that uses the requested transmissions scheme). And Paragraph [0049] just repeats that the AP may send a probe response using the requested transmission scheme.

Nowhere in Waxman, especially not in the portions cited by Petitioner, is there any disclosure of the probe request including a parameter specifying the payload content or the recipient of the probe response. In fact, the only payload that Waxman discloses can be in the probe response is a simple acknowledgement. Ex. 2007, ¶¶ 80, 83. This request-acknowledgement architecture of Waxman is far from what is recited in the challenged claims of the '690 Patent. *See* Ex. 2002, 100:9–14 (Mr. Bertonis admitting that his opinions relating to “content payload” are based on what he believed would be a POSITA’s understanding of Waxman, and not anything expressly stated in Waxman); *see also* 96:21–100:14 (Mr. Bertonis unable to identify any “content payload” for the response aside from the fact it is transmitted using the requested transmission scheme).

Because Waxman does not support Petitioner’s Grounds, Petitioner relies on Mr. Bertonis to purportedly supply the rest. As an initial matter, Petitioner’s reliance on what Mr. Bertonis says “would have [been] understood” by a POSITA, *see* Ex. 1002, ¶ 343, is an obviousness analysis that is insufficient to support an anticipation challenge, so Ground D cannot find support in the Bertonis Declaration. *See Eli*

Lilly Co. v. Los Angeles Biomedical Research Institute at HarborUCLA Medical Center, 849 F.3d 1073, 1074-75 (Fed. Cir. 2017) (finding an expert's analysis of what a POSITA "would understand" insufficient to support anticipation). The purpose of extrinsic evidence, like expert testimony, in an anticipation analysis is "not to fill in gaps in the reference." *Scripps Clinic & Res. Found. v. Genentech, Inc.*, 927 F.2d 1565, 1576 (Fed. Cir. 1991); *see also Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 851 F.3d 1270, 1274-75 (Fed. Cir. 2017) (holding that on an anticipation analysis, the Board cannot "fill in missing limitations simply because a skilled artisan would immediately envision them"); *cf. Wasica Finance GMBH v. Continental Automotive Systems, Inc.*, 853 F.3d 1272, 1284 (Fed. Cir. 2017) ("Anticipation requires that a single reference 'describe the claimed invention with sufficient precision and detail to establish that the subject matter existed in the prior art.' For this reason, it has long been understood that ambiguous references do not, as a matter of law, anticipate a claim.") (internal citations omitted).

Further, Mr. Bertonis commits the cardinal sin of an obviousness analysis by using the '690 Patent as a roadmap. Rather than hide it, though, he blatantly cites to descriptions of the inventive embodiments in the '690 Patent as illustrating the supposed knowledge of a POSITA before the '690 Patent's inventions. *See Ex. 1002*, ¶ 343 (citing '690 Patent, 3:42-58 and 7:64-8:58 to argue what "a POSITA would have understood" in relation to "Waxman's probe response" and Waxman's

“probe request parameters”). That is not how an obviousness analysis works. It is incumbent on Petitioner and Mr. Bertonis to find support for their arguments in *the prior art*, not in the challenged patent’s description of the invention. If patent claims could be rendered obvious by pointing to what is disclosed in the detailed description of the patent itself, then all patents would be obvious, and the U.S. Patent and Trademark Office would still be struggling to issue its very first patent.

The rest of Mr. Bertonis’s analysis, and the rest of the Petition, is tainted by this flagrant attempt to invalidate the ’690 Patent using itself, but it has further problems. The majority of Mr. Bertonis’s critical paragraph (¶ 343) consists of conclusory statements that “a POSITA would understand” that Waxman met the elements of the challenged claims and is based on nothing more than Mr. Bertonis’s say-so. There are no citations to support most of what he says. Opinions like these that do not rely on any evidence besides the words of the expert are due little, if any, weight. *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 16-17 (PTAB Aug. 24, 2022) (precedential) (citing 37 C.F.R. § 42.65(a) and collecting a series of Federal Circuit decisions). Second, Mr. Bertonis relies on disclosures about “probes” from the 802.11 standard but fails to identify what parameter of 802.11’s “Probe Request frame body” specifies content payload of the probe as recited in the challenged claims. Mr. Bertonis simply argues that the “probe request parameters would have specified content for the probe payload.” Ex. 1002, ¶ 343. This too is

not enough to carry Petitioner's burden, even if Mr. Bertonis had not made the other improper assertions discussed above.

