IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

HUAWEI TECHNOLOGIES CO. LTD.,

Plaintiff,

v.

VERIZON COMMUNICATIONS, INC., VERIZON BUSINESS NETWORK SERVICES, INC., VERIZON ENTERPRISE SOLUTIONS, LLC, CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS, INC., VERIZON DATA SERVICES LLC, VERIZON BUSINESS GLOBAL LLC, VERIZON SERVICES CORP.,

Defendant(s).

VERIZON BUSINESS NETWORK SERVICES, INC., CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS, VERIZON DATA SERVICES LLC, VERIZON BUSINESS GLOBAL LLC, VERIZON SERVICES CORP., AND VERIZON PATENT AND LICENSING INC.

Counterclaim-Plaintiffs,

v.
HUAWEI TECHNOLOGIES CO. LTD., HUAWEI TECHNOLOGIES USA, INC., AND FUTUREWEI TECHNOLOGIES INC.

Counterclaim-Defendants.

Case No. 2:20-cv-00030-JRG

CLAIM CONSTRUCTION MEMORANDUM OPINION AND ORDER

Before the Court are three claim construction briefs submitted by Plaintiff Huawei Technologies Co. Ltd., and Counterclaim Defendants Huawei Technologies USA, Inc., and Futurewei Technologies, Inc. (collectively referred to herein as "Huawei") and three claim construction briefs submitted by Verizon Business Network Services, Inc., Cellco Partnership D/B/A Verizon Wireless, Verizon Data Services LLC, Verizon Business Global LLC, Verizon Services Corp., and Verizon Patent and Licensing Inc. (collectively referred to herein as "Verizon").

For the Huawei-Asserted Patents:[1] Huawei's opening brief (Dkt. No. 82, filed on November 6, 2020),[2] Verizon's response (Dkt. No. 98, filed on November 20, 2020), and Huawei's reply (Dkt. No. 106, filed on November 30, 2020).

For the Verizon-Asserted Patents:[3] Verizon's opening brief (Dkt. No. 85, filed on November 6, 2020), Huawei's response (Dkt. No. 99, filed on November 20, 2020), and Verizon's reply (Dkt. No. 103, filed on November 30, 2020)

The Court held a hearing on the issues of claim construction and claim definiteness on December 17, 2020. Having considered the arguments and evidence presented by the parties at the hearing and in their briefing, the Court issues this Order.

[1] Huawei Technologies Co. Ltd. asserts seven U.S. Patents: No. 8,270,433, No. 8,406,236, No. 8,824,505, No. 8,995,253, No. 9,014,151, No. 9,270,485, and No. 9,312,982.

[2] Citations to the parties' filings are to the filing's number in the docket (Dkt. No.) and pin cites are to the page numbers assigned through ECF.

[3] Verizon asserts two U.S. Patents: No. 8,121,111 (the "'111 Patent") and No. 8,983,288 (the "'288 Patent").

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I. BACKGROUND

Huawei alleges infringement of seven U.S. Patents: No. 8,270,433 (the "'433 Patent"), No. 8,406,236 (the "'236 Patent"), No. 8,824,505 (the "'505 Patent"), No. 8,995,253 (the "'253 Patent"), No. 9,014,151 (the "'151 Patent"), No. 9,270,485 (the "'485 Patent"), and No. 9,312,982 (the "'982 Patent") (collectively, the "Huawei-Asserted Patents").

Verizon counterclaims for infringement of two U.S. Patents: No. 8,121,111 (the "'111 Patent") and No. 8,983,288 (the "'288 Patent") (collectively, the "Verizon-Asserted Patents").

II. LEGAL PRINCIPLES

A. Claim Construction

"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) (quoting *Innova/Pure Water Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). To determine the meaning of the claims, courts start by considering the intrinsic evidence. *Id.* at 1313; *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 861 (Fed. Cir. 2004); *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Group, Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001). The intrinsic evidence includes the claims themselves, the specification, and the prosecution history. *Phillips*, 415 F.3d at 1314; *C.R. Bard, Inc.*, 388 F.3d at 861. The general rule—subject to certain specific exceptions discussed *infra*—is that each claim term is construed according to its ordinary and accustomed meaning as understood by one of ordinary skill in the art at the time of the invention in the context of the patent. *Phillips*, 415 F.3d at 1312–13; *Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1368 (Fed. Cir. 2003); *Azure Networks, LLC v. CSR PLC*, 771 F.3d 1336, 1347 (Fed. Cir. 2014) ("There is a heavy presumption that claim terms carry their accustomed meaning in the relevant community at the relevant time.") (vacated on other grounds).

"The claim construction inquiry … begins and ends in all cases with the actual words of the claim." *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1248 (Fed. Cir. 1998). "[I]n all aspects of claim construction, 'the name of the game is the claim.'" *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1298 (Fed. Cir. 2014) (quoting *In re Hiniker Co.*, 150 F.3d 1362, 1369 (Fed. Cir. 1998)). First, a term's context in the asserted claim can be instructive. *Phillips*, 415 F.3d at 1314. Other asserted or unasserted claims can also aid in determining the claim's meaning because claim terms are typically used consistently throughout the patent. *Id.* Differences among the claim terms can also assist in understanding a term's meaning. *Id*. For example, when a dependent claim adds a limitation to an independent claim, it is presumed that the independent claim does not include the limitation. *Id*. at 1314–15.

"[C]laims 'must be read in view of the specification, of which they are a part.'" *Id*. (quoting *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc)). "[T]he 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.'" *Id*. (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)); *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002). But, "'[a]lthough the specification may aid the court in interpreting the meaning of disputed claim language, particular embodiments and examples appearing in the specification will not generally be read into the claims.'" *Comark Commc'ns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998) (quoting *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1571 (Fed. Cir. 1988)); *see also Phillips*, 415 F.3d at 1323. "[I]t is improper to read limitations from a preferred embodiment described in the specification—even if it is the only embodiment—into the claims absent a clear indication in the intrinsic record that the

patentee intended the claims to be so limited." *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 913 (Fed. Cir. 2004).

The prosecution history is another tool to supply the proper context for claim construction because, like the specification, the prosecution history provides evidence of how the U.S. Patent and Trademark Office ("PTO") and the inventor understood the patent. *Phillips*, 415 F.3d at 1317. However, "because the prosecution history represents an ongoing negotiation between the PTO and the applicant, rather than the final product of that negotiation, it often lacks the clarity of the specification and thus is less useful for claim construction purposes." *Id.* at 1318; *see also Athletic Alternatives, Inc. v. Prince Mfg.*, 73 F.3d 1573, 1580 (Fed. Cir. 1996) (ambiguous prosecution history may be "unhelpful as an interpretive resource").

Although extrinsic evidence can also be useful, it is "'less significant than the intrinsic record in determining the legally operative meaning of claim language.'" *Phillips*, 415 F.3d at 1317 (quoting *C.R. Bard, Inc.*, 388 F.3d at 862). Technical dictionaries and treatises may help a court understand the underlying technology and the manner in which one skilled in the art might use claim terms, but technical dictionaries and treatises may provide definitions that are too broad or may not be indicative of how the term is used in the patent. *Id*. at 1318. Similarly, expert testimony may aid a court in understanding the underlying technology and determining the particular meaning of a term in the pertinent field, but an expert's conclusory, unsupported assertions as to a term's definition are not helpful to a court. *Id*. Extrinsic evidence is "less reliable than the patent and its prosecution history in determining how to read claim terms." *Id*. The Supreme Court has explained the role of extrinsic evidence in claim construction:

> In some cases, however, the district court will need to look beyond the patent's intrinsic evidence and to consult extrinsic evidence in order to understand, for example, the background science or the meaning of a term in the relevant art during the relevant time period. *See, e.g., Seymour v. Osborne*, 11 Wall. 516, 546 (1871)

> (a patent may be "so interspersed with technical terms and terms of art that the testimony of scientific witnesses is indispensable to a correct understanding of its meaning"). In cases where those subsidiary facts are in dispute, courts will need to make subsidiary factual findings about that extrinsic evidence. These are the "evidentiary underpinnings" of claim construction that we discussed in *Markman*, and this subsidiary factfinding must be reviewed for clear error on appeal.

Teva Pharm. USA, Inc. v. Sandoz, Inc., 574 U.S. 318, 331–32 (2015).

B. Departing from the Ordinary Meaning of a Claim Term

There are "only two exceptions to [the] general rule" that claim terms are construed according to their plain and ordinary meaning: "1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when the patentee disavows the full scope of the claim term either in the specification or during prosecution."[4] *Golden Bridge Tech., Inc. v. Apple Inc.*, 758 F.3d 1362, 1365 (Fed. Cir. 2014) (quoting *Thorner v. Sony Computer Entm't Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012)); *see also GE Lighting Solutions, LLC v. AgiLight, Inc.*, 750 F.3d 1304, 1309 (Fed. Cir. 2014) ("[T]he specification and prosecution history only compel departure from the plain meaning in two instances: lexicography and disavowal."). The standards for finding lexicography or disavowal are "exacting." *GE Lighting Solutions*, 750 F.3d at 1309.

To act as his own lexicographer, the patentee must "clearly set forth a definition of the disputed claim term," and "clearly express an intent to define the term." *Id.* (quoting *Thorner*, 669 F.3d at 1365); *see also Renishaw*, 158 F.3d at 1249. The patentee's lexicography must appear "with reasonable clarity, deliberateness, and precision." *Renishaw*, 158 F.3d at 1249.

To disavow or disclaim the full scope of a claim term, the patentee's statements in the specification or prosecution history must amount to a "clear and unmistakable" surrender. *Cordis*

[4] Some cases have characterized other principles of claim construction as "exceptions" to the general rule, such as the statutory requirement that a means-plus-function term is construed to cover the corresponding structure disclosed in the specification. *See, e.g., CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1367 (Fed. Cir. 2002).

Corp. v. Boston Sci. Corp., 561 F.3d 1319, 1329 (Fed. Cir. 2009); *see also Thorner*, 669 F.3d at 1366 ("The patentee may demonstrate intent to deviate from the ordinary and accustomed meaning of a claim term by including in the specification expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope."). "Where an applicant's statements are amenable to multiple reasonable interpretations, they cannot be deemed clear and unmistakable." *3M Innovative Props. Co. v. Tredegar Corp.*, 725 F.3d 1315, 1326 (Fed. Cir. 2013).

C. Functional Claiming and 35 U.S.C. § 112, ¶ 6 (pre-AIA) / § 112(f) (AIA)

A patent claim may be expressed using functional language. *See* 35 U.S.C. § 112, ¶ 6; *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1347–49 & n.3 (Fed. Cir. 2015) (en banc in relevant portion). Section 112, Paragraph 6, provides that a structure may be claimed as a "means … for performing a specified function" and that an act may be claimed as a "step for performing a specified function." *Masco Corp. v. United States*, 303 F.3d 1316, 1326 (Fed. Cir. 2002).

But § 112, ¶ 6 does not apply to all functional claim language. There is a rebuttable presumption that § 112, ¶ 6 applies when the claim language includes "means" or "step for" terms, and that it does not apply in the absence of those terms. *Masco Corp.*, 303 F.3d at 1326; *Williamson*, 792 F.3d at 1348. The presumption stands or falls according to whether one of ordinary skill in the art would understand the claim with the functional language, in the context of the entire specification, to denote sufficiently definite structure or acts for performing the function. *See Media Rights Techs., Inc. v. Capital One Fin. Corp.*, 800 F.3d 1366, 1372 (Fed. Cir. 2015) (§ 112, ¶ 6 does not apply when "the claim language, read in light of the specification, recites sufficiently definite structure" (quotation marks omitted) (citing *Williamson*, 792 F.3d at 1349; *Robert Bosch, LLC v. Snap-On Inc.*, 769 F.3d 1094, 1099 (Fed. Cir. 2014))); *Williamson*, 792 F.3d at 1349 (§ 112, ¶ 6 does not apply when "the words of the claim are understood by persons of ordinary skill in the art to have sufficiently definite meaning as the name for structure"); *Masco*

Corp., 303 F.3d at 1326 (§ 112, ¶ 6 does not apply when the claim includes an "act" corresponding to "how the function is performed"); *Personalized Media Communications, L.L.C. v. International Trade Commission*, 161 F.3d 696, 704 (Fed. Cir. 1998) (§ 112, ¶ 6 does not apply when the claim includes "sufficient structure, material, or acts within the claim itself to perform entirely the recited function … even if the claim uses the term 'means.'" (quotation marks and citation omitted)).

When it applies, § 112, ¶ 6 limits the scope of the functional term "to only the structure, materials, or acts described in the specification as corresponding to the claimed function and equivalents thereof." *Williamson*, 792 F.3d at 1347. Construing a means-plus-function limitation involves multiple steps. "The first step … is a determination of the function of the means-plus-function limitation." *Medtronic, Inc. v. Advanced Cardiovascular Sys., Inc.*, 248 F.3d 1303, 1311 (Fed. Cir. 2001). "[T]he next step is to determine the corresponding structure disclosed in the specification and equivalents thereof." *Id.* A "structure disclosed in the specification is 'corresponding' structure only if the specification or prosecution history clearly links or associates that structure to the function recited in the claim." *Id.* The focus of the "corresponding structure" inquiry is not merely whether a structure is capable of performing the recited function, but rather whether the corresponding structure is "clearly linked or associated with the [recited] function." *Id.* The corresponding structure "must include all structure that actually performs the recited function." *Default Proof Credit Card Sys. v. Home Depot U.S.A., Inc.*, 412 F.3d 1291, 1298 (Fed. Cir. 2005). However, § 112 does not permit "incorporation of structure from the written description beyond that necessary to perform the claimed function." *Micro Chem., Inc. v. Great Plains Chem. Co.*, 194 F.3d 1250, 1258 (Fed. Cir. 1999).

For § 112, ¶ 6 limitations implemented by a programmed general purpose computer or microprocessor, the corresponding structure described in the patent specification must include an

algorithm for performing the function. *WMS Gaming Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1349 (Fed. Cir. 1999). The corresponding structure is not a general purpose computer but rather the special purpose computer programmed to perform the disclosed algorithm. *Aristocrat Techs. Austl. Pty Ltd. v. Int'l Game Tech.*, 521 F.3d 1328, 1333 (Fed. Cir. 2008).

D. Definiteness Under 35 U.S.C. § 112, ¶ 2 (pre-AIA) / § 112(b) (AIA)

Patent claims must particularly point out and distinctly claim the subject matter regarded as the invention. 35 U.S.C. § 112, ¶ 2. A claim, when viewed in light of the intrinsic evidence, must "inform those skilled in the art about the scope of the invention with reasonable certainty." *Nautilus Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 910 (2014). If it does not, the claim fails § 112, ¶ 2 and is therefore invalid as indefinite. *Id.* at 901. Whether a claim is indefinite is determined from the perspective of one of ordinary skill in the art as of the time the application for the patent was filed. *Id.* at 911. As it is a challenge to the validity of a patent, the failure of any claim in suit to comply with § 112 must be shown by clear and convincing evidence. *BASF Corp. v. Johnson Matthey Inc.*, 875 F.3d 1360, 1365 (Fed. Cir. 2017). "[I]ndefiniteness is a question of law and in effect part of claim construction." *ePlus, Inc. v. Lawson Software, Inc.*, 700 F.3d 509, 517 (Fed. Cir. 2012).

When a term of degree is used in a claim, "the court must determine whether the patent provides some standard for measuring that degree." *Biosig Instruments, Inc. v. Nautilus, Inc.*, 783 F.3d 1374, 1378 (Fed. Cir. 2015) (quotation marks omitted). Likewise, when a subjective term is used in a claim, "the court must determine whether the patent's specification supplies some standard for measuring the scope of the [term]." *Datamize, LLC v. Plumtree Software, Inc.*, 417 F.3d 1342, 1351 (Fed. Cir. 2005). The standard "must provide objective boundaries for those of skill in the art." *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1371 (Fed. Cir. 2014).

In the context of a claim governed by 35 U.S.C. § 112, ¶ 6, the claim is invalid as indefinite if the claim fails to disclose adequate corresponding structure to perform the claimed function. *Williamson*, 792 F.3d at 1351–52. The disclosure is inadequate when one of ordinary skill in the art "would be unable to recognize the structure in the specification and associate it with the corresponding function in the claim." *Id*. at 1352.

III. AGREED CONSTRUCTIONS

The parties have agreed to constructions set forth in their Joint Claim Construction Chart (Dkt. No. 112) (the "P.R. 4-5(d) Chart") and in their Joint Pre-Markman Report of Terms to Argue, Agreed Constructions, and Terms Agreed to be Submitted on the Briefing (Dkt. No. 135). Based on the parties' agreement, the Court hereby adopts the agreed constructions for this case.

IV. CONSTRUCTION OF DISPUTED TERMS

A. U.S. Patent No. 8,270,433 (Huawei-Asserted)

The '433 Patent claims priority to a Chinese application filed on June 21, 2007.

The '433 Patent is generally directed to Optical Transport Network (OTN) technology for "adapting a payload bandwidth for data transmission" to satisfy the bandwidth requirements for transmitting MAC frames of the 40 Gigabit Ethernet or 10 Gigabit Ethernet standards in an OTN. Generally, the patent sets out a process that takes multiple coding blocks (N) of a certain size (e.g., 64B) and converts the N coding blocks into a single block of a larger size (e.g., (64*N+1)B). '433 Patent col.3 ll.8–25.

The abstract of the '433 Patent provides:

> A sending method, a receiving and processing method and an apparatus for adapting a payload bandwidth for data transmission are provided. In the method, N coding blocks containing 64B are acquired, in which N is an integer greater than or equal to 2, and the acquired N coding blocks are converted into a (64*N+1)B coding block, so that a required linear rate is reduced after conversion, thereby reducing requirements for the payload bandwidth of a bearer layer, and satisfying the payload bandwidth required for transmitting 40

Gigabit Ethernet (40 GE) or 10 Gigabit Ethernet (10 GE) MAC frames in an optical transport network (OTN).

Claims 1 and 6 of the '433 Patent, exemplary method and apparatus claims respectively, provide as follows (with disputed terms emphasized):

1. A sending method for adapting a payload bandwidth for data transmission, comprising:

acquiring N 66B coding blocks each of which contains 64B, wherein the N 66B coding blocks are obtained through a 64B/66B encoding scheme, N is an integer and 5≤N≤8;

encoding the acquired N 66B coding blocks into a (64*N+ 1)B coding block; and

sending the (64*N+l)B coding block obtained by encoding;

wherein encoding the acquired N 66B coding blocks into the (64*N+l)B coding block comprises:

decoding the N 66B coding blocks to obtain ***data blocks containing data only*** and different types of control blocks each of which contains at least one control characters;

placing the control blocks into a ***control block buffer*** as a control block group, setting a first identifier to identify the control block group, setting a second identifier to identify a last control block in the control block group, and placing the data blocks, as a data block group, into a data block buffer;

setting a third identifier by using four bits of each control block to identify a block type of each of the control blocks; and

setting a fourth identifier by using a space smaller than or equal to three bits of each control block to identify positions of each of the control blocks in the N 66B coding blocks.

6. A sending device, comprising:

an acquisition unit configured to acquire N 66B coding blocks each of which contains 64B, wherein the N 66B coding blocks are obtained through a 64B/66B encoding scheme, N is an integer and 5≤N≤8;

a conversion unit configured to encode the acquired N 66B coding blocks into a (64*N+1)B coding block; and

a transmission unit configured to send the (64*N+1)B coding block obtained by encoding;

wherein the conversion unit comprises:

a decoding subunit configured to decode the N 66B coding blocks to obtain data blocks containing data only and different types of control blocks each of which contains at least one control characters;

a control block group discrimination subunit configured to place the control blocks into a control block buffer as a control block group, set a first identifier to identify the control block group, set a second identifier to identify a last control block in the control block group, and place the data blocks, as a data block group, into a data block buffer;

a type discrimination subunit configured to set a third identifier by using four bits to identify a block type of each of the control blocks; and
a position discrimination subunit configured to set a fourth identifier by using a space smaller than or equal to three bits to identify positions of the control blocks in the N 66B coding blocks.

