IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

TQ DELTA, LLC, Plaintiff, v. ZYXEL COMMUNICATIONS, INC and ZYXEL COMMUNICATIONS CORPORATION, Defendants.	Civil Action No. 1:13-cv-02013-RGA
TQ DELTA, LLC, Plaintiff, v. ADTRAN, INC., Defendant.	Civil Action No. 1:14-cv-00954-RGA
ADTRAN, INC., Plaintiff, v. TQ DELTA, LLC, Defendant.	Civil Action No. 1:15-cv-00121-RGA

MEMORANDUM OPINION

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ANDREWS, U.S. DISTRICT JUDGE:

Presently before the Court is the issue of claim construction of multiple terms in U.S. Patent Nos. 7,796,705 ("the '705 patent"), 8,335,956 ("the '956 patent"), 8,407,546 ("the '546 patent"), 8,468,411 ("the '411 patent"), 8,595,577 ("the '577 patent"), and 8,645,784 ("the '784 patent"). The Court has considered the Parties' Joint Claim Construction Brief for Family 8 (Civ. Act. No. 13-02013-RGA, D.I. 449; Civ. Act. No. 14-00954-RGA, D.I. 305; Civ. Act. No. 15-00121-RGA; D.I. 305) and for Family 9 (Civ. Act. No. 13-02013-RGA, D.I. 447; Civ. Act. No. 14-00954-RGA, D.I. 302; Civ. Act. No. 15-00121-RGA; D.I. 303).[1] The Court heard oral argument on February 1, 2018. (D.I. 485 ("Tr.")). In Family 9, the '577 patent and '784 patent are only asserted against ADTRAN, claim 28 of the '956 patent is only asserted against ZyXEL, and claim 31 of the '956 patent is only asserted against ADTRAN. (D.I. 447 at 1).

I. BACKGROUND

The patents-in-suit represent "Family 8" and "Family 9" of the patents that Plaintiff has asserted against ADTRAN and ZyXEL ("Defendants").[2] (D.I. 449 at 1; D.I. 447 at 1). The parties divide the contested patents into ten patent families. (*e.g.* D.I. 269). Family 8 is the '705 patent, and Family 9 consists of the '956, '546, '411, '577, and '784 patents. The Family 8 patent relates to "impulse noise management during initialization in xDSL systems." (D.I. 449 at 1). The Family 9 patents are "directed to various aspects of packet retransmission and memory sharing in communications systems." (D.I. 447 at 1).

Plaintiff offered proposed "compromise" constructions for the Family 9 terms on January 25, 2018. (D.I. 466-1).

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[1] Hereinafter, all references to the docket refer to Civil Action No. 13-2013-RGA.

[2] TQ Delta does not assert the Family 8 and Family 9 patents in the companion case against 2Wire, Inc. (D.I. 449 at 1; D.I. 447 at 1).

II. LEGAL STANDARD

"It is a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (internal quotation marks omitted). "'[T]here is no magic formula or catechism for conducting claim construction.' Instead, the court is free to attach the appropriate weight to appropriate sources 'in light of the statutes and policies that inform patent law.'" *SoftView LLC v. Apple Inc.*, 2013 WL 4758195, at *1 (D. Del. Sept. 4, 2013) (quoting *Phillips*, 415 F.3d at 1324) (alteration in original). When construing patent claims, a court considers the literal language of the claim, the patent specification, and the prosecution history. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 977–80 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996). Of these sources, "the specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term." *Phillips*, 415 F.3d at 1315 (internal quotation marks omitted).

"[T]he words of a claim are generally given their ordinary and customary meaning. . . . [Which is] the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Id.* at 1312–13 (citations and internal quotation marks omitted). "[T]he ordinary meaning of a claim term is its meaning to [an] ordinary artisan after reading the entire patent." *Id.* at 1321 (internal quotation marks omitted). "In some cases, the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words." *Id.* at 1314.

When a court relies solely upon the intrinsic evidence—the patent claims, the specification, and the prosecution history—the court's construction is a determination of law. *See Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 841 (2015). The court may also make factual findings based upon consideration of extrinsic evidence, which "consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises." *Phillips*, 415 F.3d at 1317–19. Extrinsic evidence may assist the court in understanding the underlying technology, the meaning of terms to one skilled in the art, and how the invention works. *Id.* Extrinsic evidence, however, is less reliable and less useful in claim construction than the patent and its prosecution history. *Id.*

"A claim construction is persuasive, not because it follows a certain rule, but because it defines terms in the context of the whole patent." *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998). It follows that "a claim interpretation that would exclude the inventor's device is rarely the correct interpretation." *Osram GMBH v. Int'l Trade Comm'n*, 505 F.3d 1351, 1358 (Fed. Cir. 2007) (citation omitted).