Accordingly, Petitioner has not met its burden to show that Waxman discloses "wherein the first plurality of parameters at least specify content payload of the probe and a second node" recited in claim 1 or "wherein the first plurality of probe parameters comprising at least a payload content for the probe" recited in claim 17.

3. Waxman Fails to Disclose a "Physical Layer Probe" As Recited in Claim 9

Claim 9 recites a "physical layer probe," and the Petition's lone argument for this element is a single conclusory sentence that "Waxman's probe response is a physical layer probe to the extent the '690 Patent's probe is." Petition, 54. Once again, Mr. Bertonis improperly relies on the '690 Patent's own disclosure, except that this time his opinion is illogical. He first cites to language in the '690 Patent explaining that "physical layer (PHY) packets comprise preambles and payloads." Ex. 1002, ¶ 404. He then asserts that Waxman's "probe" is a physical layer probe simply because it is a packet that has a preamble and a payload. *Id.* But as Mr. Bertonis himself was forced to admit at deposition (Ex. 2002, 95:4–96:4), and as Mr. Holobinko points out in his declaration, virtually all data packets have preambles and payloads, even ones that are not "probes" at all. Ex. 2007, ¶ 87. In his deposition, Mr. Bertonis further opined that Waxman has a physical layer probe

“because it goes over the physical layer.” Ex. 2002, 107:3–11. But once again, this is something that is generally true of all network messages. *Id.* at 107:20–24; *see also* 107:12–19 (“Q. Are there any probes that don’t go over the physical layer? A. Not in the context we’re discussing . . .”); Ex. 2007, ¶ 88.

Mr. Bertonis does not offer any other explanation as to why a POSITA would consider Waxman’s probe to be a *physical layer* probe. In his deposition, Mr. Bertonis attempted to explain that the probe response *could have been used* for assessing the communications path, but that this was not something Waxman (or the prior art) affirmatively teaches. *See* Ex. 2002, 104:25–106:13. Indeed, Waxman says nothing of the sort. Ex. 2007, ¶ 89.

Waxman’s “probe response” is simply an acknowledgement message, which can be transmitted using the transmission scheme and number of antennas requested by the “probe request.” Ex. 2007, ¶ 89; Ex. 1007, ¶¶ [0037], [0056]. There is no indication in Waxman that the “probe” is used to characterize physical characteristics of the channel. Ex. 2007, ¶ 89. To the contrary: the whole point of Waxman’s “probing” process is that the “probe request” instructs the AP to transmit using a certain transmission scheme, and then the AP does exactly that. Whatever information about the channel the communication station needed to decide what scheme to request, it must have had it before sending the “probe request.”

Accordingly, Petitioner has not met its burden to show that Waxman discloses “a physical layer probe” recited in claim 9.

4. Waxman Fails to Anticipate or Render Obvious the Other Challenged Claims Because It Fails to Anticipate or Render Obvious Claims 1, 9, and 17

As described above, the Petition has failed to carry its burden to show that claims 1 and 9 are anticipated by, or that claim 17 is rendered obvious by, Waxman. By failing to anticipate or render obvious any independent claim, it follows that the Petition has also failed to anticipate or render obvious the dependent claims.