A-1. "data blocks containing data only" and "data block group containing data blocks only"

Disputed Term[5]	Huawei's Proposed Construction	Verizon's Proposed Construction
"data blocks containing data only" • '433 Patent Claims 1, 6,	No construction necessary.	data blocks containing service data only
"data block group containing data blocks only" • '433 Patent Claims 10, 14	No construction necessary.	data block group containing service data only

Because the parties' arguments and proposed constructions with respect to these terms are related, the Court addresses the terms together.

The Parties' Positions

Huawei submits: The meanings of these terms are plain without construction. There is no evidence that rises to the standard of lexicography or disclaimer such that the meaning of "data" should be limited to "service data," as Verizon contends. Dkt. No. 82 at 8.

In addition to the claims themselves, Huawei cites the following **intrinsic evidence** to support its position: '433 Patent col.1 ll.26–29, col.1 ll.54–57.

Verizon responds: These terms specify that the data blocks or groups contain "only" data. This explicitly excludes control information from the data block. The '433 Patent elsewhere uses the term "service data" to distinguish between data and control information. Huawei improperly treats control information as data. Dkt. No. 98 at 13–14.

[5] The term charts in this order list claims identified in the parties' P.R. 4-5(d) Chart.

In addition to the claims themselves, Verizon cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '433 Patent figs.7A–7B, col.1 ll.26–28, col.4 ll.47–55. **Extrinsic evidence**: Ralph Second '433 Decl.[6] ¶¶ 31–33 (Verizon's Ex. 5, Dkt. No. 98-5).

Huawei replies: While a data block is plainly different from a control block, the meanings of "service data" and "control information" are vague and those terms should not be used in a construction. Dkt. No. 106 at 5.

Analysis

The issue in dispute is whether "data only" should be rewritten as "service data only." It should not.

Incorporating "service data," which Verizon posits lacks control information, into a construction only raises issues. It does not clarify claim scope. Notably, the '483 Patent does not include any reference to the "control information" that Verizon seeks to exclude from the scope of these terms. Similarly, there is no explanation in the patent of what constitutes "service data."

The distinction in the '433 Patent is between "control characters" and "data," not between "control information" and "service data." For example, the patent provides:

> In the frame structure of the 66B coding block, the Syn occupying two bits is used to identify whether a payload block in the coding block is ***a data block containing data only*** or ***a control block containing control characters***. In the first embodiment of the present invention, it is considered that one bit or two bits may be used to identify whether a payload block following a certain control block containing control characters in the coding block is ***a control block containing control characters or a data block containing data only***.

'483 Patent col.4 ll.47–55 (emphasis added). It is clear that a data block with "data only" does not include control characters and thus "data" is distinct from "control characters." Nothing in the

[6] Declaration of Stephen E. Ralph ('433 Patent) (Nov. 6, 2020)

patent, however, clearly establishes that "data" is coextensive with "service data" or excludes any information other than "control characters." Ultimately, the evidence identified by Verizon does not clearly limit "data" to "service data" or exclude information other than "control characters."

Accordingly, the Court construes these terms as follows:

- "data blocks containing data only" means "data blocks containing data only (not control characters)"; and
- "data block group containing data blocks only" means "data block group containing data blocks only (not control characters)."

A-2. "control block buffer" and "data block buffer"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"control block buffer" • '433 Patent Claims 1, 6	No construction necessary.	dedicated buffer for only control blocks
"data block buffer" • '433 Patent Claims 1, 6	No construction necessary.	dedicated buffer for only pure data

Because the parties' arguments and proposed constructions with respect to these terms are related, the Court addresses the terms together.

The Parties' Positions

Huawei submits: The "control block buffer" and the "data block buffer" are not necessarily limited to control blocks and data blocks respectively. While the '433 Patent does describe one embodiment in which a data buffer contains only data, this is exemplary rather than definitional. Further, it is a "general principle" of claim construction "that one structure may satisfy multiple claim elements." Thus, "[one] buffer capable of storing data blocks and control blocks" satisfies these limitations. Dkt. No. 82 at 9–10.

In addition to the claims themselves, Huawei cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '433 Patent col.9 ll.24–30. **Extrinsic evidence**: Bortz Decl.[7] at ¶¶ 25–26 (Dkt. No. 82-11).

Verizon responds: The claims "explicitly differentiate between data block buffers and control block buffers." Further, the '433 Patent does not describe a single combined buffer and the claims were modified during prosecution to highlight the distinction between data and control buffers. Thus, buffers of the claims are distinct. Dkt. No. 98 at 14–15.

In addition to the claims themselves, Verizon cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '433 Patent fig.7A–7B, col.9 ll.24–30, col.12 ll.45–52, col.13 ll.16–23; '433 Patent File Wrapper May 22, 2012 Amendment[8] at 2 (Verizon's Ex. 16, Dkt. No. 98-19 at 35–50, 36). **Extrinsic evidence**: Ralph Second '433 Decl. ¶¶ 35–36 (Verizon's Ex. 5, Dkt. No. 98-5); Bortz Decl. at ¶¶ 25–26 (Dkt. No. 82-11).

Huawei replies: The law allows that one structure may satisfy multiple claim elements and there is no disclaimer of scope that would exclude a single buffer from satisfying both the buffer limitations. Dkt. No. 106 at 5.

Huawei cites further **intrinsic evidence** to support its position: '433 Patent File Wrapper May 22, 2012 Amendment at 2 (Verizon's Ex. 16, Dkt. No. 98-19 at 35–50, 36).

Analysis

The issue in dispute appears to be whether the data block buffer and the control block buffer are necessarily distinct buffers. They are.

[7] Declaration of Dr. Michael Bortz Regarding Claim Construction (Nov. 6, 2020).
[8] Verizon cited a May 22, 2020 response. But the '433 Patent issued in 2012 and the only May 22 response in the file wrapper is dated 2012.

The two buffers are separately recited in the claims. Thus, the plain meaning based on the claim language reflects that the buffers are necessarily distinct structures. *See Becton, Dickinson & Co. v. Tyco Healthcare Grp., LP*, 616 F.3d 1249, 1254 (Fed. Cir. 2010) ("Where a claim lists elements separately, the clear implication of the claim language is that those elements are distinct components of the patented invention." (quotation and modification marks omitted)). Huawei has not identified any teaching in the '483 Patent that suggests these two buffers may be a single structure. Thus, even when read in the context of the patent's description of the invention, the clear implication of the separately recited buffers remains that the buffers are distinct structures.

Accordingly, the Court construes these terms as follows:

- "control block buffer" means "buffer for control blocks only" and
- "data block buffer" means "buffer for data blocks only."

A-3. Order of Steps in Claim 1

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
1. A sending method for adapting a payload bandwidth for data transmission, comprising: … placing the control blocks into a control block buffer as a control block group, setting a first identifier to identify the control block group, setting a second identifier to identify a last control block in the control block group, and placing the data blocks, as a data block group, into a data block buffer; setting a third identifier by using four bits of each control block to identify a block type of each of the control blocks; and setting a fourth identifier by using a space smaller than or equal to three bits of each control block to identify positions of each of the control blocks in the N 66B coding blocks. • '433 Patent Claim 1	No construction necessary. The steps need not occur in the order as recited by the claim.	The steps must occur in the order as recited by the claim.

The Parties' Positions

Huawei submits: Neither logic nor grammar require: (1) placing control blocks in a buffer before placing data blocks or (2) setting the first, second, third, or fourth identifiers in any particular order. Dkt. No. 82 at 10–11.

Verizon responds: The claim plainly requires that: "(1) control blocks are placed into a control block buffer as a control block group before the first and second identifiers can be set, and (2) a control block must be known before the third and fourth identifiers can be set." The information needed for setting the identifiers is not known until the control blocks are placed in the buffer as a group. Dkt. No. 98 at 15–16.

In addition to the claims themselves, Verizon cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '433 Patent col.9 ll.24–38. **Extrinsic evidence**: Ralph Second '433 Decl. ¶¶ 23–27 (Verizon's Ex. 5, Dkt. No. 98-5).

Huawei replies: Control blocks may be received, the identifiers set, and then the blocks reordered into the group with the pre-grouping identifiers. This would satisfy the four identifier limitations without requiring that the group be formed before the identifiers are set. Dkt. No. 106 at 5.

Analysis

The issue in dispute distills to whether control blocks must be in a buffer as a group before their identifiers can be set. The claims are not so limited.

The Court agrees with Huawei that, logically, identifiers of blocks can be set before the blocks are positioned. Verizon has not identified anything that dictates otherwise.

Accordingly, the Court rejects Verizon's ordering and determines that the ordering of the steps of Claim 1 is according to the plain and ordinary meaning of the claim langauge without the need for further construction.

A-4. Alleged Means-Plus-Function Terms

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"an acquisition unit configured to acquire N 66B coding blocks each of which contains 64B" • '433 Patent Claim 6	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: a data interface and equivalents thereof (see, e.g., S101 of Fig. 4; 1:25–45; 9:5–13)	Governed by 35 U.S.C. § 112, ¶ 6. **function**: acquire N 66B coding blocks each of which contains 64B **structure**: none disclosed
"an acquisition unit configured to acquire a (64*N+1)B coding block" • '433 Patent Claim 14	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: a data interface and equivalents thereof (see, e.g., S201 of Fig. 9; 1:25–45; 9:5–13; 11:13–23)	Governed by 35 U.S.C. § 112, ¶ 6. **function**: acquire a (64*N+1)B coding block **structure**: none disclosed
a position recovery subunit configured to recover the control blocks to their positions in the N 66B coding blocks • '433 Patent Claim 14	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described at 11:41-43, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: recover the control blocks to their positions in the N 66B coding blocks **structure**: none disclosed

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"a conversion unit configured to encode the acquired N 66B coding blocks into a (64*N+1)B coding block" • '433 Patent Claim 6	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: OTN processor, and equivalents thereof (see, e.g., fig. 1, S102 of fig. 4, fig. 7; 1:25-45; 9:14-10:22; 10:44-65; 12:37-59)	Governed by 35 U.S.C. § 112, ¶ 6. **function**: encode the acquired N 66B coding blocks into a (64*N+1)B coding block **structure**: none disclosed
"a decoding subunit configured to decode the N 66B coding blocks to obtain data blocks containing data only and different types of control blocks each of which contains at least one control characters" • '433 Patent Claim 6	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: decoder and equivalents thereof (see, e.g., 1:25-45; 9:14-10:22; 12:37-59)	Governed by 35 U.S.C. § 112, ¶ 6. **function**: decode the N 66B coding blocks to obtain data blocks containing data only and different types of control blocks each of which contains at least one control characters **structure**: none disclosed
"a conversion unit configured to decode the (64*N+1)B coding block to recover N 66B coding blocks each of which contains 64B" • '433 Patent Claim 14	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: OTN processor, and equivalents thereof (see, e.g., S202 of fig. 9; 1:25-45; 11:24-12:15)	Governed by 35 U.S.C. § 112, ¶ 6. **function**: decode the (64*N+1)B coding block to recover N 66B coding blocks each of which contains 64B **structure**: none disclosed

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"a decoding subunit configured to decode the (64*N+1)B coding block to obtain a first identifier for identifying a control block group, a second identifier for identifying a last control block in the control block group, a third identifier for identifying the positions of the control blocks in the N 66B coding blocks, and a fourth identifier for identifying a block type of each of the control blocks" '433 Patent Claim 14	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: decoder and equivalents thereof (see, e.g., 1:25-45; 11:24-12:15)	Governed by 35 U.S.C. § 112, ¶ 6. **function**: decode the (64*N+1)B coding block to obtain a first identifier for identifying a control block group, a second identifier for identifying a last control block in the control block group, a third identifier for identifying the positions of the control blocks in the N 66B coding blocks, and a fourth identifier for identifying a block type of each of the control blocks **structure**: none disclosed
"a control block group discrimination subunit configured to place the control blocks into a control block buffer as a control block group, set a first identifier to identify the control block group, set a second identifier to identify a last control block in the control block group, and place the data blocks, as a data block group, into a data block buffer" • '433 Patent Claim 6	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described at 9:24-30 or 9:62-10:1, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: place the control blocks into a control block buffer as a control block group, set a first identifier to identify the control block group, set a second identifier to identify a last control block in the control block group, and place the data blocks, as a data block group, into a data block buffer **structure**: none disclosed

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"a type discrimination subunit configured to set a third identifier by using four bits to identify a block type of each of the control blocks" • '433 Patent Claim 6	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described at 9:35-38, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: set a third identifier by using four bits to identify a block type of each of the control blocks **structure**: none disclosed
"a position discrimination subunit configured to set a fourth identifier" • '433 Patent Claim 6	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described at 9:39-41, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: set a fourth identifier **structure**: none disclosed
"a control block group determination subunit configured to determine the control block group and a data block group containing data blocks only" • '433 Patent Claim 14	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described at 11:26-35, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: determine the control block group and a data block group containing data blocks only **structure**: none disclosed

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"a control block type determination subunit configured to determine a type of each of the control blocks in the N 66B coding blocks" • '433 Patent Claim 14	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described at 11:36-40, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: determine a type of each of the control blocks in the N 66B coding blocks **structure**: none disclosed

Because the parties' arguments and proposed constructions with respect to these terms are related, the Court addresses the terms together.

The Parties' Positions

Huawei submits: Each of these terms lacks the term "means" and, therefore, there is a presumption against applying 35 U.S.C. § 112, ¶ 6. When the claims are read in the appropriate context, these limitations sufficiently denote structure and the presumption cannot be overcome. Specifically the context of the claims' intended environment ("known G.709 or G.8032 equipment") and the claim-recited objectives and operations of the terms sufficiently connote the structural nature of the terms. Dkt. No. 82 at 34–37.

In addition to the claims themselves, Huawei cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '433 Patent col.4 ll.30–40, col.12 ll.29–65, col.14 ll.32–60; '236 Patent col.2 ll.59–60, col.11 ll.60–63; '253 Patent col.2 ll.6–10. **Extrinsic evidence**: Bortz Decl. at ¶¶ 106–12 (Dkt. No. 82-11); Melendez Decl.[9] ¶¶ 17, 48–54 (Dkt. No. 82-12); ITU-T, *ITU-T Recommendation Y.1731* (Melendez Decl. Ex. 2, Dkt. No. 82-12 at 58–69).

[9] Declaration of Dr. Jose Luis Melendez on Claim Construction (Nov. 6, 2020).

Verizon responds: These terms are properly governed by § 112, ¶ 6 because "none of the recited 'units,' 'subunits,' or "modules" would have been understood by a POSITA to describe a particular structure for performing the recited functions." Specifically, the recited units and subunits "have no established meaning in the art and lack any structural significance." Even when read in the context of the intended environment, the standards defining the environment do not dictate structure but rather merely provide functional interfaces. The '433 Patent discloses nothing more than black boxes defined by the claim-recited functions and therefore fails to meet the § 112, ¶ 6 standard. Dkt. No. 98 at 9–12.

In addition to the claims themselves, Verizon cites the following **extrinsic evidence** to support its position: Ralph '433 Decl.[10] ¶¶ 52–58, 60–67, 70–85 (Verizon's Ex. 1, Dkt. No. 98-1); Ralph '236 & '505 Decl.[11] ¶¶ 56–68, 73–74, 76, 81, 89, 92–95, 106 (Verizon's Ex. 3, Dkt. No. 98-3); Almeroth Decl.[12] ¶¶ 41–46, 54–55, 60–61, 66–67, 70–71, 75–76 (Verizon's Ex. 4, Dkt. No. 98-4); ITU-T, *Recommendation ITU-T G.709/Y.1331* at § 1 (Dec. 2009) (Verizon's Ex. 12, Dkt. No. 98–15 at 10).

Huawei replies: As Verizon's expert agrees, one of ordinary skill in the art would be familiar with G.709 and G.8032 equipment and would understand that every interface in a G.709 network includes certain structural components. When read in this context, the terms at issue are sufficiently structural. Dkt. No. 106 at 14.

Huawei cites further **extrinsic evidence** to support its position: Min Decl. ¶¶ 88, 90 (Verizon's Counterclaim Ex. 3, Dkt. No. 85-3).

[10] Declaration of Stephen E. Ralph, Ph.D. ('433 Patent) (Oct. 16, 2020).
[11] Declaration of Stephen E. Ralph, Ph.D. ('236 and '505 Patents) (Oct. 16, 2020).
[12] Declaration of Kevin C. Almeroth, Ph. D. (undated).

Analysis

There are two issues in dispute. First, whether these terms should be governed by 35 U.S.C. § 112, ¶ 6. Second, if the terms are governed by § 112, ¶ 6, whether the '433 Patent satisfies the disclosure requirements of the statute. The Court determines that these terms are not governed by § 112, ¶ 6 and therefore does not address the second issue.

Verizon has not overcome the presumption against applying § 112, ¶ 6. The Court begins with the presumption that § 112, ¶ 6 does not apply because the terms do not include the "means" language traditionally used to signal application of the statute. *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1347–49 & n.3 (Fed. Cir. 2015) (en banc in relevant portion). This "presumption can be overcome and § 112, para. 6 will apply if the challenger demonstrates that the claim term fails to recite sufficiently definite structure or else recites function without reciting sufficient structure for performing that function." *Id.* at 1349 (quotation marks omitted). "[T]he mere fact that the disputed limitations incorporate functional language does not automatically convert the words into means for performing such functions." *Zeroclick, LLC v. Apple Inc.*, 891 F.3d 1003, 1008 (Fed. Cir. 2018). "The question whether [a term] invokes section 112, paragraph 6, depends on whether persons skilled in the art would understand the claim language to refer to structure, assessed in light of the presumption that flows from the drafter's choice not to employ the word 'means.'" *Samsung Elecs. Am., Inc. v. Prisua Eng'g Corp.*, 948 F.3d 1342, 1354 (Fed. Cir. 2020).

The presumption against applying § 112, ¶ 6 to the "… unit configured to …" and "… subunit configured to …" terms stands. To begin, it appears undisputed that the claims are directed to OTN equipment. *See, e.g.*, Bortz Decl. ¶¶ 106, 109–10, Dkt. No. 82-11; Ralph '433 Decl. ¶¶ 40–42, Dkt. No. 98-1. When read in this context, the Court understands the claim-recited units and subunits refer to a broad class of OTN structures, even if they do not invoke a particular OTN structure.

The claims themselves further provide significant indicia of the structural nature of these limitations by reciting how the units and subunits interact to achieve claim-recited objectives. For instance, Claim 6 of the '483 Patent provides:

> **6**. A sending device, comprising:
> an acquisition unit configured to acquire N 66B coding blocks each of which contains 64B, wherein the N 66B coding blocks are obtained through a 64B/66B encoding scheme, N is an integer and 5≤N≤8;
> a conversion unit configured to encode the acquired N 66B coding blocks into a (64*N+1)B coding block; and
> a transmission unit configured to send the (64*N+1)B coding block obtained by encoding;
> wherein the conversion unit comprises:
> a decoding subunit configured to decode the N 66B coding blocks to obtain data blocks containing data only and different types of control blocks each of which contains at least one control characters;
> a control block group discrimination subunit configured to place the control blocks into a control block buffer as a control block group, set a first identifier to identify the control block group, set a second identifier to identify a last control block in the control block group, and place the data blocks, as a data block group, into a data block buffer;
> a type discrimination subunit configured to set a third identifier by using four bits to identify a block type of each of the control blocks; and
> a position discrimination subunit configured to set a fourth identifier by using a space smaller than or equal to three bits to identify positions of the control blocks in the N 66B coding blocks.

The acquisition unit, conversion unit, and transmission unit cooperate in a specified and detailed manner to convert information in one format (N 66B coding blocks) to another format (one (64*N+1)B coding block) and send it. Claim 14 provides similar context. Under Federal Circuit precedent, such claim recitation of how functionally-defined components interact to achieve a claim-recited objective provides sufficient indicia of structure to maintain the presumption against § 112, ¶ 6. *See, e.g.*, *Linear Tech. Corp. v. Impala Linear Corp.*, 379 F.3d 1311, 1319–21 (Fed. Cir. 2004) ("circuit [for performing a function]" found to be sufficiently definite structure because the claim recited the "objectives and operations" of the circuit); *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1295, 1301 (Fed. Cir. 2014) ("heuristic [for performing a function]" found to be

sufficiently definite structure in part because the claim described the operation and objectives of the heuristic); *Zeroclick, LLC*, 891 F.3d 1008 (Fed. Cir. 2018) ("program that can [perform function]" found to be sufficiently definite structure in part because the claims provided operational context for the program); *Prisua Eng'g Corp.*, 948 F.3d at 1347–48, 1353–54 ("digital processing unit … performing [functions]" found to be sufficiently definite structure in part because the claims provided operational context for the unit). Given this context, Defendant has failed to overcome the presumption against applying § 112, ¶ 6.