III. TERMS FOR CONSTRUCTION

The asserted '705 patent claims cover a Discrete Multi-Tone (DMT) transceiver. They are independent claims 13 and 14 and dependent claims 19 and 24,[3] which read as follows:

> 13. A Discrete Multi-Tone (DMT) transceiver that is capable of improving initialization in the presence of impulse noise comprising:
>
> *a transmitter or a receiver module, capable of transmitting or receiving, respectively*, during an initialization procedure of the DMT transceiver, wherein the initialization procedure occurs prior to Showtime, a first *initialization message indicating an Impulse Noise Protection (INP) value*, wherein the INP value is used for DMT symbols transmitted during Showtime and the INP value specifies a number of consecutive DMT symbols that, when completely corrupted by impulse noise, can be corrected; *and*

[3] (D.I. 449 at 10).

the transmitter module capable of transmitting, during the initialization procedure of the DMT transceiver, wherein the initialization procedure occurs prior to Showtime, a second initialization message by modeling at least one message bit of the second initialization message onto a DMT symbol and repeatedly transmitting the DMT symbol N times, wherein N=A*INP+B, where A and B are integers and INP is the *impulse noise protection value.*

14. A Discrete Multi-Tone (DMT) transceiver that is capable of improving initialization in the presence of impulse noise comprising:

a transmitter or a receiver module, capable of transmitting or receiving, respectively, during an initialization procedure of the DMT transceiver, wherein the initialization procedure occurs prior to Showtime, a first *initialization message indicating an Impulse Noise Protection (INP) value*, wherein the INP value is used for DMT symbols transmitted during Showtime and the INP value specifies a number of consecutive DMT symbols that, when completely corrupted by impulse noise, can be corrected; *and*

the receiver module capable of receiving, during the initialization procedure of the DMT transceiver, wherein the initialization procedure occurs prior to Showtime, a second initialization message, wherein at least one message bit of the second initialization message was modulated onto a DMT symbol and the DMT symbol repeatedly transmitted N times, wherein N=A*INP+B, where A and B are integers and INP is the *impulse noise protection value.*

19. The transceiver of claim 13, wherein A=2 and B=1.

24. The transceiver of claim 14, wherein A=2 and B=1.

(D.I. 450-1 ("the '705 patent") at A1-15) (disputed terms italicized). The asserted claims for Family 9[4] read as follows:

28. A system to share memory between an interleaving function and a packet retransmission function comprising:

a transceiver capable of:

transmitting to another transceiver or receiving from another transceiver a message indicating:

[4] (D.I. 447 at 19-21).

an *amount of the shared memory* is to be allocated to the interleaver function;

an *amount of the shared memory* is to be allocated to the packet retransmission function;

allocating a first portion of the shared memory to the interleaving function; and

allocating a second portion of the shared memory to the packet retransmission function, wherein the first allocated *portion of the shared memory* is no more than the amount of memory indicated in the message for the interleaving function and the second allocated *portion of the shared memory* is no more than the amount of memory indicated in the message for the retransmission function.

31. A system to share memory between an interleaving function and a packet retransmission function comprising:

a transceiver capable of:

transmitting to another transceiver or receiving from another transceiver a message indicating:

an *amount of the shared memory* is to be allocated to the deinterleaver function;

an *amount of the shared memory* is to be allocated to the packet retransmission function;

allocating a first portion of the shared memory to the deinterleaving function; and

allocating a second portion of the shared memory to the packet retransmission function, wherein the first allocated *portion of the shared memory* is no more than the *amount of memory* indicated in the message for the deinterleaving function and the second allocated *portion of the shared memory* is no more than the *amount of memory* indicated in the message for the retransmission function.

(D.I. 448-1 at A1-21 ("the '956 patent)) (disputed terms italicized).

1. A method to share memory between a deinterleaving function and a packet retransmission function in a communications transceiver comprising:

transmitting or receiving, by the transceiver, a message indicating:

how much of the memory is to be allocated to the deinterleaver function, and *how much of the shared memory* is to be allocated to the packet retransmission function;

allocating a first portion of the shared memory to the deinterleaving function; and *allocating a second portion of the shared memory to the packet retransmission function*, wherein the first allocated *portion of the shared memory* is no more than the *amount of memory* indicated in the message for the deinterleaving function and the second allocated *portion of the shared memory* is no more than the *amount of memory* indicated in the message for the retransmission function.

(D.I. 448-1 at A22-37 ("the '546 patent)) (disputed terms italicized).

1. A transceiver capable of packet retransmission comprising:

a transmitter portion capable of:

transmitting a plurality of packets, identifying at least one packet of the plurality of packets as a packet that should be retransmitted and *allocating a memory between a retransmission function and an interleaving and/or deinterleaving function*, wherein at least a *portion of the memory* may be allocated to the retransmission function or to the interleaving and/or deinterleaving function at any one particular time, and wherein a message transmitted during initialization indicates how the memory has been allocated between the retransmission function and the interleaving and/or deinterleaving function in the transceiver.