D. Grounds F-I: None of Giesberts, Zuckerman, or Won Can Fix the Underlying Problems with Waxman, Particularly as to Dependent Claims 11 and 19

The Petition asserts Grounds E through I only for dependent claims 3-5, 7-8, 10-13, 15-16, 18-21, and 23-24. Because independent claims 1, 9, and 17, from which 3-5, 7-8, 10-13, 15-16, 18-21, and 23-24 depend, are not anticipated by or obvious over Waxman, claims 3-5, 7-8, 10-13, 15-16, 18-21, and 23-24 also are not obvious over Grounds F (Waxman and Giesberts), G (Waxman and Zuckerman), H (Waxman, Giesberts, and Zuckerman), or I (Waxman and Won).

In particular, the Petition relies on Waxman in combination with Zuckerman to teach transmitting two probe responses “simultaneously using OFDMA” as required by dependent claims 11 and 19. The Petition’s argument here is strikingly similar to the one concerning WiMAX, with Petitioner and Mr. Bertonis essentially

arguing that two APs might, by pure coincidence, transmit probes simultaneously to the same station. *See* Petition, 66–67; Ex. 1002, ¶¶ 427–428; *see also* Ex. 2007, ¶¶ 91–93. Not only is this reasoning insufficient for an obviousness analysis⁶; it is directly refuted by Waxman itself. Waxman describes the opposite of simultaneous transmissions; it intentionally inserts a “random or pseudo-random delay period” on the probe response so as to reduce the likelihood of interference with other APs trying to communicate with the same station. *See* Ex. 2007, ¶ 94; Ex. 1007, ¶ [0038]. Petitioner’s and Mr. Bertonis’s argument is not only legally insufficient; it flies in the face of the plain disclosure of Waxman too. Therefore, the Petition has not

⁶ *Therasense, Inc. v. Becton, Dickinson and Co.*, 593 F.3d 1325, 1332 (Fed. Cir. 2010) (“The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient.”); *see also InTouch Technologies, Inc. v. VGO Communications, Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014) (finding improper hindsight bias where expert focused on whether prior art references *could* have been combined rather than whether a POSITA *would* have been motivated to do so); *see also Procter & Gamble Co. v. Teva Pharms. USA*, 566 F.3d 989, 994 (2009) (obviousness requires showing “that the skilled artisan would have had a reasonable expectation of success”).

shown that dependent claims 11 and 19 are obvious in view of Waxman and Zuckerman.

E. Grounds J and K: DOCSIS-2.0 Fails to Anticipate the Challenged Claims, and DOCSIS-2.0 and ISO8802-2 Fail to Render Obvious the Challenged Claims

Petitioner's final Grounds rely on DOCSIS-2.0, but the parts of DOCSIS-2.0 relied upon are very similar to the parts of WiMAX relied upon, even using many of the same procedures and messages, just applying them specifically to a data-over-cable environment. Petitioner, however, treats DOCSIS-2.0 differently. It still relies on the "ranging" procedure of DOCSIS-2.0, but it now says the Ranging Request (RNG-REQ) message is the "probe" rather than the "probe request" as it contended for WiMAX. And for DOCSIS-2.0, Petitioner also relies on its "testing" procedure (in conjunction with ISO8802-2), whereby a CMTS can tell a cable modem to continuously transmit a known signal for a period of up to 30 minutes. But while Petitioner treats DOCSIS-2.0 differently, it still suffers from the same issues as WiMAX, and still fails to anticipate or render obvious the challenged claims for the same reasons.

1. Overview of the Asserted Prior Art

a. DOCSIS-2.0

DOCSIS-2.0 refers to version 2.0 of the Data-Over-Cable Service Interface Specifications, a standard which relates to the delivery of high-speed data over cable

systems. *See* Ex. 1010, 1-3; Ex. 2007, ¶ 97. Like WiMAX, DOCSIS-2.0 discloses a ranging procedure, where a cable modem (CM) sends a Ranging Request message (like RNG-REQ) to a cable modem termination system (CMTS), and the CMTS sends a Ranging Response message (RNG-RSP) back to the CM. Ex. 1010, 183, 197, 247; Ex. 2007, ¶ 98. DOCSIS-2.0 describes this as “the process of acquiring the correct timing offset such that the cable modem’s transmissions are” aligned with the time slots expected by the CMTS and that the power level and frequency offset adjustments are aligned. Ex. 1010, 197; *see also id.*, 183.