Accordingly, the Court determines that Defendant has failed to establish that these terms should be governed by § 112, ¶ 6 or that any claim is indefinite for including any of the terms.

B. U.S. Patent No. 9,014,151 (Huawei-Asserted)

The '151 Patent claims priority to a Chinese application filed on August 11, 2004.

The '151 Patent is generally directed to Optical Transport Network (OTN) technology for mapping low-rate traffic signals in an OTN in a manner that efficiently utilizes OTN bandwidth. '151 Patent col.2 ll.40–49.

The abstract of the '151 Patent provides:

> A method and apparatus for low-rate traffic signal transmission on Optical Transport Networks (OTN). The method includes: defining a frame format of the low-rate traffic optical channel data unit (ODU) signal for bearing the low-rate traffic signal; mapping the low-rate traffic signal to the low-rate traffic optical channel payload unit (OPU) of the low-rate traffic ODU signal, generating overhead bytes and filling the bytes in an overhead section of the low-rate traffic ODU to obtain the low-rate traffic ODU signal; multiplexing low-rate traffic ODU signals to an ODUk signal of which the rate matches the transmission rate rank of the OTN where the signal is transmitted, and transmitting the signal via the OTN. Based on this method, the invention provides an apparatus for the low-rate traffic signal transmission in the OTN as well. With this invention, the low-rate traffic signal transmission in the OTN can be implemented conveniently.

Claims 1 and 7 of the '151 Patent, exemplary method and apparatus claims respectively, provide as follows (with disputed terms emphasized):

1. A method for transmitting a low-rate traffic signal in an Optical Transport Network (OTN), comprising:

mapping a single ***low-rate traffic*** signal, for transmission on the OTN, to a single low-rate traffic Optical channel Payload Unit (OPU), wherein the single low-rate traffic OPU includes a payload that has a size of 4x3,808 bytes and a bit rate of 1,238,954.31 Kbps±20 ppm, the single low-rate traffic signal is a Gigabit Ethernet (GE) signal or a Fiber Connection (FC) signal with a rate of 1.06 Gbit/s, and ***the mapping the single low-rate traffic signal to the single low-rate traffic OPU is performed using a General Framing Procedure (GFP) or other adaptation protocols***;

generating one or more overhead bytes for end to end managing the single low-rate traffic signal and filling the overhead bytes in an overhead section of a low-rate traffic Optical Channel Data Unit (ODU), wherein the low-rate traffic ODU contains the single low-rate traffic OPU and the overhead section of the low-rate traffic ODU, and the low-rate traffic ODU has a size of 4x3,824 bytes with a bit rate of 1,244,160 Kbps ±20 ppm;

multiplexing at least the one low-rate traffic ODU to an ODUk with a ***rate rank*** of the OTN; and

transmitting the ODUk via the OTN.

7. An apparatus for ***transmitting a low-rate traffic signal in an Optical Transport Network (OTN)***, comprising:

at least one mapping unit and an Optical Channel Data Unit-k (ODUk) terminal module; wherein the mapping unit is ***adapted to***:

map a single ***low-rate traffic*** signal to be transmitted to a single low-rate traffic Optical channel Payload Unit (OPU), wherein the one low-rate traffic OPU includes a payload that has a size of 4x3,808 bytes and a bit rate of 1,238,954.31 Kbps±20 ppm;

and generate overhead bytes and fill the overhead bytes in an overhead section of a low-rate traffic Optical Channel Data Unit ODU, wherein the low-rate traffic ODU contains the single low-rate traffic OPU and the overhead section of the low-rate traffic ODU, and the low-rate traffic ODU has 4x3,824 bytes with a bit rate of 1,244, 160 Kbps ±20 ppm, and wherein the overhead bytes are used for end to end management of the one low-rate traffic signal, or de-map the ODUk from the ODUk terminal module into the one low-rate traffic signal; and

wherein the ODUk terminal module is adapted to: multiplex low-rate traffic ODU sent from a mapping unit to obtain one ODUk, or de-multiplex input ODUk to obtain at least one path of the low-rate traffic ODU and send the signal to the corresponding mapping unit, respectively;

wherein the single low-rate traffic signal is a Gigabit Ethernet (GE) signal or a Fiber Connection (FC) signal with a rate of 1.06 Gbit/s, and ***the mapping the single low-rate traffic signal to the single low-rate traffic OPU is performed using a General Framing Procedure (GFP) or other adaptation protocols***.

B-1. "the mapping the single low-rate traffic signal to the single low-rate traffic OPU is performed using a General Framing Procedure (GFP) or other adaptation protocols"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"the mapping the single low-rate traffic signal to the single low-rate traffic OPU is performed using a General Framing Procedure (GFP) or other adaptation protocols" • '151 Patent Claims 1, 7	No construction necessary.	the mapping the single low-rate traffic signal to the single low-rate traffic OPU is performed using a General Framing Procedure (GFP), where the adaption protocol is either GFP-T or GFP-F Alternatively: • indefinite

The Parties' Positions

Huawei submits: As explicitly recited, the mapping may be performed with "a General Framing Procedure (GFP) or other adaptation protocols" and is therefore not limited to a specific GFP protocol or GFP at all. This means that the term encompasses mapping according to GFP and other protocols that arose after the priority date of the patent. Dkt. No. 82 at 11–12.

In addition to the claims themselves, Huawei cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '151 Patent col.6 ll.22–32, col.11 ll.16–19. **Extrinsic Evidence**: Bortz Decl. ¶ 32 (Dkt. No. 82-11).

Verizon responds: If the term is construed to cover any adaptation protocol, then the phrase "performed using a General Framing Procedure (GFP) or other adaptation protocols" is meaningless because the claimed "mapping" is inherently and necessarily performed only by adaptation. Given that the only adaptation protocols disclosed in the '151 Patent are the GFP-T and GFP-P protocols and that the performed-using phrase must be given effect for the claims to be definite, the mapping must be performed using either the GFP-T or GFP-F protocol. Indeed,

the claims were not allowed until the claims were amended to require "the mapping be performed by 'General Framing Procedure (GFP).'" Dkt. No. 98 at 16–18.

In addition to the claims themselves, Verizon cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '151 Patent col.3 ll.34–39, col.4 l.32 – col.5 l.7, col.5 ll.46–62, col.6 ll.11–63, col.8 ll.26–30, col.8 l.49 – col.9 l.7, col.9 ll.24–40, col.9 ll.53–58, col.10 ll.2–12, col.10 ll.23–36; '151 Patent File Wrapper December 22, 2014 Notice of Allowability[13] at 2 (Verizon's Ex. 10, Dkt. Nos. 98-10 at 28–34, 29). **Extrinsic evidence**: Ralph '151 Decl.[14] ¶ 48 (Verizon's Ex. 2, Dkt. No. 98-2); Ralph Second '151 Decl.[15] ¶ 24 (Verizon's Ex. 6, Dkt. No. 98-6).

Huawei replies: Verizon's proposal entirely omits the claim recitation that mapping may be performed with "other adaptation protocols." The claim language clarifies that the mapping is not limited to a GFP adaptation protocol. Dkt. No. 106 at 5–6.

Analysis

The issue in dispute is whether the claim-recited mapping must be performed with either the GFP-T or GFP-F adaptation protocols, even though the claims recite that the mapping is "performed using a General Framing Procedure (GFP) or other adaptation protocols." The mapping is not limited to the GFP-T or GFP-F adaptation protocols.

The Court rejects Verizon's invitation to limit the otherwise broad claim language to the GFP-T or GFP-F adaptation protocols. The Court is not persuaded that the '151 Patent's description of

[13] Verizon cites page 3 of the Notice of Allowance, but page 3 of that document (Dkt. No. 98-10 at 25) reflects the patent-term adjustment, not an examiner's amendment. The Notice of Allowability (*id*. at 28–34) that accompanied the Notice of Allowance includes an examiner's amendment (*id*. at 29) with the language Verizon quotes.
[14] Declaration of Stephen E. Ralph, Ph.D. Regarding U.S. Patent No. 9,014,151 (Oct. 16, 2020).
[15] Declaration of Stephen E. Ralph, Ph.D. Regarding U.S. Patent No. 9,014,151 (Nov. 6, 2020).

embodiments or anything in the prosecution history rises to the exacting standard to warrant importing such a limitation, which is clearly not expressed in the examined and issued claim language.

Accordingly, the Court rejects Verizon's proposed construction and determines that this term has its plain and ordinary meaning without the need for further construction.

B-2. "transmitting the ODUk via the OTN" and "transmitting a low-rate traffic signal in an Optical Transport Network (OTN)"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"transmitting the ODUk via the OTN" • '151 Patent Claim 1	No construction necessary. Alternatively: • transmitting the ODUk in an Optical Transport Network	transmitting the ODUk within an Optical Transport Network (OTN)
"transmitting a low-rate traffic signal in an Optical Transport Network (OTN)" • '151 Patent Claims 7, 12	No construction necessary.	transmitting a low-rate traffic signal within an Optical Transport Network

Because the parties' arguments and proposed constructions with respect to these terms are related, the Court addresses the terms together.

The Parties' Positions

Huawei submits: The meanings of these terms are plain without construction. Dkt. No. 82 at 12–13.

Verizon responds: The terms "via" and "in" in the claims mean the that ODUk is transmitted "within" the network. "Under Huawei's proposed construction, the mere existence of an ODUk signal in a network would be covered by the claim. However, this is not what is required by the claims, as the purpose of the alleged invention is to create and transmit an ODUk signal within an Optical Transport Network." Dkt. No. 98 at 19.

In addition to the claims themselves, Verizon cites the following **intrinsic evidence** to support its position: '151 Patent, at [57] Abstract, col.9 ll.46–52.

Huawei replies: "To the extent Verizon contends that the claims requir[e] 'creating' an ODUk 'within' an OTN, it fails to explain or otherwise support reading such a limitation into the claims." Dkt. No. 106 at 6.

Analysis

The issue in dispute appears to distill to whether the claim language should be rewritten to ensure that the signal is transmitted within the OTN. The claims state "transmitting … via the OTN" and "transmitting … in an … OTN" which plainly do not encompass mere existence of a signal in an OTN. Verizon's rewrite of the claims either clarifies nothing or threatens to improperly limit the claims by requiring transmitting entirely within the OTN, and thus require the signal is created in the OTN.

Accordingly, the Court rejects Verizon's proposed constructions and determines that these terms have their plain and ordinary meanings without the need for further construction.

B-3. "rate rank"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"rate rank" • '151 Patent Claims 1, 6	No construction necessary.	the k value of ODUk or OPUk, where k equals 0, 1, 2, or 3 based on the traffic rate

The Parties' Positions

Huawei submits: The "rate rank" of the claims "refers to the set of bit rates standardized in the G.709 standard," but is not limited to the rate ranks available before the '151 Patent application was filed. Dkt. No. 82 at 13–14.

In addition to the claims themselves, Huawei cites the following **intrinsic evidence** to support its position: '151 Patent col.4 ll.33–38.

Verizon responds: The "rate rank" of the claims should be construed to have its meaning as of the time of the invention. Thus, the claims are limited to the rate ranks specified in the G.709 standard "in effect at the time of the effective filing date." Dkt. No. 98 at 20.

In addition to the claims themselves, Verizon cites the following **intrinsic evidence** to support its position: '151 Patent col.4 ll.35–39.

Huawei replies: The "rate rank" of the claims refers to a class of signals that properly encompasses embodiments that arise after the filing of the application. Indeed, the '151 Patent indicates that the standard should be modified to include an additional rate rank. Dkt. No. 106 at 6–7.

Huawei cites further intrinsic evidence to support its position: '151 Patent col.4 l.39 – col.5 l.21.

Analysis

The issue in dispute is whether "rate rank" in the claims is limited to the rate ranks known at the filing date of the '151 Patent application. It is not.

The Court understands that a claim term should be given the meaning it had as of the effective filing date. *See, e.g.*, *Schering Corp. v. Amgen Inc.*, 222 F.3d 1347, 1353 (Fed. Cir. 2000) ("this court must determine what the term meant at the time the patentee filed the [patent] application"); *Kopykake Enters. v. Lucks Co.*, 264 F.3d 1377, 1381–84 (Fed. Cir. 2001) ("As a general rule, the construing court interprets words in a claim as one of skill in the art at the time of invention would understand them …."); *Plant Genetic Sys. v. DeKalb Genetics Corp.*, 315 F.3d 1335, 1344–45 (Fed. Cir. 2003) ("Claims are to be given their ordinary and objective meaning as of the time of

the invention."); *PC Connector Sols. LLC v. SmartDisk Corp.*, 406 F.3d 1359, 1361–63 (Fed. Cir. 2005) ("A claim cannot have different meanings at different times; its meaning must be interpreted as of its effective filing date."); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc) ("We have made clear, moreover, that the ordinary and customary meaning of a claim term 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."); *Mass. Inst. of Tech. v. Abacus Software*, 462 F.3d 1344, 1352 (Fed. Cir. 2006) ("In determining the meaning of a term within the pertinent art, it is appropriate to determine [its use] at the time the patent application was filed.").

On the other hand, claim scope is not limited to the embodiments described in the patent and may encompass future embodiments. *See, e.g.*, *SRI Int'l v. Matsushita Elec. Corp of Am.*, 775 F.2d 1107, 1122 (Fed. Cir. 1985) (en banc) ("The law does not require the impossible. Hence, it does not require that an applicant describe in his specification every conceivable and possible future embodiment of his invention."); *Rexnard Corp. v. Laitram Corp.*, 274 F.3d 1336, 1344 (Fed. Cir. 2001) (a patent "applicant is not required to describe in the specification every conceivable and possible future embodiment of his invention"); *SuperGuide Corp. v. DirecTV Enters.*, 358 F.3d 870, 878–81 (Fed. Cir. 2004) ("The law does not require that an applicant describe in his specification every conceivable and possible future embodiment of his invention."); *Innogenetics, N.V. v. Abbott Labs.*, 512 F.3d 1363, 1371 (Fed. Cir. 2008) ("Our case law allows for after-arising technology to be captured within the literal scope of valid claims that are drafted broadly enough."); *Toshiba Corp. v. Imation Corp.*, 681 F.3d 1358, 1369 (Fed. Cir. 2012) ("a patentee need not describe in the specification every conceivable and possible future embodiment of his invention" (quotation marks omitted)).

On balance, it appears that the Federal Circuit allows claim language to literally encompass after-arising technology. Here, the '151 Patent does not explicitly limit the claims to "rate rank" at a particular date, which indicates that it can encompass after-arising embodiments of rate rank. *See SuperGuide*, 358 F.3d at 879 ("[The *Kopykake*] holding, however, does not have relevance here because the patentees in *Kopykake* explicitly limited the claim term to technologies that were 'conventional' at the time of the invention. In contrast, the '578 patentees did not explicitly limit the disputed claim language to technologies that were 'conventional' at the time of the invention.")

Accordingly, the Court rejects Verizon's proposed construction and determines that this term has its plain and ordinary meaning, as informed by the G.709 standard, without the need for further construction.

B-4. "adapted to" and "configured to"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"adapted to" • '151 Patent Claims 7–13	No construction necessary. Alternatively: • has the capability to	Plain and ordinary meaning, with the understanding that this means not merely being capable of being configured but rather being actually configured.
"configured to" • '151 Patent Claim 12	No construction necessary. Alternatively: • has the capability to	Plain and ordinary meaning, with the understanding that this means not merely being capable of being adapted but rather being actually adapted.

Because the parties' arguments and proposed constructions with respect to these terms are related, the Court addresses the terms together.

The Parties' Positions

Huawei submits: These commonly used claim terms refer to a capability to perform some limitation. In the claims at issue, the terms "refer to a device's ability to map low rate data to the

low-rate traffic ODU format described in the '151 patent (and which corresponds to ODU0 in the G.709 standard). … [they] refer to a device's capability to use ODU0; they are not directed towards some requirement that an ODU0-capable device be modified in some way by a user." Dkt. No. 82 at 14–15.

Verizon responds: The terms are directed to actual configuration, not to "the mere capability of being configured or adapted." Dkt. No. 98 at 20–21.

In addition to the claims themselves, Verizon cites the following **intrinsic evidence** to support its position: '151 Patent col.11 ll.3–5.

Huawei replies: "It is unclear if the parties have a claim construction dispute with regard to these terms, or whether they may ultimately have an infringement dispute with respect to these terms." Dkt. No. 106 at 7.

Analysis

The issue in dispute appears to distill to whether claim language directed to structure "adapted to" or "configured to" perform claim-recited functions encompasses structure that may be adapted to or configured to perform those functions, but is not in a state to perform those functions. It does not.

The "configured to" and "adapted to" limitations denote actual capability to perform the claim-recited function, not merely some potential capability (e.g., capable, but only after modification). In other words, "configured to" and "adapted to" plainly do not encompass structure that is merely "configurable" or "adaptable" to perform the claim-recited function but is not in a state to perform the function. The claims provide significant context that informs the meanings of these terms. For instance, Claim 12 of the '151 Patent provides:

> **12.** An apparatus for transmitting a low-rate traffic signal in an Optical Transport Network (OTN), applicable to network nodes in a reticular or ring

network, comprising: a wavelength dividing/multiplexing unit, an Optical channel Transport Unit-k (OTUk) line unit, an Optical Channel Data Unit-k (ODUk) switching unit, an low-rate traffic ODU to ODUk adaption unit, and a low-rate traffic signal mapping unit,

wherein the wavelength dividing/multiplexing unit is ***configured to receive*** an optical signal in the OTN, perform the optic-layer signal processing and obtain an OTUk signal;

wherein the OTUk line unit is ***configured to conduct line correlation processing*** for the OTUk signal from the wavelength dividing/multiplexing unit;

wherein the ODUk switching unit is ***configured to conduct the ODUk-rank cross dispatching*** for the ODUk signal from at least one of the OTUk line unit;

wherein the low-rate traffic ODU to ODUk adaptation unit is ***configured to implement asynchronous multiplexing and de-multiplexing*** between a low-rate traffic ODU signal originated from the low-rate traffic signal map- ping unit and an ODUk signal from ODUk switching unit;

wherein the low-rate traffic signal mapping unit is ***further adapted to map*** a single low-rate traffic signal to be transmitted to a single low-rate traffic Optical channel Payload Unit (OPU), wherein the single low-rate traffic OPU includes a payload that has a size of 4x3,808 bytes and a bit rate of 1,238,954.31 Kbps±20 ppm; ***and generate*** overhead bytes and fill the overhead bytes in an overhead section of a low-rate traffic ODU, wherein the low-rate traffic ODU contains the single low-rate traffic OPU and the overhead section of the low-rate traffic ODU, and the low-rate traffic ODU has 4x3,824 bytes with a bit rate of 1,244,160 Kbps±20 ppm; wherein the overhead bytes are used for end to end management of the low-rate traffic signal; and transmit the signal to the ODU switching unit;

wherein the OTUk line unit is ***further adapted to conduct line correlation processing*** for the ODUk signal from the ODUk switching unit to obtain the OTUk signal;

wherein the wavelength dividing/multiplexing unit is ***further adapted to make the optic-layer processing*** of the OTUk signal from the OTUk line unit to obtain the optical signal for transmission in the OTN.

'151 Patent col.13 l.53 – col.14 l.44 (emphasis added). The claim is plainly directed to an apparatus that includes various structural "units" wherein each unit's structure is defined by its functional role within the apparatus. Claims 7–11 and 13 provide similar context.

The limitations at issue here are similar to limitations addressed by the Federal Circuit in *Typhoon Touch Techs. v. Dell, Inc.*, 659 F.3d 1376 (Fed. Cir. 2011) and *Nazomi Communs., Inc. v. Nokia Corp.*, 739 F.3d 1339 (Fed. Cir. 2014).