18. A transceiver capable of packet retransmission comprising:

a receiver portion capable of:

receiving a plurality of packets, identifying at least one packet of the plurality of packets as a packet that should be retransmitted and *allocating a memory between a retransmission function and an interleaving and/or deinterleaving function,*

wherein the memory is allocated between the retransmission function and the interleaving and/or deinterleaving function in accordance with a message received during an initialization of the transceiver and wherein *at least a portion of the memory may be allocated between the retransmission function and the interleaving and/or deinterleaving function at any one particular time depending on the message.*

(D.I. 448-1 at A43-61 ("the '411 patent)) (disputed terms italicized).

1. A method, in a multi carrier communications transceiver, comprising:

   sharing a memory in the transceiver between a packet retransmission function and one or more of interleaving and deinterleaving functions; and transmitting or receiving *a message indicating how the shared memory is to be allocated to the packet retransmission function and to one or more of interleaving and deinterleaving functions.*

7. A multicarrier communications transceiver with a *shared memory*, the transceiver operable to:

   share the memory between a packet retransmission function and one or more of interleaving and deinterleaving functions; and

   transmit or receive *a message indicating how the shared memory in the transceiver is to be allocated to the packet retransmission function and to one or more of interleaving and deinterleaving functions.*

(D.I. 448-1 at A83-101 ("the '784 patent)) (disputed terms italicized).

30. An apparatus comprising:

    a multicarrier transceiver operable to receive at least one packet using deinterleaving, and transmit at least one message without using interleaving, wherein the at least one message includes information that indicates an acknowledgement (ACK) or negative acknowledgement (NACK) of the at least one packet, wherein the at least one packet comprises one or more Reed-Solomon codewords.

53. An apparatus comprising:

    a multicarrier transceiver operable to receive at least one packet using interleaving, and transmit at least one message without using interleaving, wherein the at least one message includes information that indicates an acknowledgement (ACK) or negative acknowledgement (NACK) of the at least one packet, wherein the at least one packet comprises one or more Reed-Solomon codewords.

55. The apparatus of claim 53, wherein the message indicates at least one count value associated with the at least one packet.

(D.I. 448-1 at A63-82 ("the '577 patent)).

The parties agree to be bound by the Court's construction of "transceiver" in Family 1, that the Family 9 preambles are limiting, and that "Showtime" means "that state of the transceiver reached after all initialization and training is completed, in which user data is transmitted or received." (D.I. 449 at 11; D.I. 447 at 22). The parties also agree to constructions for "packet" and "multicarrier." (*Id.*).

1. "Impulse Noise Protection (INP) value" / "INP value" ('705/13, 14)

a. *Plaintiff's proposed construction*:

This term is already defined in the claim.

"specifies a number of consecutive DMT symbols that, when completely corrupted by impulse noise, can be corrected"

b. *Defendants' proposed construction*: "a number of consecutive DMT symbols that, when completely corrupted by impulse noise, can be corrected using FEC and interleaving during Showtime"

c. *Court's construction*:

"a number of consecutive DMT symbols that, when completely corrupted by impulse noise, can be corrected"

The parties agree that the INP value "specifies a number of consecutive DMT symbols that, when completely corrupted by impulse noise, can be corrected." (D.I. 449 at 12). Defendants argue that my construction should further specify that this correction "us[es] FEC and interleaving" and occurs "during Showtime." (*Id.*).

The specification provides, "INP is defined in the ADSL2 and VDSL2 standards as the number of consecutive DMT symbols that, when completely corrupted by impulse noise, can be completely corrected by the receiver using FEC and interleaving during SHOWTIME." ('705 patent at 2:2-6). This is not lexicography. The specification does not itself "define" INP or provide what INP "means." However, the '705 patent claims and specification capitalize the words

"Impulse Noise Protection" in the term "Impulse Noise Protection (INP) value," and abbreviate "Impulse Noise Protection" using "INP." (*See, e.g.*, '705 patent, claim 1; '705 patent, 2:1-2). The patent's use of capitalization and abbreviation suggests that "INP value" is a term of art derived from the ADSL2 and VDSL2 standards.

However, claims 13 and 14 use language to describe the "INP value" that is different from the language the specification states is used to "define[INP] in the ADSL2 and VDSL2 standards." The claims' first limitation reads, "the INP value is used for DMT symbols transmitted during Showtime[,] and the INP value specifies a number of consecutive DMT symbols that, when completely corrupted by impulse noise, can be corrected." ('705 patent, claim 13). The independent claims' second limitation goes on to cover use of the "INP value" to calculate a repetition parameter "N." (*Id.*). This parameter N dictates the appropriate number of times DMT symbols must be repeatedly sent to provide immunity to impulse noise during transceiver initialization. (Tr. 17:9-14).

The first limitation's description of the "INP value" makes no mention of the correction "using FEC and interleaving during Showtime." Thus, the sense in which the patentee describes the "INP value" in the claims is broader than how the patentee describes the ADSL2 and VDSL2 standards defining "INP value."[5]

Because the claims themselves already define "INP value," I will not read the additional limitation "using FEC and interleaving during Showtime" into the claims from the specification's description of two DSL standards.[6] *See Phillips*, 415 F.3d at 1323 (warning of "the danger of

[5] Defendants agree that "[t]here is considerable overlap [between the description of 'INP value' in the specification and the description of 'INP value' in the claims], no question." (Tr. 32:17-19).