Separate from the ranging procedure, like WiMAX, DOCSIS-2.0 also discloses generic, periodic MAC management messages exchanged between the CM and CMTS. One of those is the upstream channel descriptor (UCD) message, which the CMTS sends to the CM to describe the characteristics of the communications channel between them. Ex. 1010, 135; Ex. 2007, ¶¶ 98, 102. The CMTS sends this UCD message at a fixed interval, even when the CM is turned off or not yet initialized. Ex. 1010, 246-250; Ex. 2007, ¶ 98.

DOCSIS-2.0 also discloses a “testing” procedure whereby the CMTS sends a test request message to a CM, which forces the CM to enter one of two pre-defined test modes. Ex. 1010, 184-185; Ex. 2007, ¶ 99. In either test mode, the CM will send a “continuous (non-burst) upstream signal” for up to 30 minutes, or until the CM receives another test request message telling the CM to disable all test modes

and reboot. Ex. 1010, 184-185; Ex. 2007, ¶ 99. Test modes are initiated only by human operators and are an “explicit command” for a CM to enter that test mode. Ex. 1010, 184; Ex. 2007, ¶¶ 99, 108. DOCSIS-2.0 does not disclose any other use or purpose for the continuous test transmissions and does not say what the CMTS does with the continuous test transmissions (if anything). Ex. 2007, ¶ 107.

b. ISO8802-2

ISO8802-2 refers to Part 2 of the IEEE 802.2 standard and governs the “Logical Link Control” (LLC) sublayer of network communications among various network elements. ISO8802-2, i, iii-v, 1-3; Ex. 2007, ¶ 100. ISO8802-2 describes a “TEST function” capability to “conduct loopback tests of the LLC to LLC transmission path” between two network elements. ISO8802-2, 63. “Successful completion of the test” involves sending a TEST command with a “particular information field” and “receiving, in return, the identical information field in a TEST response.” ISO8802-2, 63; Ex. 2007, ¶ 100. That said, ISO8802-2 also discloses that the information field of its LLC messages, such as the TEST messages, is optional; there need not be any information conveyed in such a message. ISO8802-2, 39 (describing that the size of the information field can be “M*8 bits,” where M is “[a]n integer value equal to or greater than zero”); *id.*, 41 (“The information field shall consist of any integral number (including zero) of octets); Ex. 2007, ¶ 100.

2. The Petition's "Ranging" Arguments Do Not Anticipate the Challenged Claims

a. DOCSIS-2.0's "Ranging" Procedure Does Not Disclose a "Probe" or, Consequently, a "Probe Request" As Required by Each Challenged Claim

Petitioner's "Ranging" arguments fail to anticipate any of the challenged claims because Petitioner fails to show that the prior art meets two elements present in each independent claim of the '690 Patent: a "probe" and, consequently, a "probe request." The Petition's arguments in this regard are similar to its failed arguments in relation to WiMAX's ranging procedure discussed above, but have even more problems. Whereas Petitioner's arguments for WiMAX alleged the Ranging Request (RNG-REQ) message was a "probe request," for DOCSIS-2.0 and ISO8802-2, Petitioner turns things around. Instead of the Ranging Request being the "probe request," Petitioner argues in Grounds J and K that the Ranging Request is now the "probe." Petition 75, 79.⁷ The Board had it right in its Institution Decision

⁷ While Petitioner calls these arguments "ranging," Petitioner does not actually capture the "ranging" aspect of DOCSIS-2.0 because ranging requires not just a Ranging Request but also a Ranging Response. *Id.*, 197-198. It is through that Ranging Response that "timing offset corrections" are sent by the CMTS to the CMs, and it is the Ranging Response that permits adjustment of "each CM's

when it found that Petitioner's reading of the claimed "probe" onto DOCSIS-2.0's "Ranging Request" could not be a "probe" because it is a "request." Paper 8 at 42. The Board should hold to that finding again in its Final Written Decision.