In *Typhoon*, the Federal Circuit addressed the meaning of "memory for storing" in the following claim:

> 12. A portable, *keyboardless*, computer comprising:
> an input/output device for displaying inquiries on a touch-sensitive screen, said screen configured for entry of responses to said inquiries;
> a ***memory for storing*** *at least one data collection application* configured to determine contents and formats of said inquiries displayed on said screen;
> a processor coupled to said memory and said input/output device for executing said data collection application;
> an application generator for generating said data collection application and for creating different functional libraries relating to said contents and said formats displayed on said screen, said application generator further comprising *means for cross-referencing responses to said inquiries with possible responses from one of said libraries*; and
> a run-time utility *operating in conjunction with said processor to execute said application* and said libraries to facilitate data collection operations.

Typhoon, 659 F.3d at 1379–80 (italic emphasis is in original, bold emphasis added). The Federal Circuit rejected that the "memory for storing at least one data collection application" means simply that the "memory is capable of being configured to store data collection applications." *Id*. at 1380. *Typhoon* invoked precedent governing patent claims to structure through recitation of function without invoking 35 U.S.C. § 112, ¶ 6 and held that the functionally-defined structure "must be 'capable' of performing the recited function, not that it might later be modified to perform that function." *Id*.

In *Nazomi*, the Federal Circuit addressed the meaning of "central processing unit (CPU) capable of executing a plurality of instruction sets" in the following claim:

> 48. A **central processing unit (CPU) capable of executing a plurality of instruction sets comprising**:
> an execution unit and associated register file, the execution unit *to execute instructions of a plurality of instruction sets, including a stack-based* and a register-based instruction set;
> a mechanism to maintain at least some data for the plurality of instruction sets in the register file, including *maintaining an operand stack for the stack-based instructions* in the register file and an indication of a depth of the operand stack;

> *a stack control mechanism* that includes at least one of an overflow and underflow mechanism, wherein at least some of the operands are moved between the register file and memory; and
> a mechanism to generate an exception in respect of selected stack-based instructions.

Nazomi, 739 F.3d at 1343–44 (italic emphasis is in original, bold emphasis added). The Federal Circuit distinguished between a CPU "capable of" performing functions and one that is "programmable" or "capable of being modified" to perform the functions. *Id*. at 1344–45.

As instructed in *Typhoon* and *Nazomi*, a structural claim element that is defined by the function it performs—rather than a function it might be modified or programmed to perform—must be in a state capable of performing the function. *See also, Aspex Eyewear, Inc. v. Marchon Eyewear, Inc.*, 672 F.3d 1335, 1349 (Fed. Cir. 2012) (noting "configured to" claim language is distinct form "capable of" or "suitable for," and that "members … configured to accomplish [a] specified objective" requires more than "simply that they can be made to serve that purpose"); *Sipco, LLC v. Abb, Inc.*, No. 6:11-CV-0048 LED-JDL, 2012 U.S. Dist. LEXIS 106659, at *29–33 (E.D. Tex. July 30, 2012) (noting that construing "configured to" perform a function as "may be configured [to]" perform a function "would eliminate any meaningful limits to the claims").

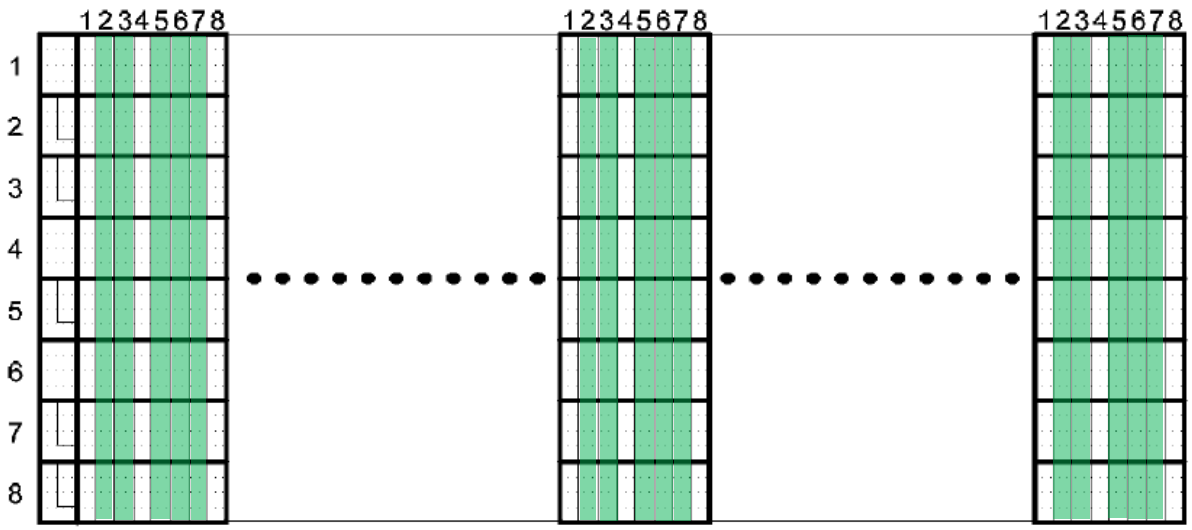
Accordingly, the Court rejects that the plain and ordinary meaning of the "adapted to [perform functions]" or "configured to [perform functions]" claim language encompasses structure that is merely capable of performing the functions in the abstract. Under their plain and ordinary meanings, these terms require structure that is in a state to perform the functions (i.e., structure that is "configured to" or "adapted to" perform the functions) and does not encompass structure that may be modified to perform that function but is not in that modified state. With this understanding, the Court determines that these terms have their plain and ordinary meanings without the need for further construction.

C. U.S. Patent No. 9,312,982 (Huawei-Asserted)

The ’982 Patent claims priority to a Chinese application filed on March 9, 2009.

The ’982 Patent is generally directed to Optical Transport Network (OTN) technology for mapping Lower Order Optical Channel Data Unit (LO ODU) signals into an Optical Channel Data Tributary Unit (ODTU) that will in turn be multiplexed into a Higher Order Optical Channel Payload Unit (HO OPU). ’982 Patent col.2 ll.6–22. The technology may be generally understood with reference to Figure 2, reproduced and annotated here. In the figure, a HO OPU (HO OPU2) is divided into eight tributary slots (numbered 1 through 8) “and eight frames of HO OPU2 forms a large multi-frame.” A LO ODU signal may ultimately occupy a number (M) of tributary slots of the HO OPU, with the number of slots (M) depending on the rates of the LO ODU signal and the HO OPU tributary slot. For example, a 6G LO ODU signal may require five 1.25G tributary slots (e.g., slots 2, 3, 5, 7, and 8 (shaded green)). The ODTU is constructed based on the number of slots (M) and the LO ODU is mapped to the payload area of the ODTU in “M-byte granularity.” *Id*. at col.3 l.63 – col.4 l.61.

’982 Patent fig.2



The abstract of the '982 Patent provides:

> The embodiments of the present invention disclose methods and apparatuses for mapping processing and de-mapping processing in an optical transport network. A Lower Order Optical Channel Data Unit (LO ODU) signal is mapped into a payload area of an Optical Channel Data Tributary (ODTU) signal in units of M bytes. M is equal to the number of tributary slots of a Higher Order Optical Channel Payload Unit (HO OPU) that are to be occupied by the ODTU signal, and M is an integer larger than 1. Overhead information is encapsulated to an overhead area of the ODTU signal. Thereafter, the ODTU signal is multiplexed into the HO OPU. In this way, an efficient and universal mode for mapping the LO ODU to the HO OPU is provided.

Claims 1 and 12 of the '982 Patent, exemplary method and apparatus claims respectively, provide as follows (with disputed terms emphasized):

> **1**. A method for processing data in an Optical Transport Network (OTN), comprising:
> mapping, by a processor of an apparatus for processing data, a ***Lower Order Optical Channel Data Unit (LO ODU) signal*** into a payload area of an ***Optical Channel Data Tributary Unit (ODTU) signal in groups of M bytes***, wherein M is equal to the number of ***time slots*** of a ***Higher Order Optical Channel Payload Unit (HO OPU)*** that are to be occupied by the ODTU signal, and M is an integer larger than 1;
> ***encapsulating overhead information to an overhead area of the ODTU signal***; and
> multiplexing the ODTU signal into the HO OPU.
>
> **12.** An apparatus for processing data in an Optical Trans- port Network (OTN), comprising:
> a processor and a computer readable non-transitory medium having a plurality of computer executable instructions stored thereon which, when executed by the processor, cause the processor to:
> parse a ***Higher Order Optical Channel Payload Unit (HO OPU)*** to obtain an ***Optical Channel Data Tributary Unit (ODTU) signal***; and
> de-map a ***Lower Order Optical Channel Data Unit (LO ODU) signal*** from a payload area of the ODTU signal ***in groups of M bytes***, wherein M is equal to the number of ***tributary slots*** of the HO OPU that are occupied by the ODTU, and M is an integer larger than 1.

C-1. "in groups of M bytes"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"in groups of M bytes" • '982 Patent Claims 1, 5, 9, 12	in a M-byte granularity	Plain and ordinary meaning.

The Parties' Positions

Huawei submits: This term refers to "how bytes are mapped from the LO ODU into the ODTU" rather than "how bytes are organized within an ODTU or HO OPU." Specifically, the bytes are mapped in M-byte groups. Dkt. No. 82 at 16–17.

In addition to the claims themselves, Huawei cites the following **intrinsic evidence** to support its position: '982 Patent col.5 ll.36–46.

Verizon responds: "Huawei's proposed construction needlessly complicates this claim by rewording the phrase and improperly narrowing it to one example used in the specification." Dkt. No. 98 at 21–22.

Huawei replies: The Court should clarify that Huawei's proposal is the correct plain meaning of the term because Verizon has taken a different position in an IPR proceeding. Dkt. No. 106 at 7–8.

Analysis

The issue in dispute appears to be whether mapping or de-mapping "in groups of M bytes" encompasses mapping / de-mapping in multiple groups each of less than M bytes that aggregate to M bytes. It does not.

Accordingly, the Court construes this term as follows:

- "in groups of M bytes" means "in a M-byte granularity."

C-2. "Lower Order Optical Channel Data Unit (LO ODU) signal" and "Higher Order Optical Channel Payload Unit (HO OPU)"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"Lower Order Optical Channel Data Unit (LO ODU) signal" • '982 Patent Claims 1, 5, 9, 12	No construction necessary.	ODUk (k=0, 1, 2, 2e, 3, 3e), where k is less than a k value for a higher order OPU
"Higher Order Optical Channel Payload Unit (HO OPU)"[16] • '982 Patent Claims 1, 5, 9, 12	No construction necessary.	OPUk (k=1, 2, 3, 3e, 4), where k is greater than the k value for the lower order ODU

Because the parties' arguments and proposed constructions with respect to these terms are related, the Court addresses the terms together.

The Parties' Positions

Huawei submits: These terms are well-understood terms of art. Verizon's proposed construction improperly limits the terms to ODU and OPU rates set forth in the 2009 version of the relevant standard. "As with the term 'rate rank,' the Court should not limit the scope of the claims to exclude more recent versions of the G.709 standard." Indeed, the '982 Patent indicates that the standard should be modified. Dkt. No. 82 at 17–18.

In addition to the claims themselves, Huawei cites the following **intrinsic evidence** to support its position: '982 Patent col.1 ll.39–55.

Verizon responds: "For the reasons set forth above for the 'rate rank' term of the '151 patent, these terms should be construed as the G.709 defines these terms at the time of the '982 patent's invention." Dkt. No. 98 at 22.

[16] The parties identified "Higher Order Optical Channel Payload Unit (HO OPU) signal" but the terms in the claims do not include "signal."

In addition to the claims themselves, Verizon cites the following **intrinsic evidence** to support its position: '982 Patent col.1 ll.49–55.

Huawei replies: "This dispute is similar to the 'rate rank' dispute with respect to the '151 patent." Dkt. No. 106 at 8.

Analysis

The issue in dispute distills to whether the claims are limited to the G.709 standard in effect at the effective filing date of the '982 Patent. For the reasons provided above with respect to "rate rank," the Court declines to limit the meanings of these terms to the embodiments in a particular version of the G.709 standard.

Accordingly, the Court rejects Verizon's proposed constructions and determines that these terms have their plain and ordinary meanings without the need for further construction.

C-3. "[encapsulating / encapsulate] overhead information to an overhead area of the ODTU signal"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"[encapsulating / encapsulate] overhead information to an overhead area of the ODTU signal" • '982 Patent Claims 1, 5	No construction necessary.	[embedding/embed] overhead information from another protocol or layer into the overhead area of the ODTU signal

The Parties' Positions

Huawei submits: Nothing in the intrinsic record justifies rewriting these terms to require embedding information from another protocol or layer. Dkt. No. 82 at 18.

In addition to the claims themselves, Huawei cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '982 Patent col.6 ll.20–23. **Extrinsic evidence**: Bortz Decl. ¶ 43 (Dkt. No. 82-11).

Verizon responds: As indicated by prior-art references cited by the examiner during prosecution and by an extrinsic networking dictionary from 1996, encapsulating necessarily requires embedding overhead information from another protocol or layer. Dkt. No. 98 at 22–23.

In addition to the claims themselves, Verizon cites the following **extrinsic evidence** to support its position: Ralph '982 Decl.[17] ¶¶ 42–46 (Verizon's Ex. 8, Dkt. No. 98-8).

Huawei replies: The prior-art references cited by Verizon's expert do not use the terminology Verizon proposes, and there is no indication how either the examiner or the applicant viewed those references. The 1996 dictionary does not establish a meaning of these terms in a patent filed twelve years later. Dkt. No. 106 at 8.

Analysis

The issue in dispute is whether encapsulating overhead information necessarily requires embedding overhead information from another protocol or layer. It does not.

The evidence presented by Verizon does not support rewriting the claims as Verizon proposes. First, Verizon's expert merely quotes passages from two prior-art references cited by the examiner during prosecution (Ralph '982 Decl. ¶ 44, Dkt. No. 98-8). Neither the expert nor Verizon cite any applicant or examiner statements that suggest the terms at issue are coextensive with the subject matter of the quoted passages. Even were the Court to interpret those passages to suggest that encapsulating overhead information from another protocol or layer into the overhead area of the ODTU was known in the art, there is nothing to suggest that encapsulating necessarily involves information from another protocol or layer. Further, neither reference mentions "embedding." Second, the mere fact that a 1996 technical dictionary[18] may have offered a definition of

[17] Declaration of Stephen E. Ralph, Ph.D. Regarding U.S. Patent No. 9,312,982 (Nov. 6, 2020).
[18] Neither Verizon nor its expert submitted any portion of the cited dictionary as an exhibit.

"encapsulation" that involves a "process by which each layer subsumes the PDU (protocol data unit) from the layer above into a larger PDU by adding a header to the higher-layer PDU," is not sufficient to limit the otherwise plain meaning of "encapsulating overhead information to an overhead area of the ODTU signal" to "embedding overhead information from another protocol or layer into the overhead area of the ODTU signal." Notably, the '982 Patent does not use "protocol" or "layer" in describing the invention or the prior art.

Accordingly, the Court rejects Verizon's proposed construction and determines that these terms have their plain and ordinary meanings without the need for further construction.

C-4. "time slot"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"time slot" • '982 Patent Claims 1	No construction necessary. Alternatively: • tributary slot	fixed period of time during which data is transmitted or received

The Parties' Positions

Huawei submits: In the context of the '982 Patent and the relevant art, "time slot" and "tributary slot" are used interchangeably. Both Huawei's expert and Verizon's expert testified to this fact. The "time slots" (or "tributary slots") in the OTN are discontinuous in time, and Verizon's proposed construction improperly threatens to exclude the OTN devices from the patent which is directed to improving the OTN. Dkt. No. 82 at 18–20.

In addition to the claims themselves, Huawei cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '982 Patent col.1 ll.35–48, col.2 ll.15–18,

col.4 ll.12–14. **Extrinsic evidence**: Bortz Decl. ¶¶ 46–48 (Dkt. No. 82-11); Min IPR Decl.[19] ¶ 34 (Huawei's Ex. 8, Dkt. No. 82-9).

Verizon responds: The term "time slot" has a customary meaning in the art and, as "time slot" is used only in the claim, there is no suggestion in the '982 Patent that it is used other than according to that meaning. Indeed, because some claims use "time slot" and others use "tributary slot," there is a presumption that the terms have different meanings. The distinction between "time slot" and "tributary slot" is further evinced by related U.S. Application No. 12/712,675, which uses "time slot" instead of "tributary slot." Dkt. No. 98 at 23–24.

In addition to the claims themselves, Verizon cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '982 File Wrapper (Verizon's Ex. 11, Dkt. Nos. 98-13 and 98-14). **Extrinsic evidence**: Ralph '982 Decl. ¶¶ 47–49 (Verizon's Ex. 8, Dkt. No. 98-8); Min IPR Decl. ¶ 40 (Verizon's Ex. 14, Dkt. No. 98-17).

Huawei replies: That the related patent application (U.S. Application No. 12/712,675, which issued as U.S. Patent No. 8,948,205[20]) and the '982 Patent "are nearly identical except that the term 'tributary slot' replaces the term 'time slot'" indicates that the terms are interchangeable. In fact, the examiner held that the claims of the two patents were not patentably distinct. Dkt. No. 106 at 8–9.

[19] Declaration of Dr. Paul S. Min, *Verizon Business Network Services LLC v. Huawei Technologies Co. Ltd.*, IPR2020-01278 (P.T.A.B. July 13, 2020), Exhibit No. 1003.

[20] The parties do not directly make the connection between the application cited by Verizon and the "'205 Patent" cited by Huawei. The U.S. Patent Office database provides this link. https://patentcenter.uspto.gov/#!/applications/12712675 (or navigate to https://patentcenter.uspto.gov and search for application no. 12712675).

Huawei cites further intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '982 File Wrapper April 1, 2015 Office Action at 4–5 (Verizon's Ex. 11, Dkt. No. 98-13 at 188–95, 192–93). **Extrinsic evidence**: Bortz Decl. ¶ 49 (Dkt. No. 82-11).

Analysis

The issue in dispute distills to whether "time slot" in OTN and the '982 Patent is interchangeable with "tributary slot" or rather has a customary meaning set forth in a telecommunications dictionary. In context, "time slots" in Claim 1 refers to tributary slots.

The claims of the '982 Patent provide significant context informing the meaning of "time slots" in Claim 1. Claim 1 recites an OTN processing method that includes mapping, encapsulating, and multiplexing:

> **1**. A method for processing data in an Optical Transport Network (OTN), comprising:
> mapping, by a processor of an apparatus for processing data, a Lower Order Optical Channel Data Unit (LO ODU) signal into a payload area of an Optical Channel Data Tributary Unit (ODTU) signal in groups of M bytes, wherein M is equal to ***the number of time slots of a Higher Order Optical Channel Payload Unit (HO OPU) that are to be occupied by the ODTU signal***, and M is an integer larger than 1;
> encapsulating overhead information to an overhead area of the ODTU signal; and
> multiplexing the ODTU signal into the HO OPU.

'982 Patent col.9 ll.44–56 (emphasis added). Claim 5 recites an apparatus with computer-executable instruction to cause a method similar to that recited in Claim 1:

> **5**. An apparatus for processing data in an Optical Transport Network (OTN), comprising:
> a processor and a computer readable non-transitory medium having a plurality of computer executable instructions stored thereon which, when executed by the processor, cause the processor to:
> map a Lower Order Optical Channel Data Unit (LO ODU) signal into a payload area of an Optical Channel Data Tributary Unit (ODTU) signal in groups of M bytes, wherein M is equal to ***the number of tributary slots of a Higher Order Optical Channel Payload Unit (HO OPU) that are to be occupied by the ODTU signal***, and M is an integer larger than 1;
> encapsulate overhead information to an overhead area of the ODTU signal; and

multiplex the ODTU signal into the HO OPU.