[6] Defendants also argue that the applicant adopted the examiner's definition of "impulse noise protection value" during prosecution of a continuation application. (D.I. 449 at 16). The examiner's definition mirrors Defendants' proposed construction, and includes "using FEC and interleaving during Showtime." (D.I. 450-1 at A54). Defendants thus argue that a "clear and unmistakable" disclaimer occurred. (*Id.* at 16-17).

reading limitations from the specification into the claim"). Accordingly, I adopt Plaintiff's proposed construction.

2. "Initialization Message Indicating an Impulse Noise Protection (INP) value" ('705/13, 14)

a. *Plaintiff's proposed construction*: "a message sent during initialization that indicates an Impulse Noise Protection (INP) value"

b. *Defendants' proposed construction*: "a message sent during initialization that provides the INP value"

c. *Court's construction*: "message sent during initialization that indicates an Impulse Noise Protection (INP) value"

The parties have two points of disagreement. First, they disagree as to whether my construction should refer to "an" INP value, as Plaintiff argues, or "the" INP value, as Defendants argue. (D.I. 449 at 29). Second, they disagree as to whether my construction should refer to a message that "indicates" an INP value or a message that "provides" an INP value. (*Id.* at 29-30).

As to the first disagreement, the claims recite "an" INP value, not "the" INP value. ('705 patent, claim 13). Defendants do not seriously argue that its construction's use of "the" is correct, writing "[t]he only disagreement as to this term is whether the message 'indicates' or 'provides' the INP value." (D.I. 449 at 30). Accordingly, my construction will refer to "an" INP value.

As to the second disagreement, the claims recite "indicating" an INP value, not "providing" an INP value. ('705 patent, claim 13). Defendants argue that "provides" is less "vague" than "indicates." (D.I. 449 at 30, 32). More specifically, Defendants argue that all embodiments in the specification support actually including an INP value in the message, so the specification teaches that the message actually "provides" an INP value. (*Id.* at 30).

I disagree that a disclaimer occurred. Defendants contend that the "applicant repeated verbatim" the examiner's definition in response to a statement by the examiner. (D.I. 449 at 16). However, without more, merely quoting the examiner cannot amount to a "clear and unmistakable" disavowal of claim scope. *Purdue Pharma. L.P. v. Endo Pharm. Inc.*, 438 F.3d 1123, 1136 (Fed. Cir. 2006).

However, when a patentee uses a broad term in the claim, the Court honors that broad claim, absent lexicography or disclaimer to the contrary. "Absent disclaimer or lexicography, the plain meaning of the claim controls." *See Toshiba Corp. v. Imation Corp.*, 681 F.3d 1358, 1369 (Fed. Cir. 2012). Defendants do not argue that there is lexicography or disclaimer here, nor do Defendants dispute that each embodiment supports "indicating" an INP value. (D.I. 449 at 30).

Accordingly, I will not accept Defendants' invitation to rewrite Plaintiff's claim. Instead, I will adopt "message sent during initialization that indicates an Impulse Noise Protection (INP) value" as my construction.

3. "a transmitter or a receiver module, capable of transmitting or receiving, respectively ...; and the transmitter module capable of transmitting, during the initialization procedure of the DMT transceiver" / "a transmitter or a receiver module, capable of transmitting or receiving, respectively, ...; and the receiver module capable of receiving, during the initialization procedure of the DMT transceiver" ('705/13, 14)

a. *Plaintiff's proposed construction*: Definite

b. *Defendants' proposed construction*: Indefinite

c. *Court's construction*: Not indefinite

"[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014).

Defendants argue that claims 13 and 14 of the '705 patent are invalid for indefiniteness because they "employ a confusing disjunctive claim structure that renders the scope of the claims wholly unclear." (D.I. 449 at 33).

Claim 13 employs a structure where a claimed Discrete Multi-Tone (DMT) transceiver "compris[es]" two limitations. First, the claim covers, "a transmitter or a receiver module,

capable of transmitting or receiving, respectively . . . ." This first limitation provides certain requirements for either the "transmitter . . . module" or the "receiver module." Second, the claim covers, "the transmitter module capable of transmitting . . . ." ('705 patent, claims 13-14).[7] The antecedent basis for the "transmitter module" of the second limitation is the "transmitter . . . module" of the first limitation. This second limitation provides certain requirements for the "transmitter module," which differ from the requirements of the first limitation.