Apart from the failings already identified by the Board, however, Petitioner's reworking of its Ground A and B arguments fails for other reasons. First, the DOCSIS-2.0 "ranging" procedure is not used to determine characteristics of the channel between the CMTS and a cable modem. Ex. 2007, ¶ 102. DOCSIS-2.0 describes its "ranging" procedure (which utilizes the INIT-RNG-REQ and RNG-REQ messages) much like that of WiMAX as "the process of acquiring the correct timing offset such that the cable modem's transmissions are" aligned with the time slots expected by the CMTS. Ex. 1010, 197. The ranging procedure of DOCSIS-2.0, like that of WiMAX, is also used to align power level and offset frequency adjustments. Ex. 1010, 197; *see also id.*, 183; Ex. 2007, ¶¶ 98, 102. In short, the ranging procedure is used for the CMTS and CM to negotiate power thresholds and

timing offset such that it appears to be located right next to the CMTS." *Id.*, 197; *see also id.*, 198 ("The CMTS MUST return another Ranging Response message to the cable modem with any additional fine tuning required"). Because Petitioner does not point to this aspect of ranging as reading on the challenged claims, it is not appropriate to call Petitioner's grounds "ranging."

timing offsets for the messages to be exchanged between them and for the SS to move to a different downlink frequency and/or uplink channel ID. *E.g.*, Ex. 1010, 183, 197; Ex. 2007, ¶¶ 64, 102. And when the CMTS receives a Ranging Request (the alleged “probe”), the CMTS simply “return[s] a Ranging Response message addressed to the individual cable modem” containing information on power and timing adjustments for the CM. Ex. 1010, 197; *see also* Ex. 2007, ¶ 98.

Thus, as in WiMAX, DOCSIS-2.0 makes clear that its CMTS does not use the ranging procedure or the RNG-REQ message to determine characteristics of a channel. Ex. 2007, ¶ 102. The CMTS determines those characteristics on its own and in fact reports those channel characteristics to the CM via the UCD message (which Petitioner contends is the “probe request”). Ex. 2007, ¶¶ 98, 102–103. Petitioner has it all backwards; the Ranging Request is not used by the CMTS to determine channel characteristics, as a probe would be used. Rather, it is the CMTS that reports those characteristics to the CM through what Petitioner argues is the “probe request” (*i.e.*, the UCD message). *Id.* And the CMTS knows the characteristics of a channel before it even receives the Ranging Request “probe” because it has been transmitting those characteristics by its own UCD messages all along. Ex. 2007, ¶¶ 102–103. The CMTS has no mechanism, and no need, to use the Ranging Request message to determine channel characteristics because the

CMTS already has the channel characteristic information it needs apart from the ranging process. *Id.*; *see also* Ex. 2007, ¶ 65.

Like with WiMAX, none of this is discussed by Petitioner or Mr. Bertonis because both treat “probe” as if it meant nothing more than a mere “message,” even though it has a more specific meaning. Also like with WiMAX, based on the plain meaning of “probe” as agreed by Mr. Bertonis and Mr. Holobinko, there should be no doubt that Petitioner has failed to meet its burden. Neither Petitioner nor Mr. Bertonis make any real effort to argue that the Ranging Request is used to characterize the channel. That is a critical failure that dooms Ground J, especially because it is a ground asserting anticipation.