Id. at col.10 ll.1–17 (emphasis added). As explained in the patent:

> In the mapping method provided by the embodiments of the present invention, first, a Lower Order Optical Channel Data Unit (LO ODU) signal is mapped into a payload area of an Optical Channel Data Tributary Unit (ODTU) signal in units, each unit including M bytes, where ***M is equal to the number of tributary slots of a Higher Order Optical Channel Payload Unit (HO OPU) that are to be occupied by the ODTU signal***, and M is an integer larger than 1.
>
> And, overhead information is encapsulated to an overhead area of the ODTU signal.
>
> Finally, the ODTU signal is multiplexed into the HO OPU.
>
> The ***apparatus for processing data in an OTN***, provided by the embodiments of the present invention, includes a processor and a computer readable medium having a plurality of ***computer executable instructions*** stored thereon. The ***instructions***, when executed by the processor, ***cause the processor to perform the steps of the above mapping method.***

Id. at col.2 ll.12–28 (emphasis added). There is no description of "time slots" in the patent and there is no description of mapping LO ODU to the payload area of an ODTU except according to the number of tributary slots in the HO OPU. In this context, it appears that "time slots" in Claim 1 may be used synonymously with "tributary slots" in the description of the invention and the other claims.

On the extrinsic evidence of record, it appears that "time slots" is customarily used in the art of OTN to refer to tributary slots, whatever other customary meaning the phrase may hold. For example, Huawei's expert explains how the phrase "time slots" is used in OTN documentation to refer to tributary slots. Bortz Decl. ¶¶ 48, Dkt. No. 82-11. One such document, the G.798 standard, explains: "Multiplexing: The function assigns the individual ODTUjk[/ik] to specific ***time slots*** of the OPUk payload area as defined by the multiplex structure (see clauses 19.3 and 19.4.1 of [ITU-T G.709])." ITU-T, *Recommendation ITU-T G.798* at 187 (Dec. 2006) (brackets in original, emphasis added), Dkt. No. 82-11 at 68. Clause 19.3 of the G.709 standard, provides, for example:

"Multiplexing an ODTU01 signal into an OPU1 is realized by mapping the ODTU01 signal in one of the two OPU1 1.25G ***tributary slots***." ITU-T, *Recommendation ITU-T G.709/Y.1331* at 120 (Dec. 2009), Dkt. No. 82-10 at 129. Verizon's IPR expert similarly explains: "The G.709 standard also defines a time-division multiplexing methodology to multiplex multiple client signals. The G.709 standard multiplexes signals by combining multiple transport structures of one 'k' index into a single transport structure of a higher 'k' index (*i.e.*, higher bit rate) which has been divided into ***time slots (known as 'tributary slots')***." In contrast, however, Verizon's litigation expert explains that "time slot" has a customary meaning in telecommunications of: "the slot (brief moment in time) committed to a voice, data or video conversation. It can be occupied with conversation of [sic] left blank. But the slot is always present. You can tell the capacity of the switch or the transmission channel by figuring how many slots are present." Ralph '982 Decl. ¶ 49 (quoting *Newton's Telecom Dictionary* (19th ed. 2003)[21]), Dkt. No. 98-8.

Ultimately, the intrinsic record suggests that "time slots" in Claim 1 of the '982 Patent is used according to its customary meaning of "tributary slots" in the OTN art rather than according to some other customary meaning in the telecommunications art. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) (en banc) ("The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction." (quotation marks omitted)); *Trs. of Columbia Univ. v. Symantec Corp.*, 811 F.3d 1359, 1363 (Fed. Cir. 2016) ("The only meaning that matters in claim construction is the meaning in the context of the patent.").

Accordingly, the Court construes "time slot" as follows:

- "time slot" means "tributary slot."

[21] Neither Verizon nor its expert submitted any portion of the cited dictionary as an exhibit.

C-5. "tributary slot"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"tributary slot" • '982 Patent Claims 4–5, 8–9, 11-12, 14	No construction necessary.	a slot interleaved within the OPUk that includes a part of the OPUk OH area and a part of the OPUk payload area

The Parties' Positions

Huawei submits: "As used in the G.709 standard, the term 'tributary slot' can refer to a slot of payload information, or it can refer to a slot of payload information plus overhead (OH) information." Dkt. No. 82 at 20.

In addition to the claims themselves, Huawei cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '981 Patent col.1 ll.35–55. **Extrinsic evidence**: Bortz Decl. ¶¶ 51–52 (Dkt. No. 82-11).

Verizon responds: "This term should be construed as Verizon proposes for the same reasons described above with respect to the 'rate rank' term of the '151 patent." Dkt. No. 98 at 24.

In addition to the claims themselves, Verizon cites the following **extrinsic evidence** to support its position: ITU-T, *Recommendation ITU-T G.709/Y.1331* at § 19.1 (Dec. 2009) (Verizon's Ex. 12, Dkt. No. 98–15 at 120).

Huawei replies: "Verizon does not attempt to justify its construction, instead confusing this term with the 'rate rank' terms. Accordingly, the Court should find that no construction is necessary." Dkt. No. 106 at 9.

Analysis

The issue in dispute distills to whether the claims are limited to the G.709 standard in effect at the effective filing date of the '982 Patent. For the reasons provided above with respect to "rate

rank," the Court declines to limit the meaning of this term to the embodiments in a particular version of the G.709 standard.

Accordingly, the Court rejects Verizon's proposed construction and determines that this term has its plain and ordinary meaning without the need for further construction.

C-6. "Optical Channel Data Tributary Unit (ODTU) signal"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"Optical Channel Data Tributary Unit (ODTU) signal" • '982 Patent Claims 1, 5, 9, 12	No construction necessary.	Optical Channel Data Tributary Unit, as defined in Section 19.2 of the G.709 standard (12/2009)

The Parties' Positions

Huawei submits: "As with the terms rate rank, LO ODU, and HO OPU, Verizon's proposal improperly limits the claims to covering a particular version of the standard." Dkt. No. 82 at 20–21.

Verizon responds: "For the reasons set forth above for the 'rate rank' term of the '151 patent, these terms should be construed as the G.709 defines these terms at the time of the '982 patent's invention." Dkt. No. 98 at 24.

In addition to the claims themselves, Verizon cites the following **intrinsic evidence** to support its position: Ralph '982 Decl. ¶¶ 51–53 (Verizon's Ex. 8, Dkt. No. 98-8).

Huawei replies: "This dispute is similar to the 'rate rank' dispute with respect to the '151 patent." Dkt. No. 106 at 9.

Analysis

The issue in dispute distills to whether the claims are limited to the G.709 standard in effect at the effective filing date of the '982 Patent. For the reasons provided above with respect to "rate

rank," the Court declines to limit the meaning of this term to the embodiments in a particular version of the G.709 standard.

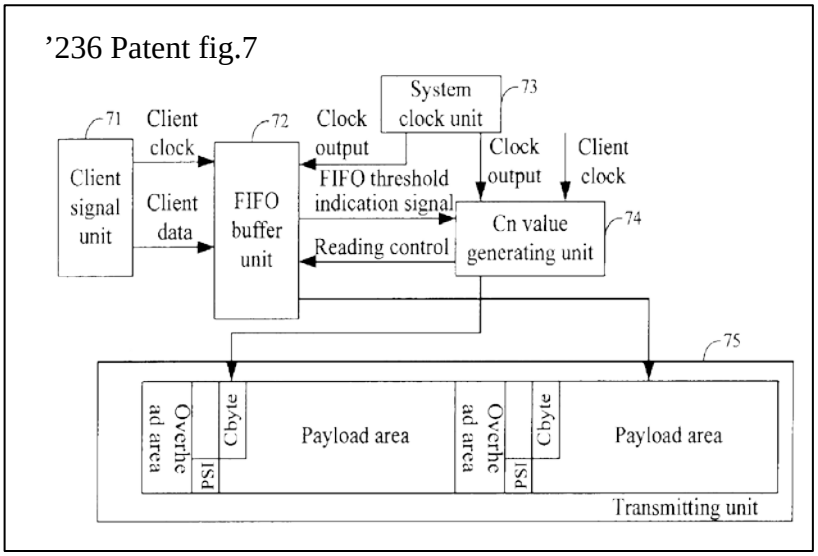
Accordingly, the Court rejects Verizon's proposed construction and determines that this term has its plain and ordinary meaning without the need for further construction.

D. U.S. Patent No. 8,406,236 (Huawei-Asserted)

The '236 Patent claims priority to a Chinese application filed on June 15, 2007.

The '236 Patent is generally directed to Optical Transport Network (OTN) technology for transporting client signals. The technology may be generally understood with reference to Figure 7, reproduced here. A client signal unit (71) writes a client signal into a buffer (72) according to a client signal clock rate. The buffer "write[s] the client signal in the buffer unit to an OPUk payload area of a next OTN frame according to the system clock rate." The client signal in the buffer may be above or below a threshold. If above a threshold, a Cn value generating unit (74) "generate[s] the demand of increasing the client signal byte number Cn born by the OPUk." If below a threshold, the Cn value generating unit "generate[s] the demand of decreasing the client signal byte number Cn born by the OPUk." '236 Patent col.8 l.32 – col.9 l.23.

'236 Patent fig.7



For example, a client signal may be transmitted in an OTN as follows: A client signal is acquired, its clock extracted, and the signal stored in the buffer. The client signal byte number

Cn is determined according to the client clock and the system clock. If Cn is outside a range, a new client signal type occurs. Whether a new client signal type occurs is identified in certain bit positions of the Cbyte area of the OPUk. If a new client signal is detected, then the demanded increase or decrease results in reversing a first set of bit positions in the OPUk (increase) or a second set of bit positions in the OPUk (decrease). The client signal is eventually mapped to the OPUk payload areas and "the OPUk is transmitted to the OTN network." *Id*. at col.11 ll.1–59. A process for receiving a client signal in an OTN is also described. *Id*. at col.13 l.49 – col.14 l.42.

The abstract of the '236 Patent provides:

> A method for transporting a client signal in an optical transport network (OTN) includes steps as follows. A byte number Cn of a client signal transported in a OTN frame period is generated according to a client signal clock and a system clock. If the Cn of the OTN frame falls in a certain range, a predetermined area in an optical channel payload unit-k (OPUk) overhead field is identified as normal, and the Cn is filled in the OPUk overhead field of the OTN frame. Therefore, the reliability for transporting the client byte number can be improved and an OPUk overhead byte space needed for transporting the client signal byte number can be saved.

Claims 1 and 7 of the '236 Patent, exemplary method and apparatus claims respectively, provide as follows (with disputed terms emphasized):

> **1**. A method for transmitting a client signal in an optical transport network (OTN), comprising:
> acquiring the client signal;
> extracting a client signal clock from the client signal;
> ***generating a client signal byte number Cn transported in an OTN frame period according to a client signal clock and a system clock***;
> ***if the Cn transported in the OTN frame needs to be increased, reversing, values of a first series of bit positions*** of a second area in an optical channel payload unit-k (OPUk) of the OTN frame, and filling values of ***a second series of bit positions*** of the second area in the OPUk with a Cn filled in a previous OTN frame;
> ***if the Cn transported in the OTN frame needs to be decreased, reversing, values of the second series of bit positions*** of the second area in the OPUk overhead field of the OTN frame, and filling values of ***the first series of***

bit positions of the second area in the OPUk with the Cn filled in the previous OTN frame.

7. An apparatus for transmitting a client signal in an optical transport network (OTN), comprising:

an acquiring unit configured to acquire the client signal, and extract a client signal clock from the client signal;

a client signal byte number Cn generating unit configured to generate a ***client signal byte number Cn*** transported in an OTN frame period according to the client signal clock and a system clock;

a ***first processing unit configured to reverse, if the Cn transported in the OTN frame needs to be increased, values of a first series of bit positions*** of a second area in an optical channel payload unit-k (OPUk) of the OTN frame, and fill values of ***a second series of bit positions*** of the second area in the OPUk with a Cn filled in a previous OTN frame; and

a ***second processing unit configured to reverse, if the Cn transported in the OTN frame needs to be decreased, values of a second series of bit positions*** of the second area in the OPUk overhead field of the OTN frame, and fill values of ***the first series of bit positions*** of the second area in the OPUk with the Cn filled in the previous OTN frame.

D-1. "client signal byte number Cn"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"client signal byte number Cn" • '236 Patent Claims 1, 7, 13–15[22]	the number of client signal bytes in one OTN frame	Cn as defined in Equation D-1 of the G.709 Standard (12/2009)

The Parties' Positions

Huawei submits: There is nothing in the intrinsic record that justifies limiting "Cn" to that determined by equation D-1 in the G.709 standard. Further, the standard itself does not limit Cn to that equation but rather also provides equation D-2 and D-6. Dkt. No. 82 at 21–22.

In addition to the claims themselves, Huawei cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '236 Patent, at [57] Abstract, col.1 ll.64–65,

[22] The parties identified Claims 1–15 in the P.R. 4-5(d) chart, but the term does not appear in Claims 4–6 or 10–12. The Court identifies only those independent claims in which the term appears.

col.3 ll.1–3, col.10 ll.24–30, col.11 ll.65–67, col.14 ll.1–19. **Extrinsic evidence**: Bortz Decl. ¶¶ 55–58 (Dkt. No. 82-11); ITU-T, *Recommendation ITU-T G.709/Y.1331* at Annex D (Dec. 2009) (Huawei's Ex. 9, Dkt. No. 82-10 at 172–82).

Verizon responds: The term "Cn" has meaning only in the context of the G.709 standard and the standard defines the term using equation D-1 (and with minor variations, equations D-2 and D-6). The '236 Patent explicitly invokes this context in describing the invention (citing '236 Patent col.5 ll.17–34). Dkt. No. 98 at 25–26.

In addition to the claims themselves, Verizon cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '236 Patent col.5 ll.17–34. **Extrinsic evidence**: Ralph Second '236 & '505 Decl.[23] ¶¶ 27–29, 31, 33–34 (Verizon's Ex. 7, Dkt. No. 98-7); Bortz Decl. ¶ 57 (Dkt. No. 82-11); ITU-T, *Recommendation ITU-T G.709/Y.1331* at Annex D (Dec. 2009) (Verizon's Ex. 12, Dkt. No. 98–15 at 163–73).

Huawei replies: The '236 Patent specifies that Cn is calculated using a client signal clock and a system clock; thus, incorporating the G.709 Annex D equation into a construction would render claim language superfluous. Dkt. No. 106 at 9–10.

Huawei cites further intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '236 Patent col.3 ll.1–6. **Extrinsic evidence**: Bortz Decl. ¶ 59 (Dkt. No. 82-11).

Analysis

The issue in dispute distills to whether "client signal byte number Cn" is necessarily the "c_n" set forth in equation D-1 of the G.709 standard. It is not.

[23] Declaration of Stephen E. Ralph, Ph.D. Regarding U.S. Patent Nos. 8,406,236 and 8,824,505 (Nov. 6, 2020).

The "Cn" of the claims is not coextensive with "c_n" in the G.709 standard. All the claims at issue essentially define the phrase with surrounding claim language. Claims 1, 7, and 15 each provides "a client signal byte number Cn transported in an OTN frame period." '236 Patent col.17 ll.36–38, col.18 ll.48–51, col.20 ll.51–52. Claims 13 and 14 each provides "a client signal byte number Cn of a client signal transported in one OTN frame period." *Id*. at col.20 ll.6–7, col.20 ll.28–29. After the first reference to "client signal byte number Cn," the claims often recite only "Cn" as shorthand. *See, e.g., id*. at col.17 ll.39–40 ("if the Cn transported in the OTN frame needs to be increased …").

While the use of Cn in the '236 Patent substantially comports with the meaning of c_n set forth in the G.709 standard, there are differences. The G.709 standard provides: "c_n: number of client n-bit data entities per server frame or server multiframe." ITU-T, *Recommendation ITU-T G.709/Y.1331* at 163 (Dec. 2009), Dkt. No. 82-10 at 172. One difference between the "c_n" of the standard and the "Cn" of the claims is that the claims refer to a "byte" number whereas the G.709 standard refers to a number of "n-bit" data entities, where "e.g., n = 1/8, 1, 8." If a byte is 8-bits, it seems that the G.709 version of a byte number would be c_8 rather than c_n. In other words, Cn in the claims refers to a number of bytes whereas c_n in the G.709 standard does not necessarily refer to the number of "bytes." The terms, therefore, are not coextensive.

Given the facial differences between "Cn" in the claims and "c_n" in the standard, the Court declines to limit calculation of "Cn" in the claims to the equation(s) set forth for "c_n" in the G.709 standard.

The Court also rejects Huawei's proposed construction as it is potentially confusing. For instance, it threatens to confuse rather than clarify claim scope in that it specifies "the number of

client signal bytes ***in one OTN frame***" when the claims already specify "a client signal byte number Cn ***transported*** in an OTN frame ***period***" or "***transported*** in one OTN frame ***period***."

Accordingly, the Court construes this term as follows:

- "client signal byte number Cn" means "number of client signal bytes."

D-2. "if the Cn transported in the OTN frame needs to be [increased / decreased]" and "the Cn transported in the OTN frame doesn't need to be increased or decreased"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"if the Cn transported in the OTN frame needs to be [increased / decreased]" • '236 Patent Claims 1–3, 7–9, 15	No construction necessary. Alternatively: • if the Cn transported in the OTN frame needs to be increased/ decreased relative to a Cn in a previous OTN frame	indefinite
"the Cn transported in the OTN frame doesn't need to be increased or decreased" • '236 Patent Claims 1, 9		

Because the parties' arguments and proposed constructions with respect to these terms are related, the Court addresses the terms together.

The Parties' Positions

Huawei submits: The '236 Patent describes that the Cn may need to be increased or decreased and provides examples. This is sufficient for one of ordinary skill in the art to understand the claims with reasonable certainty. Dkt. No. 82 at 22–23.

In addition to the claims themselves, Huawei cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '236 Patent col.14 ll.1–19. **Extrinsic evidence**: Bortz Decl. ¶¶ 60–62 (Dkt. No. 82-11).

Verizon responds: It is not reasonably certain what it means that Cn "needs to be" increased or decreased. Dkt. No. 98 at 26–27.

In addition to the claims themselves, Verizon cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '236 Patent col.7 ll.62–67, col.8 ll.11–16. **Extrinsic evidence**: Ralph '236 & '505 Decl.[24] ¶¶ 46–47, 49–53 (Verizon's Ex. 3, Dkt. No. 98-3).

Huawei replies: The '236 Patent includes examples of when Cn "needs to be" increased or decreased. "For example, the specification explains that a request to increase the Cn is generated when client signal data written into a buffer reaches or exceeds an upper threshold, and a request to decrease the Cn is generated when client signal data written into a buffer reaches or drops below a lower threshold." Dkt. No. 106 at 10.

Huawei cites further **intrinsic evidenc**e to support its position: '236 Patent col.8 l.44 – col.9 l.2, col.9 ll.48–63, col.15 l.48 – col.16 l.5.

Analysis

The issue is whether the meanings of these terms are reasonably certain in the context of the claims and the description of the invention. They are.

In the context of the '236 Patent, a Cn needs to be increased if a determination of such was made at some point. Notably, the claims do not require determining if Cn needs to be increased (or not), but rather only to effect certain steps if such a condition exists. (See Section H-3 below for a similar issue.)

[24] Verizon cited "Ex. 7," which is the second Ralph declaration regarding the '236 & '505 Patents (Dkt. No. 98-7), but the paragraphs cited from that declaration do not refer to the issue or term in dispute. The cited paragraphs when taken from the first Ralph declaration, which is Verizon's Ex. 3 (Dkt. No. 98-3), do correspond to the indefiniteness issue in dispute.

Accordingly, Verizon has not proven any claim is indefinite for including either of the terms in dispute. The Court determines that these terms have their plain and ordinary meanings without the need for further construction.

D-3. Alleged Means-Plus-Function Terms

Disputed Term[25]	Huawei's Proposed Construction	Verizon's Proposed Construction
"an acquiring unit" • '236 Patent Claims 7, 11, 12	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described at 15:3-5, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: acquire the client signal **structure**: none disclosed
"a client signal byte number Cn generating unit" • '236 Patent Claim 7	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described at 15:24-26, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: generate a client signal byte number Cn **structure**: none disclosed

[25] The parties identified Claims 7–12 for these terms in the aggregate. P.R. 4-5(d) Chart. The Court here identifies only the claims within that range that recite the term.