Claims 13 and 14 are "precise enough to afford clear notice of what is claimed, thereby appris[ing] the public of what is still open to them." *Nautilus*, 134 S. Ct. at 2129. A person of ordinary skill in the art would understand what the claims cover. Claim 13 covers a transceiver, which inherently includes a "transmitter portion and receiver portion." (D.I. 468 at 4). The claimed transceiver requires either a transmitter module capable of performing the first limitation and second limitation, or a receiver module capable of performing the first limitation and a transmitter module capable of performing the second limitation. Similarly, for claim 14, the claimed transceiver requires either a receiver module capable of performing the first limitation and second limitation, or a transmitter module capable of performing the first limitation and a receiver module capable of performing the second limitation. Contrary to Defendants' argument, no portion of these claims is "superfluous." (D.I. 449 at 46; Tr. 52:1-10).

For these reasons, I do not find claims 13 and 14 of the '705 patent indefinite.

I note that a DMT transceiver comprising both the claimed "transmitter module" and the claimed "receiver module" would infringe. Both parties agree that when a claim comprises "A or B," the claim requires "the presence of either A or B." (Tr. 47:25-48:2). However, they also

[7] Claim 14 contains a similar structure, but its second limitation covers "the receiver module." ('705 patent, claim 14).

agree that such a claim does not "necessarily exclude the possibility that something that has [both] A and B would infringe." (Tr. 48:3-4, 48:9-20).

4. "the [shared] memory" ('956/28, 31; '546/1; '784/1, 7)

a. *Plaintiff's proposed construction*: "a common memory space used by at least two functions, where particular memory cells within the common memory space can be used by either one of the functions"

b. *Plaintiff's compromise construction:* "common memory used by at least two functions, where a portion of the memory can be used by either one of the functions"

c. *Defendants' proposed construction*: "single common memory in a transceiver used by a retransmission function and at least one other function"

d. *Court's construction*: "common memory used by at least two functions, where a portion of the memory can be used by either one of the functions"

Plaintiff argues that "shared memory"[8] should be construed as "a common memory space." (D.I. 447 at 23). Neither the claims nor the specification refer to "a common memory space." (*See generally* '956 patent). A patentee can be its own lexicographer, but to do so, the patentee "must clearly set forth a definition of the disputed claim term other than its plain and ordinary meaning." *Thorner v. Sony Comput. Entm't Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012). As Defendants note, the specification never mentions "common memory space," never defines "common memory space," and never uses "common memory space" to define "shared memory." (D.I. 447 at 26). I therefore do not adopt the term "common memory space." I instead use the agreed-upon "common" to modify "memory."

Defendants argue that "common memory" is "single." (*Id.* at 23). As evidence, Defendants point to the specification, which refers to "a" shared memory and "the" shared memory. (*Id.* at 27-28). But the Federal Circuit has held that "a" or "an" is presumed to mean

[8] For the Family 3 patents, I construed "shared memory" to mean "common memory used by at least two functions, where a portion of the memory can be used by either one of the functions." (D.I. 429 at 5).

"one or more." *Baldwin Graphic Sys., Inc. v. Siebert, Inc.*, 512 F.3d 1338, 1342 (Fed. Cir. 2008). Thus, this language is not dispositive. As further evidence, Defendants point to Figure 1 of the '956 patent, which depicts just one "shared memory." (D.I. 447 at 27). Indeed, the embodiment highlighted by Defendants shows just one memory. However, "claims of the patent will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using words or expressions of manifest exclusion or restriction." *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004).

Nothing in the patent demonstrates a clear intention to limit "common memory" to a "single" memory. Plaintiff raises the concern that including "single" in the construction might limit "shared memory" to a "single" memory "module," "block," or "chip." (D.I. 447 at 23). As discussed at oral argument for Family 3, memory need not necessarily be a "single" memory "module," "block," or "chip" to be "shared." (D.I. 407 at 44:1-50:13). For example, two people can share a "single" large pizza or two small pizzas to the same effect. Defendants agree that "scientifically," it does not matter if "common memory" comprises one physical memory structure or more than one physical memory structure. (*Id.* at 44:19-45:2). As a result, my construction does not use "single" to modify "common memory."

Plaintiff urges that my construction must clarify that "common memory" "can be used by either one of the [two] functions." (D.I. 447 at 23, 32-33). To support its contention, Plaintiff points to two types of shared memory that are unlike the shared memory described in the patents. First, at the Family 3 Markman hearing, Plaintiff noted that one type of shared memory involves functions in a single transceiver that use the memory for "interprocess communication." (D.I. 407 at 21:5-22). Second, Plaintiff noted that yet another type of shared memory, known as "ping pang" memory, involves transmission in a single direction and uses a shared memory "exclusively for an

interleaver" or "for a deinterleaver" at any one time. (*Id.* at 21:23-22:18). Neither of these memories is like the "shared memory" at hand. Defendants do not contest that for these patents, at any one time, a certain part of the memory can be used by one function or the other, but not both. (D.I. 447 at 30). Accordingly, to read out these other types of shared memory, I will include Plaintiff's language clarifying that common memory "can be used by either one of the functions."