In the end, because the Petition has failed to demonstrate that the Ranging Response message is a “probe”—let alone a *physical layer* probe—the Petition has also failed to demonstrate that the UCD message is a “probe request,” under any construction. And for good reason: the UCD message is decoupled from the Ranging Request. The CMTS transmits the UCD messages at periodic intervals, regardless of whether ranging will occur. Ex. 1010, 246-250; Ex. 2007, ¶¶ 98, 102. The Petition thus has failed to meet its burden as to Ground J.

3. The Petitioner's "Testing" Arguments Do Not Render Obvious the Challenged Claims

Similar to Petitioner's "Ranging" arguments, Petitioner's "Testing" arguments also fail to render obvious any of the challenged claims because Petitioner fails to show that the prior art meets two elements present in each independent claim of the '690 Patent: a "probe" and, consequently, a "probe request."

DOCSIS-2.0 describes that its "testing" procedure can be "used to force a CM to enter or leave one of two test modes," both of which involve the CM transmitting "a continuous (non-burst) upstream signal." Ex. 1010, 184-185; Ex. 2007, ¶ 106. A "mode 1" transmission is the equivalent of "an alternating binary sequence (1, -1, 1, -1, 1, -1, ...) at nominal amplitude," whereas a "mode 2" transmission is the equivalent of "the constant sequence (1, 1, 1, 1, 1, 1, ...) at nominal amplitude." Ex. 1010, 185; Ex. 2007, ¶ 106. These modes continue until either (1) the CM receives another TST-REQ message with "mode" equal to 0 or (2) the test mode has persisted for more than 30 minutes. Ex. 1010, 185. In either case, the CM disables all test modes and reboots. *Id.*

DOCSIS-2.0 does not anywhere disclose that its "testing" procedure is used to determine characteristics of a channel, only that the test is initiated by a human operator. Ex. 2007, ¶¶ 107–108. DOCSIS-2.0 discloses that its TST-REQ messages "MUST NOT be sent by the CMTS" to a CM except when a human operator

provides “an explicit command” to do so. Ex. 1010, 184. DOCSIS-2.0 does not disclose any other use or purpose for the continuous test transmissions, especially not as far as the CMTS (the recipient of the CM’s continuous test transmissions) is concerned. Ex. 2007, ¶¶ 107–108.

ISO8802-2 only discloses that a “TEST command” may be used to test the logical link control (“LLC to LLC”) transmission path between the CMTS and a CM. ISO8802-2, 51; *id.*, 63 (“The TEST function provides a facility to conduct loopback tests of the LLC to LLC transmission path.”); Ex. 2007, ¶ 109. ISO8802-2 defines “[s]uccessful completion of the test” as a sending of “a particular information field” and a receiving of “the identical information field” in response. ISO8802-2, 63; Ex. 2007, ¶ 109. There is no discussion in ISO8802-2 of using the “TEST command” procedure to determine characteristics of a channel between a CMTS and a CM. Ex. 2007, ¶¶ 107, 109–110.

The reason that neither DOCSIS-2.0 nor ISO8802-2 use their “testing” procedure to determine characteristics of a CMTS-to-CM channel is because DOCSIS-2.0 already provides a means for the CMTS to report those channel characteristics to the CM: the UCD MAC message discussed above for Petitioner’s “ranging” arguments. Ex. 2007, ¶ 110. Like with those arguments, where Petitioner contended that the CM-to-CMTS Ranging Request message was the “probe,” the CM-to-CMTS continuous test transmissions are ancillary to the CMTS determining

channel characteristics. The CMTS already knows the characteristics of a channel before it even receives the test-transmission “probe” because it has been transmitting those characteristics to the CM with its own UCD messages all along. Ex. 2007, ¶ 110. The CMTS has no mechanism, and no need, to use the CM’s continuous test transmissions to determine channel characteristics because the CMTS already has the channel characteristic information it needs apart from the testing process. Ex. 2007, ¶¶ 107–110.