Disputed Term[25]	Huawei's Proposed Construction	Verizon's Proposed Construction
"a first processing unit" • '236 Patent Claim 7	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to • perform the algorithm described at 15:56-60, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: reverse, if the Cn transported in the OTN frame needs to be increased, values of a first series of bit positions of a second area in an optical channel payload unit-k (OPUk) of the OTN frame, and fill values of a second series of bit positions of the second area in the OPUk with a Cn filled in a previous OTN frame **structure**: none disclosed
"a second processing unit" • '236 Patent Claim 7	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described at 15:61-65, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: reverse, if the Cn transported in the OTN frame needs to be decreased, values of a second series of bit positions of the second area in the OPUk overhead field of the OTN frame, and fill values of the first series of bit positions of the second area in the OPUk with the Cn filled in the previous OTN frame **structure**: none disclosed

Disputed Term[25]	Huawei's Proposed Construction	Verizon's Proposed Construction
"a determining unit" • '236 Patent Claim 8, 9	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described at 15:30-34, and equivalents thereof[26]	Governed by 35 U.S.C. § 112, ¶ 6. **function**: determine whether the client signal byte number Cn exceeds a range of client signal byte number transported in an OTN frame period **structure**: none disclosed
"an identifying unit" • '236 Patent Claim 8	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • structure: hardware and/or software programmed to perform the algorithm described at 15:30-34, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: identify a new client signal in a first area in the OPUk overhead field of the OTN frame • **structure**: none disclosed
"an identifying unit" • '236 Patent Claim 9	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described at 15:30-34, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: identify the Cn is normal in a first area in a n optical channel payload unit-k (OPUk) overhead field of the OTN frame **structure**: none disclosed

[26] Huawei separately lists two structures in the P.R. 4-5(d) Chart for the "determining unit": (1) "hardware and/or software programmed to perform the algorithm described at 15:30-34, and equivalents thereof," Dkt. No. 112 at 29–30 and (2) "hardware and/or software programmed to perform the algorithm described at 15:36-39, and equivalents thereof," *id*. at 30.

Disputed Term[25]	Huawei's Proposed Construction	Verizon's Proposed Construction
"a filling unit" • '236 Patent Claim 8	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described at 15:41-43, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: fill the Cn in the second area of the OTN frame **structure**: none disclosed
"a filling unit" • '236 Patent Claim 9	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described at 15:41-43, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: fill a second area in the OPUk overhead field of the OTN frame with a Cn filled in a previous OTN frame **structure**: none disclosed
"a parsing unit" • '236 Patent Claim 11	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described at 16:23-25, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: parse an optical channel payload unit-k (OPUk) of an OTN frame to acquire a second area in an OPUk overhead field **structure**: none disclosed

Disputed Term[25]	Huawei's Proposed Construction	Verizon's Proposed Construction
"a restoring unit" • '236 Patent Claim 10	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described at 16:20-23, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: restore data of the OPUk payload area of a next OTN frame to acquire a client signal data stream **structure**: none disclosed

Because the parties' arguments and proposed constructions with respect to these terms are related, the Court addresses the terms together.

The Parties' Positions

Huawei submits: Each of these terms lacks the term "means" and, therefore, there is a presumption against applying 35 U.S.C. § 112, ¶ 6. When the claims are read in the appropriate context, these limitations sufficiently denote structure and the presumption cannot be overcome. Specifically the context of claims' intended environment—"known G.709 or G.8032 equipment"—and claim-recited objectives and operations of the terms sufficiently connote the structural nature of the terms. Dkt. No. 82 at 34–37.

In addition to the claims themselves, Huawei cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '433 Patent col.4 ll.30–40, col.12 ll.29–65, col.14 ll.32–60; '236 Patent col.2 ll.59–60, col.11 ll.60–63; '253 Patent col.2 ll.6–10. **Extrinsic evidence**: Bortz Decl. at ¶¶ 106–12 (Dkt. No. 82-11); Melendez Decl. ¶¶ 17, 48–54 (Dkt. No. 82-12); ITU-T, *ITU-T Recommendation Y.1731* (Melendez Decl. Ex. 2, Dkt. No. 82-12 at 58–69).

Verizon responds: These terms are properly governed by § 112, ¶ 6 because "none of the recited 'units,' 'subunits,' or "modules" would have been understood by a POSITA to describe a

particular structure for performing the recited functions." Specifically, the recited units and subunits "have no established meaning in the art and lack any structural significance." Even when read in the context of the intended environment, the standards defining the environment do not dictate structure but rather merely provide functional interfaces. Dkt. No. 98 at 9–12.

In addition to the claims themselves, Verizon cites the following **extrinsic evidence** to support its position: Ralph '433 Decl. ¶¶ 52–58, 60–62, 64–67, 70–72, 79–81, 84–85 (Verizon's Ex. 1, Dkt. No. 98-1); Ralph '236 & '505 Decl. ¶¶ 56–90, 92–107 (Verizon's Ex. 3, Dkt. No. 98-3); Almeroth Decl. ¶¶ 41–46, 54–55, 60–61, 66–67, 70–71, 75–76 (Verizon's Ex. 4, Dkt. No. 98-4); ITU-T, *Recommendation ITU-T G.709/Y.1331* at § 1 (Dec. 2009) (Verizon's Ex. 12, Dkt. No. 98–15 at 10).

Huawei replies: As Verizon's expert agrees, one of ordinary skill in the art would be familiar with G.709 and G.8032 equipment and would understand that every interface in a G.709 network includes certain structural components. When read in this context, the terms at issue are sufficiently structural. Dkt. No. 106 at 14.

Huawei cites further **extrinsic evidence** to support its position: Min Decl. ¶¶ 88, 90 (Verizon's Counterclaim Ex. 3, Dkt. No. 85-3).

Analysis

There are two issues in dispute. First, whether these terms should be governed by 35 U.S.C. § 112, ¶ 6. Second, if the terms are governed by § 112, ¶ 6, whether the '236 Patent satisfies the disclosure requirements of the statute. The Court determines that these terms are not governed by § 112, ¶ 6 and therefore does not address the second issue.

This issue is similar to that addressed in the alleged means plus function terms from the '433 Patent. For reasons similar to those stated there, the Court determines that the claims of the '236 Patent provide sufficient structural context to sustain the presumption against applying § 112, ¶ 6.

Accordingly, the Court determines that Defendant has failed to establish that these terms should be governed by § 112, ¶ 6 or that any claim is indefinite for including any of the terms.

E. U.S. Patent No. 8,824,505 (Huawei-Asserted)

The '505 Patent claims priority to a Chinese application filed on April 17, 2007.

The '505 Patent is generally directed to Optical Transport Network (OTN) technology for mapping client signals comprising n-bit data units to an Optical Channel Payload Unit (OPU) utilizing an Optical Channel Data Tributary Unit (ODTU). '505 Patent col.2 ll.51–65.

The abstract of the '505 Patent provides:

> Method and apparatus for transporting client signals in an OTN are illustrated. In one embodiment, the method includes: receiving a client signal; determining a quantity of n-bit data units of the client signal based on a clock of the client signal and a local clock; mapping the quantity of n-bit data units of the client signal to an overhead of a first Optical Channel Data Tributary Unit (ODTU) frame; mapping the n-bit data units of the client signal to a payload area of a second ODTU frame next to the first ODTU frame according to the quantity of n-bit data units mapped in the overhead of the first ODTU frame; mapping each n-bit data unit of the second ODTU frame to an Optical Channel Payload Unit-k Tributary Slot (OPUk TS) in an OPUk frame; and forming an Optical Channel Transport Unit-k (OTUk) frame including the OPUk frame for transmission.

Claims 1 and 3 of the '505 Patent, exemplary method and apparatus claims respectively, provide as follows (with disputed terms emphasized):

> **1**. A method for transmitting client signals in an Optical Transport Network (OTN), comprising:
> receiving a client signal;
> ***determining a quantity of n-bit data units of the client signal based on a clock of the client signal and a local clock***;
> mapping information of the quantity of n-bit data units of the client signal to an overhead of a first ***Optical Channel Data Tributary Unit (ODTU) frame***;
> mapping the n-bit data units of the client signal to a payload area of a second ***ODTU frame*** next to the first ODTU frame according to the information of

the quantity of n-bit data units mapped in the overhead of the first ODTU frame;

mapping each byte of the second ODTU frame to at least one Optical Channel Payload Unit-k Tributary Slot (OPUk TS) in an OPUk frame, wherein the OPUk frame includes an overhead containing a tributary slot Multi- Frame Indicator (MFI-TS) byte, which increases by 1 for every frame until its number is the same as the number of the OPUk TSs in the OPUk frame; and

forming an Optical Channel Transport Unit-k (OTUk) frame including the OPUk frame for transmission.

3. A transmitter for transmitting client signals in an Optical Transport Network (OTN), comprising:

a first unit configured to receive a client signal;

a second unit configured to determine a quantity of n-bit data units of the client signal based on a clock of the client signal and a local clock;

a third unit configured to map information of the quantity of ***n-bit data units*** of the client signal to an overhead of a first ***Optical Channel Data Tributary Unit (ODTU) frame***;

a fourth unit configured to map then-bit data units of the client signal to a payload area of a second ***ODTU frame*** next to the first ODTU frame according to the information of the quantity of n-bit data units mapped in the overhead of the first ODTU frame;

a fifth unit configured to map each byte of the second ODTU frame to at least one Optical Channel Payload Unit-k Tributary Slot (OPUk TS) in an OPUk frame, wherein the OPUk payload area includes a total of 4 rows and 3808 columns, the 3808 columns of the OPUk payload area being divided into multiple OPUk TSs, and the first and second ODTU frames each including a payload area that consists of 4n rows and int(3808/n) columns, int(3808/n) being an integer portion of the quotient of 3808/n, ***n indicating the number of the multiple OPUk TSs***; and

a sixth unit configured to form an Optical Channel Transport Unit-k (OTUk) frame including the OPUk frame for transmission,

wherein the first unit, second unit, third unit, fourth unit, fifth unit and sixth unit are structural entities collectively comprising one or more processors instructed by one or more software programs.

E-1. "Optical Channel Data Tributary Unit (ODTU) [frame]" and "ODTU [frame]"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"Optical Channel Data Tributary Unit (ODTU) [frame]" • '505 Patent Claims 1–4	No construction necessary, however the Court should clarify that the ODTU frame referred to in the claims is not synonymous with the ODTUjk structure criticized in the patent	Optical Channel Data Tributary Unit, as defined in Section 19.2 of the G.709 standard (12/2009)
"ODTU [frame]" • '505 Patent Claims 1–4		

Because the parties' arguments and proposed constructions with respect to these terms are related, the Court addresses the terms together.

The Parties' Positions

Huawei submits: As used in the '505 Patent, these terms do not encompass the prior-art ODTUjk structure. The prior-art structure is disparaged in the patent and is distinguished in the claims, which contemplate mapping information from a Cn byte to an ODTU frame, and the ODTUjk structure does not accommodate Cn bytes. Dkt. No. 82 at 27–28.

In addition to the claims themselves, Huawei cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '505 Patent at col.1 l.25 – col.2 l.45. **Extrinsic evidence**: Bortz Decl. ¶¶ 86–88 (Dkt. No. 82-11); ITU-T, *Recommendation ITU-T G.709/Y.1331* at 128–38 (Dec. 2009) (Huawei's Ex. 9, Dkt. No. 82-10 at 137–47).

Verizon responds: The term "ODTU" has well-known meaning in the context of the G.709 standard. This customary meaning encompasses the ODTUjk structure and there is no lexicography or disclaimer that justifies straying from this meaning. Dkt. No. 98 at 32–33.

In addition to the claims themselves, Verizon cites the following **extrinsic evidence** to support its position: Ralph Second '236 & '505 Decl. ¶¶ 42, 49–51, 55–56 (Verizon's Ex. 7, Dkt. No.

98-7); Bortz Decl. ¶ 54 (Dkt. No. 82-11); ITU-T, *Recommendation ITU-T G.709/Y.1331* at § 17.7 (Dec. 2009) (Verizon's Ex. 12, Dkt. No. 98–15 at 90–91).

Huawei replies: "Verizon's position conflicts with the claims, which explicitly recite mapping Cn information to an ODTU frame." Dkt. No. 106 at 12.

Analysis

The issue in dispute distills to whether ODTU should be construed to exclude the ODTUjk embodiment of that structure. It should not. The term ODTU is neither coextensive with nor exclusive of ODTUjk.

Huawei has not established any reason to stray from the customary meaning of these terms, which the parties agree is set forth in the G.709 standard. (See above on the similar term in the '982 Patent for the dispute regarding whether the term is limited to a particular version of the standard.) The background section does not include the specific disparagement of any particular ODTU structure, including the ODTUjk structure, required to rise to the level of disclaimer or lexicography. Further, while the claims may require mapping of certain information to the overhead of an ODTU frame, whether the ODTUjk structure enables that mapping is a factual issue of validity or infringement rather than an issue of claim construction.

Accordingly, the Court determines that these terms have their plain and ordinary meaning without the need for further construction.

E-2. "n-bit data units" and "n indicating the number of the multiple OPUk TSs"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"n-bit data units" • '505 Patent Claims 2, 3	No construction necessary, but the Court should clarify that the word "n-bit data unit"	

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"n indicating the number of the multiple OPUk TSs" • '505 Patent Claims 2, 3	refers to a data unit containing some number of bits, not a data unit with bits equal to the number of the multiple OPUk TSs.	units of data comprising n bits, where the value 'n' is the same throughout the claim

Because the parties' arguments and proposed constructions with respect to these terms are related, the Court addresses the terms together.

The Parties' Positions

Huawei submits: As explained in the '505 Patent, the number of tributary slots is not related to the number of bits in a data unit. Thus, "n" in "n-bit data unit" and "n indicating the number of the multiple OPUk TSs" are not the same terms. Dkt. No. 82 at 28–29.

In addition to the claims themselves, Huawei cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '505 Patent col.2 l.54, col.5 ll.18–19, col.5 l.28, col.5 l.45–50, col.11 l.2. **Extrinsic evidence**: Bortz Decl. ¶¶ 94–98 (Dkt. No. 82-11).

Verizon responds: "If the two values of 'n' were intended to take different values in the same claim, then different variable names should have been used." Dkt. No. 98 at 34.

Huawei replies: "A POSITA would understand 'n' to mean different things in different terms, and the specification uses the same letter in many contexts." Dkt. No. 106 at 13.

Analysis

The issue in dispute is whether the "n" of "n-bit data units" is necessarily the same "n" as the "n indicating the number of the mulitple OPUk TSs." It is not.

The term "n-bit data unit" is distinct from the "n indicating the number of the multiple OPUk TSs" separately recited in the claims. The claims provide significant context informing the meaning of these terms. For instance, Claim 2 of the '505 Patent provides:

> 2. A method for transmitting client signals in an Optical Transport Network (OTN), comprising:
> receiving a client signal;
> determining a quantity of ***n-bit data units*** of the client signal based on a clock of the client signal and a local clock;
> mapping information of the quantity of n-bit data units of the client signal to an overhead of a first Optical Channel Data Tributary Unit (ODTU) frame;
> mapping the n-bit data units of the client signal to a payload area of a second ODTU frame next to the first ODTU frame according to the information of the quantity of n-bit data units mapped in the overhead of the first ODTU frame;
> mapping each byte of the second ODTU frame to at least one Optical Channel Payload Unit-k Tributary Slot (OPUk TS) in an OPUk frame, wherein the OPUk frame includes an OPUk payload area that includes a total of 4 rows and 3808 columns, the 3808 columns of the OPUk payload area being divided into multiple OPUk TSs, and the first and second ODTU frames each includes a payload area that consists of ***4n*** rows and int(***3808/n***) columns, int(***3808/n***) being an integer portion of the quotient of ***3808/n***, ***n indicating the number of the multiple OPUk TSs***; and
> forming an Optical Channel Transport Unit-k (OTUk) frame including the OPUk frame for transmission.

'505 Patent col.17 ll.10–36 (emphasis added). The client signal has a quantity of "n-bit data units," plainly referring to a quantity of data units all of the same number of bits. The payload areas of the two ODTU frame each include a number of rows and columns related to the number of the multiple OPUk tributary slots. Plainly, "n-bit" in the "determining" clause refers to the number of bits in each data unit and "n" in the "mapping each byte …" refers to the number tributary slots in the OPUk. Thus, "n" and "n-bit" are two distinct and separately recited terms and should not be equated.

Accordingly, the Court rejects Verizon's proposed construction and determines that these terms have their plain and ordinary meanings without the need for further construction.

E-3. "Optical Channel Payload Unit-k Tributary Slot (OPUk TS)"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"Optical Channel Payload Unit-k Tributary Slot (OPUk TS)" • '505 Patent Claims 1–4	No construction necessary.	Optical Channel Payload Unit-k Tributary Slot (OPUk TS), where k = 1, 2, 3, or 4

The Parties' Positions

Huawei submits: There is no lexicography or disclaimer that justifies limiting "k" to 1, 2, 3, or 4. Dkt. No. 82 at 29–30.

In addition to the claims themselves, Huawei cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '505 Patent col.1 ll.42–59, col.5 ll.36–44. **Extrinsic evidence**: Bortz Decl. ¶¶ 99–101 (Dkt. No. 82-11).

Verizon responds: The '505 Patent "only describes bit rates (j, k) that can take the values 1, 2, or 3, and therefore, a POSITA would understand that k can only take these values." The patent also notes that the G.709 standard defines the Optical Channel Payload Unit-k Tributary Slot (OPUk TS), and "at the time of the '505 Patent" the standard included k=4. Dkt. No. 98 at 34–35.

In addition to the claims themselves, Verizon cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '505 Patent col.1 ll.42–59, col.5 ll.36–44. **Extrinsic evidence**. ITU-T, *Recommendation ITU-T G.709/Y.1331* at § 13 (Dec. 2009) (Verizon's Ex. 12, Dkt. No. 98–15 at 90–91)

Huawei replies: "See 'rate rank' dispute with respect to the '151 patent." Dkt. No. 106 at 13.

Analysis

The issue in dispute appears to be whether "k" in "Optical Channel Payload Unit-k Tributary Slot (OPUk TS)" is necessarily less than or equal to four, since neither the G.709 standard nor the

'505 Patent describe OPUk for k greater than four. It is not. Verizon has not identified anything in the intrinsic record that properly limits k as Verizon proposes and, as explained above, the Court declines to limit the meaning of this term to the embodiments in a particular version of the G.709 standard.

Accordingly, the Court rejects Verizon's proposed construction and determines that this term has its plain and ordinary meaning without the need for further construction.

E-4. Alleged Means-Plus-Function Terms

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"a first unit configured to …" • '505 Patent Claims 3, 4	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described at 12:37-38, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: receive a client signal **structure**: none disclosed
"a second unit configured to …" • '505 Patent Claims 3, 4	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described at 12:38-40, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: determine a quantity of n-bit data units of the client signal based on a clock of the client signal and a local clock **structure**: none disclosed

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"a third unit configured to …" • '505 Patent Claims 3, 4	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described at 12:40-41, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: map information of the quantity of n-bit data units of the client signal to an overhead of the first Optical Channel Data Tributary Unit (ODTU) frame **structure**: none disclosed
"a fourth unit configured to …" • '505 Patent Claims 3, 4	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described at 12:41-43, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: map information of the quantity of n-bit data units of the client signal to an overhead of the first Optical Channel Data Tributary Unit (ODTU) frame **structure**: none disclosed
"a fifth unit configured to…" • '505 Patent Claims 3, 4	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described at 12:43-45, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: map each byte of the second ODTU frame to at least one Optical Channel Payload Unit-k Tributary Slot (OPUk TS) in an OPUk frame **structure**: none disclosed

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"a sixth unit configured to …" • '505 Patent Claims 3, 4	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described at 12:53-54, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: form an Optical Channel Transport Unit-k (OTUk) frame including the OPUk frame for transmission **structure**: none disclosed
"wherein the first unit, second unit, third unit, fourth unit, fifth unit and sixth unit are structural entities collectively comprising one or more processors instructed by one or more software programs"[27] • '505 Patent Claims 3, 4	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction.	Governed by 35 U.S.C. § 112, ¶ 6.

Because the parties' arguments and proposed constructions with respect to these terms are related, the Court addresses the terms together.