Separately, Plaintiff argues that my construction should include a reference to "particular memory cells." (D.I. 447 at 23-24). But neither the specification nor the claims refers to "memory cells." Moreover, the jury will not have difficulty understanding "portion of the memory" to be physical memory. As a result, I will not include "memory cells" in my construction.

Next, the parties dispute whether "common memory" must be "in a transceiver." (D.I. 447 at 23). Some of the asserted claims, including claim 5 of the '956 patent, specifically dictate that "shared memory" is "in a transceiver." Others, including claim 13 of the '956 patent, do not. The doctrine of claim differentiation provides that "different words or phrases used in separate claims are presumed to indicate that the claims have different meanings and scopes." *Andersen Corp. v. Fiber Composites, LLC*, 474 F.3d 1361, 1369 (Fed. Cir. 2007).[9] Moreover, for the former set of claims, including "in a transceiver" in the construction would be redundant. Thus, my construction does not mandate that "common memory" be in a transceiver when being in a transceiver is not explicitly claimed.

Finally, Defendants' proposed construction specifies that one of the "two functions" is a "retransmission function." (D.I. 447 at 23). Plaintiff's does not do so. (*Id.*). All asserted claims already make clear that one of the "two functions" is a retransmission function. (*See, e.g.*, '956

[9] The Federal Circuit has applied the doctrine of claim differentiation both within a single patent and within a family of patents. In *Andersen Corp.*, the court analyzed claim differentiation within the "Group I patents," which all stemmed from continuations based on a single application. *Andersen Corp.*, 474 F.3d at 1368-70. Likewise, the Family 9 patents share a common specification.

patent, claim 28). To specify that one of the "two functions" is a "retransmission function" in my construction would be redundant. Accordingly, I will not do so.

5. "amount of [the] [shared] memory" ('956/28, 31; '546/1)

a. *Plaintiff's proposed construction*: plain meaning or "number of units of memory"

b. *Plaintiff's compromise construction:* plain meaning

c. *Defendants' proposed construction*: "number of bytes of [the shared] memory"

d. *Court's construction*: plain meaning

The parties agree that "amount of memory" indicates a quantity of memory. (D.I. 447 at 41). They dispute whether this memory must be measured in "bytes."[10] (*Id.*).

Defendants argue that the intrinsic record refers to memory only in "bytes," and does not refer to "units of memory" or other measurements of memory. (*Id.* at 43-44).

Plaintiff, on the other hand, argues that "amount of memory" can be specified using any number of units, includes bits, kilobytes, or words. (*Id.* at 44-47; D.I. 407 at 56:6-9). "[C]laims of the patent will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using words or expressions of manifest exclusion or restriction." *Liebel-Flarsheim*, 358 F.3d at 906. Plaintiff argues that the patentee has not demonstrated a "clear intention to limit the scope of 'amount of memory' to bytes." (D.I. 447 at 45). Thus, Plaintiff contends that "amount of memory" must not be limited to "bytes of memory."

Ultimately, at the Family 3 Markman hearing, the parties agreed that "amount of memory" will either be a "number of bytes" or a unit that is "probably convertible" to bytes. (D.I. 407 at 61:20-22). Nonetheless, the term is broader than "bytes," and the jury will not have trouble understanding what is or is not an "amount of memory." Accordingly, I adopt a plain

[10] For the Family 3 patents, the parties proposed identical constructions to those proposed here. I adopted a plain meaning construction for "amount of memory." (D.I. 429 at 8).

meaning construction. The plain meaning is not limited to bytes, and Defendants cannot argue that it is.

6. "how much of the [shared] memory" ('546/1)

a. *Plaintiff's proposed construction*: plain meaning or "number of units of memory"

b. *Plaintiff's compromise construction:* plain meaning

c. *Defendants' proposed construction*: "number of bytes of [the shared] memory"

d. *Court's construction*: plain meaning

The parties agree that the issues for "how much of the [shared] memory" are the same as the issues for "amount of [the] [shared] memory." (D.I. 447 at 48). Thus, because I give "amount of [the] [shared] memory" a plain meaning construction, I give "how much of the [shared] memory" a plain meaning construction.

7. "portion of the [shared] memory" ('956/28, 31; '546/1; '411/10, 18)

a. *Plaintiff's proposed construction*: This term should not be construed out of context. See [Term 8] for proposed construction in context.

b. *Plaintiff's compromise construction:* plain meaning

c. *Defendants' proposed construction*: "number of bytes within the [shared] memory"

d. *Court's construction*: plain meaning

The issues for "portion of the [shared] memory" are the same as the issues for "amount of [the] [shared] memory." (D.I. 447 at 50). Thus, because I give "amount of [the] [shared] memory" a plain meaning construction, I give "portion of the [shared] memory" a plain meaning construction.