Moreover, there is no discussion in either DOCSIS-2.0 or ISO8802-2 about what the CMTS does with the CM’s continuous test transmissions once the CMTS receives them. There is no discussion about using those transmissions to characterize the channel. And as Mr. Holobinko explains, the test process has minimal utility and would only be useful for confirming that the cable modem is capable of transmitting 1s and -1s. *Id.* at ¶ 107. In addition, the test process cannot be performed once the cable modem has begun normal operation, making it less likely that a POSITA would be motivated to use the test process to attempt to characterize the channel. *Id.* at ¶ 108; *see also* Ex. 1010 at 185 (“In normal operation, the CM MUST ignore any TST-REQ message it receives subsequent to receiving the first SYNC message.”).

Again, none of this is discussed by Petitioner or Mr. Bertonis because both incorrectly treat “probe” as if it were a nonce word. And, again, under the plain

meaning of that term as agreed by both experts here, there should be no doubt that Petitioner has failed to meet its burden. Neither Petitioner nor Mr. Bertonis make any real effort to argue that the CM's continuous test transmissions are used to characterize the channel. That is a critical failure that dooms Ground K.

In his deposition, Mr. Bertonis attempted to right course and explain how the test signal might be used to diagnose problems with the cable modem. "Diagnosing problems with the cable modem" is of course not the same as "characterizing the channel," but more to the point: it is evident that Mr. Bertonis's opinions were once again based on conjecture and what *could have been possible* rather than what the prior art actually teaches. *See* Ex. 2002, 119:14–15 ("presumably, the cable modem is analyzing that test signal"), 119:25–120:1 ("I'm presuming that the CMTS is analyzing that information"), 120:16–17 ("it's used by that test message presumably"), 122:1–2 ("presumably you're making tests and doing something with it"). What a POSITA "could" understand or do is irrelevant to anticipation and obviousness both; the question for anticipation is what a prior art reference *discloses*, and the question for obviousness is what a POSITA *would* understand. *Therasense, Inc. v. Becton, Dickinson and Co.*, 593 F.3d 1325, 1332 (Fed. Cir. 2010) ("all elements must be disclosed in an anticipatory reference in the same way as they are arranged or combined in the claim"); *see also InTouch Technologies, Inc. v. VGO Communications, Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014) (finding improper

hindsight bias where expert focused on whether prior art references *could* have been combined rather than whether a POSITA *would* have been motivated to do so). Under either invalidity theory, Mr. Bertonis cannot save Petitioner's flawed theory of unpatentability.

Further undermining Petitioner is Mr. Bertonis's deposition admission that DOCSIS 2.0 did not disclose using the test signal to diagnose cable modem problems and that his opinions were based on what he saw as the purpose of the test mode. Ex. 2002, 113:2–6 (“If you’re asking, is it explicitly described, what the CMTS does or what the program that the network operator might have running behind the CMTS, that might not be disclosed in this table, but I see it as the purpose of the test mode”). But opinions like these that do not rely on any evidence besides the words of the expert are due little, if any, weight. *Xerox Corp.*, IPR2022-00624, Paper 9 at 16-17.

The Board also determined in its Institution Decision that “Petitioner has not explained sufficiently how the mode parameter” of DOCSIS-2.0’s testing “specifies the content payload of the probe,” Paper 8 at 43-44, and Patent Owner agrees that Petitioner does not sufficiently explain the same. Thus, whether for that reason or the various others provided by Patent Owner above, the Petition thus has failed to meet its burden as to Ground K.

4. Ranging/Testing: DOCSIS-2.0 and ISO8802-2 Fail to Anticipate or Render Obvious the Other Challenged Claims Because They Fail to Anticipate or Render Obvious Claims 1 and

9, Particularly with Regard to Dependent Claims 10, 11, 18, and 19

As described above, the Petition has failed to carry its burden to show that claims 1 and 9 are anticipated by DOCSIS-2.0 or rendered obvious by DOCSIS-2.0 and ISO8802-2, whether under Petitioner's "Ranging" or "Testing" arguments. By failing to anticipate or render obvious those independent claims, it follows that the Petition has also failed to anticipate or render obvious their dependent claims.