The Parties' Positions

Huawei submits: Each of these terms lacks the term "means" and, therefore, there is a presumption against applying 35 U.S.C. § 112, ¶ 6. When the claims are read in the appropriate context, these limitations sufficiently denote structure and the presumption cannot be overcome. Specifically the context of claims' intended environment—"known G.709 or G.8032 equipment"—and claim-recited objectives and operations of the terms sufficiently connote the structural nature of the terms. Dkt. No. 82 at 34–37.

[27] The parties list this term in the P.R. 4-5(d) Chart, but do not propose and specific constructions.

In addition to the claims themselves, Huawei cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '433 Patent col.4 ll.30–40, col.12 ll.29–65, col.14 ll.32–60; '236 Patent col.2 ll.59–60, col.11 ll.60–63; '253 Patent col.2 ll.6–10. **Extrinsic evidence**: Bortz Decl. at ¶¶ 106–12 (Dkt. No. 82-11); Melendez Decl. ¶¶ 17, 48–54 (Dkt. No. 82-12); ITU-T, *ITU-T Recommendation Y.1731* (Melendez Decl. Ex. 2, Dkt. No. 82-12 at 58–69).

Verizon responds: These terms are properly governed by § 112, ¶ 6 because "none of the recited 'units,' 'subunits,' or "modules" would have been understood by a POSITA to describe a particular structure for performing the recited functions." Specifically, the recited units and subunits "have no established meaning in the art and lack any structural significance." Even when read in the context of the intended environment, the standards defining the environment do not dictate structure but rather merely provide functional interfaces. Dkt. No. 98 at 9–12.

In addition to the claims themselves, Verizon cites the following **extrinsic evidence** to support its position: Ralph '433 Decl. ¶¶ 52–58, 60–62, 64–67, 70–72, 79–81, 84–85 (Verizon's Ex. 1, Dkt. No. 98-1); Ralph '236 & '505 Decl. ¶¶ 56–90, 92–107 (Verizon's Ex. 3, Dkt. No. 98-3); Almeroth Decl. ¶¶ 41–46, 54–55, 60–61, 66–67, 70–71, 75–76 (Verizon's Ex. 4, Dkt. No. 98-4); ITU-T, *Recommendation ITU-T G.709/Y.1331* at § 1 (Dec. 2009) (Verizon's Ex. 12, Dkt. No. 98–15 at 10).

Huawei replies: As Verizon's expert agrees, one of ordinary skill in the art would be familiar with G.709 and G.8032 equipment and would understand that every interface in a G.709 network includes certain structural components. When read in this context, the terms at issue are sufficiently structural. Dkt. No. 106 at 14.

Huawei cites further **extrinsic evidence** to support its position: Min Decl. ¶¶ 88, 90 (Verizon's Counterclaim Ex. 3, Dkt. No. 85-3).

Analysis

There are two issues in dispute. First, whether these terms should be governed by 35 U.S.C. § 112, ¶ 6. Second, if the terms are governed by § 112, ¶ 6, whether the '505 Patent satisfies the disclosure requirements of the statute. The Court determines that these terms are not governed by § 112, ¶ 6 and therefore does not address the second issue.

This issue is similar to that addressed in the alleged means plus function terms from the '433 Patent. For reasons similar to those stated there, the Court determines that the claims of the '505 Patent provide sufficient structural context to sustain the presumption against applying § 112, ¶ 6.

Accordingly, the Court determines that Defendant has failed to establish that these terms should be governed by § 112, ¶ 6 or that any claim is indefinite for including any of the terms.

F. U.S. Patent No. 8,995,253 (Huawei-Asserted)

The '253 Patent claims priority to a Chinese application filed on January 23, 2007.

The '253 Patent is generally directed to Ethernet technology for protecting an Ethernet network in a ring topology (an "Ethernet Ring").

The abstract of the '253 Patent provides:

> A method, apparatus and system for Ethernet Ring Protection (ERP) are disclosed. The method includes: detecting, by a node, a link fault on a ring; blocking, by the node, a port connected with the faulty link after detecting the link fault, and sending a fault alarm message to other nodes on the ring, wherein the fault alarm message contains a fault identifier; and judging, by a node which receives the fault alarm message, whether the fault identifier changes; if the fault identifier changes, the node which receives the fault alarm message storing the fault identifier contained in the fault alarm message and clearing a forwarding table of the node which receives the fault alarm message.

Claims 1 and 4 of the '253 Patent, exemplary method and apparatus claims respectively, provide as follows (with disputed terms emphasized):

> **1**. A ring protection method, comprising:
> detecting, by a first node in a ring, a link fault occurring in a link connected to a port of the first node;

blocking, by the first node, the port connected to the link after detecting the link fault, and sending a fault alarm message to other nodes in the ring, wherein the fault alarm message contains an identifier that indicates the first node detecting the link fault;

judging, by a second node which receives the fault alarm message, whether the identifier contained in the fault alarm message is different from a fault identifier record stored in the second node; and

if the identifier contained in the fault alarm message is different from the fault identifier record stored in the second node, storing, by the second node which receives the fault alarm message, the identifier contained in the fault alarm message and clearing a forwarding table of the second node which receives the fault alarm message.

4. A ring protection apparatus in a first node in a ring, the apparatus comprising:

an alarm message processing module, configured to: receive a fault alarm message; forward the fault alarm message downstream; extract, from the received fault alarm message, an identifier indicating a second node that detects a link fault occurring in a link connected to a port of the second node; and send the identifier to a judging module;

a fault information storing module, configured to store fault information which includes a collection of identifiers of received fault alarm messages; and

the judging module, configured to: judge, according to the identifier extracted from the received fault alarm message and the fault information stored in the fault information storing module, whether the identifier extracted from the fault alarm message is different from the fault information stored in the fault information storing mod- ule; and if the identifier extracted from the fault alarm message is different from the fault information stored in the fault information storing module, instruct a forward- ing table flushing module to clear a forwarding table of the first node in which the ring protection apparatus locates.

F-1. "judging … whether …," "judge … whether," "determining whether …" and "determine whether …"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"judging … whether the identifier contained in the fault alarm message is different from a fault identifier record stored in the second node" • '253 Patent Claim 1	No construction necessary.	judging whether the identifier contained in the fault alarm message is different from an identifier stored in the second node for the port on which the message is received Alternatively: • indefinite

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"judge … whether the identifier extracted from the fault alarm message is different from the fault information stored in the fault information storing module" • '253 Patent Claim 4		judge whether the identifier extracted from the fault alarm message is different from an identifier stored in the fault information storing module for the port on which the message is received Alternatively: • indefinite
"judge … whether the identifier contained in the fault alarm message is different from a fault identifier record stored in the second node" • '253 Patent Claim 6		judge whether the identifier contained in the fault alarm message is different from an identifier stored in the second node for the port on which the message is received Alternatively: • indefinite
"determining … whether the identifier contained in the fault alarm message is different from a fault identifier record stored in the first node" • '253 Patent Claim 9		determining whether the identifier contained in the fault alarm message is different from an identifier stored in the first node for the port on which the message is received Alternatively: • indefinite
"determine whether the identifier contained in the fault alarm message is different from a fault identifier record stored in the first node" • '253 Patent Claim 14		determine whether the identifier contained in the fault alarm message is different from an identifier stored in the first node for the port on which the message is received Alternatively: • indefinite

Because the parties' arguments and proposed constructions with respect to these terms are related, the Court addresses the terms together.

The Parties' Positions

Huawei submits: There is no lexicography or disclaimer of claim scope requiring that the identifier with which the fault alarm message is compared is for the same port on which the message is received. Rather, the '253 Patent teaches that the invention is "not limited to information for a specific port for judging whether the identifier is different." Indeed, Verizon did not propose this narrowing same-port construction in its petitions for IPR of the '253 Patent. Further, Verizon would improperly exclude the embodiment in which the identifier is a null. Dkt. No. 82 at 30–32.

In addition to the claims themselves, Huawei cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '253 Patent col.4 l.66 – col.5 l.4, col.6 ll.54–56. **Extrinsic evidence**: Melendez Decl. ¶¶ 32–38 (Dkt. No. 82-12).

Verizon responds: The '253 Patent describes stored identifiers that are pairs of values, "a first identifier (e.g., a source address) for fault alarm messages received at one ring port, and a second identifier for messages received at a second ring port." As consistently described in the patent, a node judges whether an identifier in a fault alarm message received at a port is different than a stored identifier for the "corresponding port." The patent "provides no guidance as to whether (or how) an identifier for the other, non-receiving port could be used." In fact, without clarifying that the comparison of the received identifier is with the stored identifier for the receiving port, these terms would have no meaningful scope. The mere fact that the stored identifier has two values and the received identifier has only one indicates a difference. Dkt. No. 98 at 35–37.

In addition to the claims themselves, Verizon cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '253 Patent figs.4–7, col.3 ll.30–37, col.4 ll.36–38, col.4 ll.52–62, col.5 ll.22–26, col.6 ll.3–24, col.6 ll.56–57. **Extrinsic evidence**: Almeroth

Supp. Decl.[28] ¶¶ 11–16 (Verizon's Ex. 9, Dkt. No. 98-9); '253 IPR Petition[29] at 24–25 (Verizon's Ex. 17, Dkt. No. 98-20 at 36–37).

Huawei replies: The claims simply require judging based on a fault identifier stored in a node, regardless of whether there are multiple stored identifier values. Dkt. No. 106 at 13.

Analysis

The issue in dispute is whether judging or determining whether an identifier in a received fault alarm message is different from a stored fault identifier record or fault information necessarily requires that the stored fault identifier record or fault information is "for the port on which the message is received." It is not.

The Court rejects Verizon's invitation to inject a "for the port on which the message is received" limitation into the claims. The Court is not persuaded that the '253 Patent's description of embodiments rises to the exacting standard to warrant importing such a limitation, which is clearly not expressed in the examined and issued claim language.

Accordingly, the Court rejects Verizon's proposed constructions and determines that these terms have their plain and ordinary meanings without the need for further construction.

F-2. "configured to"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"configured to" • '253 Patent Claims 4, 6, 14	No construction necessary.	Plain and ordinary meaning, with the understanding that this means not merely being capable of being configured but rather being actually configured.

[28] Supplemental Declaration of Kevin C. Almeroth, Ph. D. (Nov. 6, 2020).
[29] Petition for Inter Partes Review of U.S. Patent No. 8,995,253, *Cellco Partnership d/b/a Verizon Wireless v. Huawei Technologies Co. Ltd.*, IPR2020-01352 (P.T.A.B. July 23, 2020), Paper No. 1.

The Parties' Positions

Huawei submits: "The dispute here is identical to the 'configured to' dispute of the '151 patent. The Court should reject Verizon's proposal for the same reasons." Dkt. No. 82 at 32.

In addition to the claims themselves, Huawei cites the following **extrinsic evidence** to support its position: Melendez Decl. ¶¶ 40–44 (Dkt. No. 82-12).

Verizon responds: "Verizon proposes the same construction for this term in the '253 patent as for the '151 patent, and Verizon's construction should be adopted for the same reasons described above." Dkt. No. 98 at 37.

Huawei replies: "See the term 'configured to' in the '151 patent." Dkt. No. 106 at 13.

Analysis

This is the same issue as addressed above in the section on "adapted to" and "configured to" in the '151 Patent; essentially, whether "configured to" encompasses "configurable to." For the reasons stated there, the Court rejects that the plain and ordinary meaning of the "configured to [perform functions]" claim language encompasses structure that is merely capable of performing those functions in the abstract. Under its plain and ordinary meaning, "configured to [perform functions]" requires structure that is in a state to perform the functions and does not encompass structure that may be modified to perform that function but is not in that modified state. With this understanding, the Court determines that this term has its plain and ordinary meaning without the need for further construction.

F-3. "null"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"null" • '253 Patent Claim 12	No construction necessary.	no value

The Parties' Positions

Huawei submits: "[T]he term 'null' can mean a lack of a value, such as an empty string, or can mean a value that is non-consequential, such as a zero, and treated by the system in a particular manner." Verizon's proposed construction improperly limits to the former meaning, which would improperly exclude a fault identifier record that "contains a zero value or sequence of all zeroes." Indeed, Verizon did not propose such a narrow construction in its petitions for IPR of the '253 Patent. Dkt. No. 82 at 32–33.

In addition to the claims themselves, Huawei cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '505 Patent col.4 ll.66–67, col.5 ll.7–9. **Extrinsic evidence**: Melendez Decl. ¶¶ 45–48 (Dkt. No. 82-12).

Verizon responds: The ordinary meaning of "null" refers to a character having no value, and nothing in the '253 Patent strays from this ordinary meaning. Indeed, "the patent never describes a 'null' value as a zero or sequence of zeroes." Dkt. No. 98 at 37–38.

In addition to the claims themselves, Verizon cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '253 Patent col.4 l.66 – col.5 l.21. **Extrinsic evidence**: *Microsoft Computer Dictionary* at 370, 587 (5th ed. 2002), "null character" and ANSI Character "NUL" (Verizon's Ex. 13, Dkt. No. 98-16 at 4–5).

Huawei replies: "Verizon relies on a definition of a different term 'null character' and the purported lack of examples in the specification. These arguments cannot override the plain claim language." Dkt. No. 106 at 13.

Analysis

The issue in dispute is whether "null" in the '253 Patent is limited to "no value." It is not.

The Court is not persuaded that "null" has a limited ordinary meaning of "no value," as Verizon suggests. The only evidence of record on this issue is a computer-dictionary definition of "null character," not of "null." Indeed, that very dictionary suggests that "null" is not coextensive with "null character" in that it provides a definitions for "null cycle," "null modem," "null modem cable," "null pointer," "null string," and "null-terminated string." *Microsoft Computer Dictionary* at 370 (5th ed. 2002), Dkt. No. 98-16 at 4. Likewise, nothing in the '253 Patent suggests that "null" is limited to "no value." In fact, the patent rather suggests that a null may be a value. *See, e.g.*, '253 Patent col.5 ll.7–9 ("whereas the source address of the alarm message corresponding to a port changes from a null value to a non-null value"). Ultimately, the Court will not limit "null" to "no value" on the evidence of record.

Accordingly, the Court rejects Verizon's proposed construction and determines that this term has its plain and ordinary meaning without the need for further construction.

F-4. Alleged Means-Plus-Function Terms

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"an alarm message processing module, configured to: receive a fault alarm message; forward the fault alarm message downstream; extract, from the received fault alarm message, an identifier indicating a second node that detects a link fault occurring in a link connected to a port of the second node; and send the identifier to a judging module" • '253 Patent Claim 4	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described with respect to 5:27-30, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: receive a fault alarm message; forward the fault alarm message downstream; extract, from the received fault alarm message, an identifier indicating a second node that detects a link fault occurring in a link connected to a port of the second node; and send the identifier to a judging module **structure**: none disclosed

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"a fault information storing module, configured to store fault information which includes a collection of identifiers of received fault alarm messages" • '253 Patent Claim 4	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described with respect to 5:27-30, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: store fault information which includes a collection of identifiers of received fault alarm messages **structure**: none disclosed
"the judging module, configured to: judge, according to the identifier extracted from the received fault alarm message and the fault information stored in the fault information storing module, whether the identifier extracted from the fault alarm message is different from the fault information stored in the fault information storing module; and if the identifier extracted from the fault alarm message is different from the fault information stored in the fault information storing module, instruct a forwarding table flushing module to clear a forwarding table of the first node in which the ring protection apparatus locates" • '253 Patent Claim 4	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described with respect to 3:48-50 or 5:27-30, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: judge, according to the identifier extracted from the received fault alarm message and the fault information stored in the fault information storing module, whether the identifier extracted from the fault alarm message is different from the fault information stored in the fault information storing module; and if the identifier extracted from the fault alarm message is different from the fault information stored in the fault information storing module, instruct a forwarding table flushing module to clear a forwarding table of the first node in which the ring protection apparatus locates **structure**: none disclosed

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"a first module, configured to determine whether the identifier contained in the fault alarm message is different from a fault identifier record stored in the first node" • '253 Patent Claim 14	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described with respect to 3:48-50 or 5:27-30, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: determine whether the identifier contained in the fault alarm message is different from a fault identifier record stored in the first node **structure**: none disclosed
"a second module, configured to clear a forwarding table of the first node if the identifier contained in the fault alarm message is different from the fault identifier record stored in the first node" • '253 Patent Claim 14	Not governed by 35 U.S.C. § 112, ¶ 6, needs no construction. Alternatively: • **structure**: hardware and/or software programmed to perform the algorithm described with respect to 5:27-30, and equivalents thereof	Governed by 35 U.S.C. § 112, ¶ 6. **function**: clear a forwarding table of the first node if the identifier contained in the fault alarm message is different from the fault identifier record stored in the first node **structure**: none disclosed

Because the parties' arguments and proposed constructions with respect to these terms are related, the Court addresses the terms together.

The Parties' Positions

Huawei submits: Each of these terms lacks the term "means" and, therefore, there is a presumption against applying 35 U.S.C. § 112, ¶ 6. When the claims are read in the appropriate context, these limitations sufficiently denote structure and the presumption cannot be overcome. Specifically the context of claims' intended environment—"known G.709 or G.8032 equipment"—and claim-recited objectives and operations of the terms sufficiently connote the structural nature of the terms. Dkt. No. 82 at 34–37.

In addition to the claims themselves, Huawei cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '433 Patent col.4 ll.30–40, col.12 ll.29–65, col.14 ll.32–60; '236 Patent col.2 ll.59–60, col.11 ll.60–63; '253 Patent col.2 ll.6–10. **Extrinsic evidence**: Bortz Decl. at ¶¶ 106–12 (Dkt. No. 82-11); Melendez Decl. ¶¶ 17, 48–54 (Dkt. No. 82-12); ITU-T, *ITU-T Recommendation Y.1731* (Melendez Decl. Ex. 2, Dkt. No. 82-12 at 58–69).

Verizon responds: These terms are properly governed by § 112, ¶ 6 because "none of the recited 'units,' 'subunits,' or "modules" would have been understood by a POSITA to describe a particular structure for performing the recited functions." Specifically, the recited units and subunits "have no established meaning in the art and lack any structural significance." Dkt. No. 98 at 9–12. Even when read in the context of the intended environment, the standards defining the environment do not dictate structure but rather merely provide functional interfaces.. Dkt. No. 98 at 9–13.

In addition to the claims themselves, Verizon cites the following **extrinsic evidence** to support its position: **Intrinsic evidence**: '253 Patent col.2 ll.27–31, col.8 ll.53–58. **Extrinsic evidence**: Ralph '433 Decl. ¶¶ 52–58, 60–62, 64–67, 70–72, 79–81, 84–85 (Verizon's Ex. 1, Dkt. No. 98-1); Ralph '236 & '505 Decl. ¶¶ 56–68, 73–74, 76, 81, 89, 92–95, 106 (Verizon's Ex. 3, Dkt. No. 98-3); Almeroth Decl. ¶¶ 41–46, 48–76 (Verizon's Ex. 4, Dkt. No. 98-4); ITU-T, *Recommendation ITU-T G.709/Y.1331* at § 1 (Dec. 2009) (Verizon's Ex. 12, Dkt. No. 98–15 at 10).

Huawei replies: As Verizon's expert agrees, one of ordinary skill in the art would be familiar with G.709 and G.8032 equipment and would understand that every interface in a G.709 network includes certain structural components. When read in this context, the terms at issue are sufficiently structural. Dkt. No. 106 at 14.

Huawei cites further **extrinsic evidence** to support its position: Min Decl. ¶¶ 88, 90 (Verizon's Counterclaim Ex. 3, Dkt. No. 85-3).

Analysis

There are two issues in dispute. First, whether these terms should be governed by 35 U.S.C. § 112, ¶ 6. Second, if the terms are governed by § 112, ¶ 6, whether the '253 Patent satisfies the disclosure requirements of the statute. The Court determines that these terms are not governed by § 112, ¶ 6 and therefore does not address the second issue.

This issue is similar to that addressed in the alleged means plus function terms from the '433 Patent. For reasons similar to those stated there, the Court determines that the claims of the '253 Patent provide sufficient structural context to sustain the presumption against applying § 112, ¶ 6.