8. "allocating a [first / second] portion of the shared memory to the [deinterleaving / packet retransmission] function" ('956/28, 31; '546/1)

a. *Plaintiff's proposed construction*: "allocating a [first / second] set of memory cells within the shared memory to the [deinterleaving / packet retransmission] function"

b. *Plaintiff's compromise construction:* plain meaning

c. *Defendants' proposed construction*: "allocating a [first / second] number of bytes within the shared memory to the [deinterleaving / packet retransmission] function for use in either the upstream or downstream direction[]"

d. *Court's construction*: plain meaning

The parties first dispute whether my construction should refer to a "set of memory cells within the shared memory" or "number of bytes within the shared memory." (D.I. 447 at 51). I give the "portion of the [shared] memory" its plain meaning. Accordingly, I give it a plain meaning construction in this context.

The parties also dispute whether my construction should specify that the allocation is "for use in either the upstream or downstream direction[]." (D.I. 447 at 51). The "upstream direction" refers to data communicated from a "modem located at a customer's subscriber's premise" to the "transceiver located within the service provider's network infrastructure." (*Id.* at 2-3). The "downstream direction" refers to data communicated in the opposite direction. (*Id.*).

Defendants do not argue that lexicography or disclaimer supports that these claims require that the shared memory is allocated between the deinterleaving and packet retransmission functions "for use in either the upstream or downstream direction[]." Rather, Defendants argue that all embodiments in the specification depict memory sharing by functions for use in a single direction. (D.I. 447 at 52-57).

"Absent disclaimer or lexicography, the plain meaning of the claim controls." *See Toshiba Corp.*, 681 F.3d at 1369. No words in the patent teach that "both functions must be used in either the upstream or the downstream direction, rather than one function applied in the upstream direction and the other in the downstream direction." (D.I. 447 at 53). Rather, the specification provides that "aspects of the invention relate to sharing memory between a

retransmission function and one or more of an interleaver, deinterleaver, coder, decoder, and other transceiver functions," without limiting these functions to use in exclusively the upstream or the downstream direction. ('956 patent at 2:48-55).

Because Defendants provide no reason to read embodiments into the claims, I will not read "for use in either the upstream or downstream direction[]" into the claims. I instead adopt a plain meaning construction.

9. "allocating a memory between a retransmission function and an interleaving and/or deinterleaving function" ('411/10, 18)

a. *Plaintiff's proposed construction*: plain meaning or "allocating a first set of memory cells within the shared memory to the retransmission function and allocating a second set of memory cells within the shared memory to an interleaving function and/or deinterleaving function"

b. *Plaintiff compromise construction:* "allocating a portion of the memory to a retransmission function and a portion of the memory to an interleaving and/or deinterleaving function"

c. *Defendants' proposed construction*: "allocating a [first / second] number of bytes within the shared memory to the [interleaving and/or deinterleaving / packet retransmission] function for use in either the upstream or downstream direction[]"

d. *Court's construction*: plain meaning

The parties agree that the issues for "allocating a memory between a retransmission function and an interleaving and/or deinterleaving function" are the same as the issues for "allocating a [first / second] portion of the shared memory to the [deinterleaving / packet retransmission] function." (D.I. 447 at 67). Thus, because I give "allocating a [first / second] portion of the shared memory to the [deinterleaving / packet retransmission] function" a plain meaning construction, I give "allocating a memory between a retransmission function and an interleaving and/or deinterleaving function" a plain meaning construction.

10. "a message indicating how the shared memory [] is to be allocated to the packet retransmission function and to the one or more of interleaving [or/and] deinterleaving functions" ('784/1, 7)

a. *Plaintiff's proposed construction*: plain meaning or "a first set of memory cells within the shared memory that are to be allocated to the retransmission function and a second set of memory cells within the shared memory that are to be allocated to an interleaving function [and/or] deinterleaving function"

b. *Plaintiff's compromise construction:* "a message indicating an amount of shared memory to be allocated to a packet retransmission function and an amount of memory to be allocated to an interleaving function and/or deinterleaving function"

c. *Defendants' proposed construction*: "allocating a [first / second] number of bytes within the shared memory to the [interleaving and/or deinterleaving / packet retransmission] function for use in either the upstream or downstream direction[]"

d. *Defendants' proposed construction*: "a message allocating a [first / second] number of bytes within the shared memory to the [interleaving and/or deinterleaving / packet retransmission] function for use in either the upstream or downstream direction[]"

e. *Court's construction*: plain meaning

The parties agree that the issues for "a message indicating how the shared memory [] is to be allocated to the packet retransmission function and to the one or more of interleaving [or/and] deinterleaving functions" are the same as the issues for "portion of the [shared] memory" and "allocating a [first / second] portion of the shared memory to the [deinterleaving / packet retransmission] function." (D.I. 447 at 69-70). Thus, because I give those terms plain meaning constructions, I give "a message indicating how the shared memory [] is to be allocated to the packet retransmission function and to the one or more of interleaving [or/and] deinterleaving functions" a plain meaning construction.[11]

11. "wherein a message transmitted during initialization indicates how the memory has been allocated between the retransmission function and the interleaving/deinterleaving function" ('411/10)

[11] The parties do not discuss whether I should use "indicating" or "allocating." (D.I. 447 at 68-71). Because the claims use "indicating," I will also use "indicating."