In addition, dependent claims 10, 11, 18, and 19 all recite transmitting probe requests using OFDMA. Petitioner and Mr. Bertonis assert that it would have been obvious to a POSITA to use OFDMA in the system taught by DOCSIS 2.0. Petition, 89; Ex. 1002, ¶ 665; *see also* ¶¶ 666–671, 681–687, 729, 746. However, this is plainly refuted by the actual history and development of DOCSIS. *See* Ex. 2007, ¶¶ 113–115. As explained by Mr. Holobinko, DOCSIS 2.0 was initially released in 2007. Ex. 2007, ¶ 113. DOCSIS 2.0 did not utilize OFDMA. *Id.* The next version, 3.0, which was released in 2006 and significantly improved upon the previous version, also did *not* include OFDMA. *Id.* It was not until the release of version 3.1 in 2013—twelve years after DOCSIS 2.0 and *five years after* the priority date for the '690 Patent—that OFDMA was finally integrated into the DOCSIS standard. *Id.*, ¶¶ 113–115.

Mr. Bertonis's opinions do not line up with these facts. That is likely because he is using hindsight but, even worse, Mr. Bertonis admitted at deposition that he was less familiar with these later versions compared to DOCSIS 2.0. Ex. 2002, 93:5–15. Thus, not only is Petitioner having Mr. Bertonis fill in gaps and create an anachronistic view of the world for the sole purpose of rendering the challenged claims unpatentable, Mr. Bertonis is complying without any real understanding of what the references say or what actually happened in the real world. Obviousness is, of course, a hypothetical exercise, but that hypothetical exercise cannot subsume reality. Therefore, the Board should give no weight to Mr. Bertonis's opinions here, that it would have been obvious to merge OFDMA and DOCSIS at the time of the priority date.

F. Grounds L and M: Zuckerman Cannot Fix the Underlying Problems with DOCSIS-2.0 and ISO8802-2

Petitioner's Grounds L and M are essentially the same as Grounds J and K, except they challenge independent claim 17 and thus add Zuckerman to fill in the gap left by DOCSIS-2.0 and ISO8802-2, but not the gaps identified above. Petitioner only uses Zuckerman to assist in its argument that a POSITA would have understood that "the computer executable program code would have been configured to carry out the procedures (e.g., ranging and test procedures) of the layers in the stack" in relation to [17A] and [17B]. Petition, 94. The Petition otherwise treats the

requirements of claim 17 as the same as for claim 1 and 9, even cross-referencing its arguments for those claims in Grounds J and K. Petition, 92-96. Petitioner thus does not offer Zuckerman to cure the fundamental problems in Grounds J and K, nor can Zuckerman fill the significant chasms between the proposed combinations and the challenged claims discussed above. Accordingly, Grounds L and M fail for the same reasons as Grounds J and K, both for independent claim 17, and for all challenged dependent claims.

IV. CONCLUSION

All Grounds of the Petition fail for a multitude of reasons. Accordingly, the Board should find that all challenged claims are valid in view of the asserted art.

Dated: December 6, 2024

Respectfully submitted,

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

Counsel for Patent Owner

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

The undersigned hereby certifies that the foregoing contains 12,853 words according to the word count of the word-processing software used to prepare the foregoing.

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

CERTIFICATE OF SERVICE

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

Frederic M. Meeker
Paul T. Qualey
Craig W. Kronenthal
Camille Sauer
John M. Fleming
BANNER & WITCOFF, LTD.
1100 13th Street NW, Suite 1200
Washington, DC 20005
fmeeker@bannerwitcoff.com
pqualey@bannerwitcoff.com
ckronenthal@bannerwitcoff.com
csauer@bannerwitcoff.com
jfleming@bannerwitcoff.com
comcastiprservice@bannerwitcoff.com

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