a. *Plaintiff's proposed construction*: plain meaning or "wherein a message transmitted during initialization indicates the amount of memory that has been allocated to the retransmission function and the amount of memory that has been allocated to the interleaving and/or deinterleaving function"

b. *Plaintiff's compromise construction:* "wherein a message transmitted during initialization indicates the amount of memory that has been allocated to the retransmission function and the amount of memory that has been allocated to the interleaving and/or deinterleaving function"

c. *Defendants' proposed construction*: "wherein a message transmitted by the transceiver during initialization indicates a number of bytes of memory allocated to the retransmission function and the interleaving and/or deinterleaving function"

d. *Court's construction*: plain meaning

The parties agree that the issues for "wherein a message transmitted during initialization indicates how the memory has been allocated between the retransmission function and the interleaving/deinterleaving function" are the same as the issues for "amount of [the] [shared] memory" and "portion of the [shared] memory." (D.I. 447 at 72-73). Thus, because I give those terms plain meaning constructions, I give "wherein a message transmitted during initialization indicates how the memory has been allocated between the retransmission function and the interleaving/deinterleaving function" a plain meaning construction.[12]

12. "wherein at least a portion of the memory may be allocated to the retransmission function or to the interleaving and/or deinterleaving function at any one particular time" ('411/10)

a. *Plaintiff's proposed construction*: "wherein at least some particular memory cells within the memory can be allocated for use by either the retransmission function or the interleaving and/or deinterleaving function at any one particular time"

b. *Plaintiff's compromise construction:* plain meaning

c. *Defendants' proposed construction*: "wherein at least a number of bytes within the memory may be allocated to the retransmission function or to the interleaving and/or deinterleaving function at any one particular time"

d. *Court's construction*: plain meaning

[12] Defendants' proposed "by the transceiver" language is redundant, so I do not include it.

The parties agree that the issues for "wherein at least a portion of the memory may be allocated to the retransmission function or to the interleaving and/or deinterleaving function at any one particular time" are the same as the issues for "amount of [the] [shared] memory," "how much of the [shared] memory," and "portion of the [shared] memory." (D.I. 447 at 74-76). Thus, because I give those terms plain meaning constructions, I give "wherein at least a portion of the memory may be allocated to the retransmission function or to the interleaving and/or deinterleaving function at any one particular time" a plain meaning construction.

13. "wherein at least a portion of the memory may be allocated between the retransmission function and the interleaving and/or deinterleaving function at any one particular time depending on the message" ('411/18)

a. *Plaintiff's proposed construction*: "wherein at least some particular memory cells within the memory can be allocated for use by either the retransmission function or the interleaving and/or deinterleaving function at any one particular time depending on the message"

b. *Plaintiff's compromise construction:* plain meaning

c. *Defendants' proposed construction*: "wherein at least a number of bytes within the memory may be allocated to the retransmission function or to the interleaving and/or deinterleaving function at any one particular time depending on the amount of memory specified in the message"

d. *Court's construction*: plain meaning

The parties agree that this term is the same as "wherein at least a portion of the memory may be allocated between the retransmission function and the interleaving and/or deinterleaving function at any one particular time," except it includes the additional limitation, "depending on the message." (D.I. 447 at 77-79). However, the parties disagree as to whether the claimed "message" must actually specify amounts of memory. (*Id.*).

The claim language does not require that the message specify amounts of memory. The disputed term's language requires that the amount of memory depend on the message's contents,

but it does not require that the message's contents themselves actually specify amounts of memory. ('411 patent, claim 18).

Likewise, the specification does not require that the message specify amounts of memory.[13] Plaintiff points to an embodiment in the specification where a message related to memory does not does not specify an amount of memory. (D.I. 447 at 78 (citing '411 patent at 19:9-56)). Defendants respond that the embodiment identified by Plaintiff "describes a preliminary step that can be used to 'reduc[e] the total memory requirement of a transceiver.'" (D.I. 447 at 79 (citing '956 patent at 19:30-33)). Defendants argue that this "preliminary message . . . can [] be used in the process of determining an allocation of memory," which allocation is then "communicated to the other transceiver." (D.I. 447 at 79 (citing '956 patent at 19:30-56, 19:10-13)). In doing so, Defendants agree that at least one "message" need not necessarily specify an amount of memory.

Even if Defendants were correct that every embodiment in the specification demonstrates that the message must actually specify amounts of memory, I would not read that limitation into the claim. Defendants do not argue that lexicography or disclaimer requires the message to specify amounts of memory. *See Toshiba Corp.*, 681 F.3d at 1369.

Accordingly, I adopt a plain meaning construction.

IV. CONCLUSION

Within five days the parties shall submit a proposed order consistent with this Memorandum Opinion.

[13] I came to the same conclusion for a claim term in Family 3, which contained identical language. (D.I. 429 at 9-11). However, the Family 3 specification is different from the '411 patent specification. As a result, my analysis is different.