Accordingly, the Court determines that Defendant has failed to establish that these terms should be governed by § 112, ¶ 6 or that any claim is indefinite for including any of the terms.

G. U.S. Patent No. 9,270,485 (Huawei-Asserted)

The '485 Patent claims priority to a Chinese application filed on January 23, 2007.

The '485 Patent is generally directed to Ethernet technology for protecting an Ethernet network in a ring topology (an "Ethernet Ring").

The abstract of the '485 Patent provides:

> An Ethernet Ring Protection (ERP) method is disclosed. The method includes: when a link on an Ethernet ring network is faulty, determining whether the faulty link is a link where a normally blocked port is located; and sending a first control message which carries first indication information to a ring node on the Ethernet ring network if the faulty link is the link where the normally blocked port is located, wherein the first indication information indicates that a forwarding table is not desired to be cleared by the ring node. Through the method according to the present invention, the broadcast traffic generated by unnecessary clearing of the forwarding table and self-learning is reduced effectively.

Claim 8 of the '485 Patent, an exemplary method claim, provides as follows (with disputed terms emphasized):

> **8**. An Ethernet Ring Protection (ERP) method, comprising:
> when a fault on a link on an Ethernet ring network is detected by a ring node, determining, by the ring node, whether the faulty link is ***a link where a normally blocked port locates***; and
> sending, by the ring node, a first control message which carries a fault indication and a non-clearing indication to other ring nodes on the Ethernet ring network, if the faulty link is the link where the normally blocked port locates, wherein the non-clearing indication indicates that a forwarding table is not desired to be cleared by the other ring nodes; wherein the first control message is an ***Automatic Protection Switching (APS) packet in Ethernet protection switching mechanism***, the APS packet carries the fault indication and the non-clearing indication.

G-1. "a link where a normally blocked port locates"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"a link where a normally blocked port locates" • '485 Patent Claims 8, 10	No construction necessary.	a link connected to a port that has been configured to be blocked when there are no faults in the Ethernet ring network

The Parties' Positions

Huawei submits: The meaning of this term is plain without construction, it "means a link between two ports for two nodes, where one of the ports is the port that is normally blocked to prevent loops in the Ethernet ring network." The normally blocked port is blocked regardless of whether "there are faults in the network." This plain meaning does not include Verizon's proposed "configured to be blocked when there are no faults in the Ethernet ring network" limitation. Indeed, Verizon did not propose this narrow construction in its petitions for IPR of the '485 Patent. Dkt. No. 82 at 33.

In addition to the claims themselves, Huawei cites the following **extrinsic evidence** to support its position: Melendez Decl. ¶¶ 86–90 (Dkt. No. 82-12).

Verizon responds: "Verizon disagrees that its proposed construction is incorrect or excludes any embodiments, but would accept a construction based on Huawei's explanation: 'a link between ports of two nodes, where one of the ports is normally blocked to prevent loops in the Ethernet ring network.'" Dkt. No. 98 at 38.

Huawei replies: "Because Verizon abandoned its indefiniteness assertion for this patent and failed to show that any of the remaining terms require a construction, no constructions are necessary." Dkt. No. 106 at 13–14.

Analysis

The dispute appears to be whether this term should be construed to clarify what it means for a port to be normally blocked. It should. A normally blocked port is a port that is ordinarily blocked, and not blocked just because of a fault.

The parties appear to agree that a normally blocked port is a port that is blocked even in the absence of a fault. Huawei posits that the port is "normally blocked to prevent loops in the Ethernet ring network" and neither requires nor precludes a network fault for blocking. Dkt. No. 82 at 33 (citing Melendez Decl. ¶¶ 86–90, Dkt. No. 82-12). Huawei's expert opines succinctly that "a normally blocked port [is a] a port that is ordinarily blocked and not just because there is a fault." Melendez Decl. ¶ 86, Dkt. No. 82-12. Verizon posits that it is "blocked when there are not faults in the Ethernet ring network" and agrees with Huawei that it "is normally blocked to prevent loops in the Ethernet ring network."

Accordingly, the Court addresses the dispute by construing "normally blocked port" as follows:

- "normally blocked port" means "port that is ordinarily blocked and not blocked just because there is a fault."

G-2. "Automatic Protection Switching (APS) packet in Ethernet protection switching mechanism"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"Automatic Protection Switching (APS) packet in Ethernet protection switching mechanism" • '485 Patent Claim 8	No construction necessary.	a packet used in an automatic protection switching protocol in an Ethernet protection switching mechanism

The Parties' Positions

Huawei submits: "[A] POSITA would understand what is meant by an APS packet in an Ethernet protection switching mechanism, particularly in context of ERP." Thus, there is no reason to inject Verizon's proposed "protocol,' which term does not appear in the '485 Patent. Dkt. No. 82 at 34.

In addition to the claims themselves, Huawei cites the following **extrinsic evidence** to support its position: Melendez Decl. ¶¶ 97–102 (Dkt. No. 82-12).

Verizon responds: "Verizon would not object to [the removal of 'protocol'], e.g., 'a packet used for automatic protection switching in an Ethernet protection switching mechanism.'". Dkt. No. 98 at 38.

Huawei replies: "Because Verizon abandoned its indefiniteness assertion for this patent and failed to show that any of the remaining terms require a construction, no constructions are necessary." Dkt. No. 106 at 13–14.

Analysis

The issue in dispute appears to be whether the claim language should be rewritten as Verizon proposes. On the record before the Court, it should not.

Verizon has not provided any good reason to stray from the examined and issued claim language and has cited no evidence in support of doing so. In contrast, Huawei's expert has opined that "Automatic Protection Switching (APS) packet" has a customary meaning in the art of Ethernet. Melendez Decl. ¶ 97, Dkt. No. 82-12.

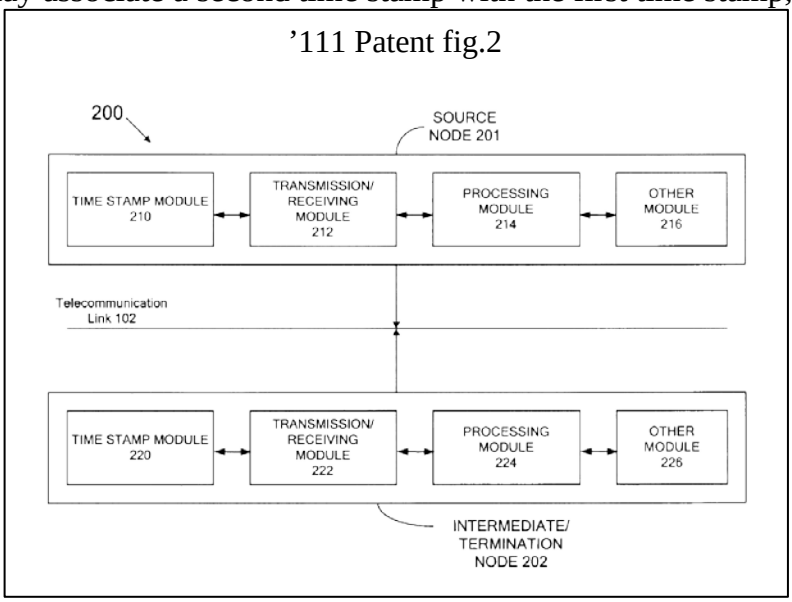
Accordingly, the Court rejects Verizon's proposed construction and determines that this term has its plain and ordinary meaning without the need for further construction.

H. U.S. Patents No. 8,121,111 and No. 8,983,288 (Verizon-Asserted)

The '111 and '288 Patents are related through a continuation application and state an earliest priority date of March 29, 2007.

The '111 and '288 Patents are generally directed to telecommunication technology for measuring latency in node-to-node and round-trip communications in an Optical Transport Network (OTN). The technology may be generally understood with reference to Figure 2 of the patents, reproduced here. The latency between two nodes (201, 202) may be determined through use of a time stamp provided by each node. The first time stamp from the originating node (201) may be placed in an Optical Transport Unit (OTU) frame and sent to the receiving node (202). The receiving node may associate a second time stamp with the first time stamp, place in an OTU frame, and send back to the originating node (201), which extracts the second time stamp and uses it to determine a latency of the OTN. '111 Patent col.2 l.62 – col.4 l.25.

'111 Patent fig.2



The abstracts of the '111 and '288 Patent are identical and provide:

> A system and method for measuring latency of an optical transport network includes generating a time stamp, transmitting the time stamp in an optical transport network, and processing the time stamp to measure latency of the optical transport network.

Claim 1 of the '111 Patent and Claim 12 of the '288 Patent, exemplary method and apparatus claims respectively, provide as follows (with disputed terms emphasized):

> **'111 Patent Claim 1**. A method, comprising:
> receiving a first time stamp associated with a first location at a second location, wherein the first time stamp is inserted in a first overhead of a first optical transport unit frame;
> extracting information of the first time stamp from the first overhead of the first optical transport unit frame, ***wherein the information reflects a round trip delay of a network***;
> generating a second time stamp based at least in part on the extracted information of the first time stamp associated with the first location, wherein the second time stamp includes at least part of the extracted information of the first time stamp; and
> transmitting the second time stamp in a second overhead of a second transport unit frame to the first location wherein the second time stamp is used to measure the round trip delay of the network.
>
> **'282 Patent Claim 12.** A system, comprising:
> a ***receiving module*** at a second location to receive a first time stamp associated with a first location inserted into one of a frame alignment overhead portion, an optical channel transporting unit overhead portion, an optical channel data unit overhead portion, and an optical channel payload unit overhead portion of a first overhead of a first optical transport unit frame and to extract information of the first time stamp from the first overhead of the first optical transport unit frame, ***wherein the first time stamp was inserted into one of the frame alignment overhead portion, the optical channel transporting unit overhead portion, the optical channel data unit overhead portion, and the optical channel payload unit overhead portion of the first overhead of a first optical transport unit frame based on at least a characteristic of the first time stamp***, and the characteristic of the first time stamp is at least one of a size of the first time stamp, an amount of the first time stamp and a type of the first time stamp;
> a ***processing module*** comprising a computer processor to store the information of the first time stamp from the first overhead of the first optical transport unit frame;
> a ***generating module*** to generate a second time stamp based at least in part on the extracted information of the first time stamp associated with the

first location, wherein the second time stamp includes at least part of the extracted information of the first time stamp;

a ***transmission module*** to transmit the second time stamp in a second overhead of a second optical transport unit frame to the first location via a network to measure a round trip delay of the network.

H-1. "… reflecting a round trip delay …" and "… reflects a round trip delay …"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"wherein the first time stamp comprises information reflecting a round trip delay of the network" • '111 Patent Claims 6, 16, 22, 30	indefinite	Plain and ordinary meaning. Alternatively, • wherein the first time stamp comprises information used to determine a round trip time of a signal traveling within the network
"wherein the information of the first time stamp reflects a round trip delay of a network" • '111 Patent Claim 12		Plain and ordinary meaning. Alternatively, • wherein the information of the first time stamp is used to determine a round trip time of a signal traveling within a network
"wherein the information reflects a round trip delay of a network" • '111 Patent Claims 1, 26		

Because the parties' arguments and proposed constructions with respect to these terms are related, the Court addresses the terms together.

The Parties' Positions

Verizon submits: The meanings of these terms are plain without construction. "As Huawei acknowledges, 'reflects' is just another way to say 'show' or 'to make manifest.'" Thus, information that reflects a round trip delay encompasses information that makes it possible to determine the round trip delay. Information in the first time stamp "is used as part of the round trip delay measurement" and thus "reflects" a round trip delay. Finally, applicant's remarks during

prosecution of the '111 Patent do not preclude this interpretation of the reflects terms. Dkt. No. 85 at 8–11.

In addition to the claims themselves, Verizon cites the following **extrinsic evidence** to support its position: Min Decl.[30] ¶¶ 60–73 (Verizon's Counterclaim Ex. 3, Dkt. No. 85-3); Melendez Indefiniteness Decl.[31] ¶¶ 39, 41–45 (Huawei's Counterclaim Ex. A, Dkt. No. 99-2).

Huawei responds: "[T]he '111 Patent never uses the phrase 'reflects a round trip delay' or any variant," this is not a term of art, and the patent does not "provide any hint at how a round trip delay can be 'reflected' in information of the first time stamp or what that means." Thus, the meanings of these terms are not reasonably certain. Verizon's explanation that the information reflects a round trip delay by being used to determine the delay is improper as (1) it recaptures claim scope surrendered during prosecution, (2) it is still ambiguous, and (3) it improperly renders other claim language superfluous. Specifically, prior art overcome during prosecution by adding the reflects-a-round-trip-delay limitation actually discloses using information of a first time stamp as part of round-trip delay measurement. Thus, Verizon improperly attempts to recapture subject matter that the reflects limitations were meant to exclude. Verizon's examples of using information of first time stamp to determine a round trip delay are not supported by '111 Patent's disclosure, and thus rely on indefinite assumptions. Finally, the claims otherwise require using extracted information of the first time stamp to measure the round trip delay, so such an interpretation of the reflects limitations would render claim language superfluous. Dkt. No. 99 at 7–16.

In addition to the claims themselves, Huawei cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '111 Patent figs.6–7, col.1 ll.57–60, col.2

[30] Declaration of Paul S. Min, Ph.D. Regarding the Claim Construction of U.S. Patent Nos. 8,121,111 and 8,983,288 (Nov. 6, 2020).
[31] Declaration of Dr. Jose Luis Melendez on Indefiniteness (Oct. 16, 2020).

ll.3–7, col.3 ll.16–26, col.3 l.66 – col.4 l.25, col.7 ll.3–7, col.7 ll.30–56, col.8 ll.16–19, col.8 ll.41–67; '111 Patent File Wrapper May 13, 2011 Office Action at 3–5 (Huawei's Counterclaim Ex. B, Dkt. No. 99-3 at 260–87, 263–65), July 18, 2011 Response at 2, 12 (Huawei's Counterclaim Ex. B, Dkt. No. 99-3 at 294–309, 295, 305), October 13, 2011 Notice of Allowability at 2–3 (Huawei's Counterclaim Ex. B, Dkt. No. 99-3 at 317–21, 318–19); Edmison et al.[32] at fig.4, ¶¶ 50, 63–65 (Huawei's Counterclaim Ex. C, Dkt. No. 99-4). **Extrinsic evidence**: Melendez Indefiniteness Decl. ¶¶ 32–46 (Huawei's Counterclaim Ex. A, Dkt. No. 99-2); Min Decl. ¶¶ 61–62, 65–67, 73 (Verizon's Counterclaim Ex. 3, Dkt. No. 85-3).

Verizon replies: Nothing in the prosecution history rises to a disclaimer of information in the first time stamp that is used to determine a round trip delay. Indeed, the Edmison reference that Huawei contends teaches such an interpretation does not. Further, that information reflects a round trip delay does not require that it equal the round trip delay, only that it "make it manifest or possible to compute" the delay. Thus, there are a variety of ways that information can reflect a delay. Finally, interpreting the reflect terms to refer to first-time-stamp information that is used to determine a round trip delay does not render any claim language superfluous. Specifically, the second time stamp expressly may include information other than the reflecting information of the first time stamp and these two pieces of information work together to measure the round trip delay. Dkt. No. 103 at 4–7.

Verizon cites further **intrinsic evidence** to support its position: '111 Patent File Wrapper December 10, 2010 Response at 13–14 (Huawei's Counterclaim Ex. B, Dkt. No. 99-3 at 224–40, 236–37), May 13, 2011 Office Action at 3–4 (Huawei's Counterclaim Ex. B, Dkt. No. 99-3 at 260–87, 263–65), July 18, 2011 Response at 2, 12 (Huawei's Counterclaim Ex. B, Dkt. No. 99-3

[32] U.S. Patent Application Publication No. 2003/0115321.

at 294–309, 295, 305), October 13, 2011 Notice of Allowability (Huawei's Counterclaim Ex. B, Dkt. No. 99-3 at 317–21).

Analysis

The issue in dispute is whether the meanings of these terms are reasonably certain in the context of the claims and the description of the invention. They are.

The Court is not persuaded that anything in the '111 Patent's prosecution history rises to the exacting standard of disclaimer such that "information reflecting a round trip delay" and variants cannot refer to information that is used to determine a round trip delay. For instance, the July 18, 2011 Response includes an amended claim 1 (among others) as follows:

> 1. (Currently Amended) A method, comprising:
> receiving a first time stamp associated with a first location at a second location, wherein the first time stamp is inserted in a first overhead of a first optical transport unit frame;
> extracting information of the first time stamp from the first overhead of the first optical transport unit frame. wherein the information reflects a round trip delay of a network;
> generating a second time stamp based at least in part on the extracted information of the first time stamp associated with the first location, wherein the second time stamp includes at least part of the extracted information of the first time stamp; and
> transmitting the second time stamp in a second overhead of a second transport unit frame to the first location wherein the second time stamp is used to measure ~~a~~ the round trip delay of ~~a~~ the network.

'111 Patent File Wrapper, July 18, 2011 Response at 2, Dkt. No. 99-3 at 295 (emphasis in original). The applicant argued as follows:

> Regarding independent claim 1, the Office Action alleges that Edmison, Ofek, and Fujimori disclose an embodiment of the claimed subject matter. However, Applicant has amended independent claim 1 and thus rendered the aforementioned obviousness rejection of independent claim 1 moot. Specifically, Applicant respectfully submits that neither the cited portions of Edmison, Ofek, and Fujimori, nor Edmison, Ofek, and Fujimori generally, disclose, or even suggest, "extracting information of the first time stamp from the first overhead of the first optical transport unit frame, wherein the information reflects a round trip delay of a network," and "generating a second time stamp based at least in part on the extracted information of the first time

> stamp associated with the first location, wherein the second time stamp includes at least part of the extracted information of the first time stamp," as recited in independent claim 1 (emphasis added).
>
> Specifically, the Office Action asserts, and Applicant agrees, that Edmison and Ofek fail to disclose, or even suggest, "extracting information of the first time stamp," and "generating a second time stamp based at least in part of the extracted information of the first time stamp." *See* Office Action, page 4. However, the Office Action alleges that Fujimori remedies the deficiencies of Edmison and Ofek. However, Fujimori fails to disclose, or even suggest, "extracting information of the first time stamp from the first overhead of the first optical transport unit frame, wherein the information reflects a round trip delay of a network," and "generating a second time stamp based at least in part on the extracted information of the first time stamp associated with the first location, wherein the second time stamp includes at least part of the extracted information of the first time stamp," as recited in independent claim 1 (emphasis added).
>
> Rather, Fujimori discloses that the previously-attached time stamp of the received packet El is replaced with a reproducing time stamp that is newly generated by adding, to the time value of the time point ti, one frame time length and relative time value of the previously-attached time stamp. *See* Fujimori, column 33, lines 53-57. Also, Fujimori discloses operations that are performed to impart a transferring time stamp to the received packet E1 and to replace the previously-attached time stamp. *See* Fujimori, column 33, lines 1-4. Nowhere does Fujimori disclose, or even suggest, that the previously-attached time stamp comprises information that "reflects a round trip delay of a network," as recited in independent claim 1. Thus, Applicant respectfully submits that Fujimori, at most, discloses a previously-attached time stamp and fails to disclose, or even suggest, "extracting information of the first time stamp from the first overhead of the first optical transport unit frame, wherein the information reflects a round trip delay of a network," and "generating a second time stamp based at least in part on the extracted information of the first time stamp associated with the first location, wherein the second time stamp includes at least part of the extracted information of the first time stamp," as recited in independent claim 1 (emphasis added). Accordingly, Applicant respectfully submits that independent claim 1 is allowable over Edmison, Ofek, and Fujimori in view of the current amendments.

Id. at 12–13, Dkt. No. 99-3 at 305–06 (emphasis in original).

Rather than a clear and unequivocal disclaimer of using information from a first time stamp to determine a round trip delay, the applicant distinguished the prior art based on Edmison's and Ofek's failure to teach "extracting information of the first time stamp" and on Fujimori's failure

to clear that defect. Specifically, the examiner identified Fujimori's teaching of extracting information of "previously attached time stamp of the received packet E1" as satisfying the "extracting" limitation the examiner found missing in Edmison and Ofek:

> Edmison in view of Ofek does not explicitly disclose "extracting information of the first time stamp", "generating a second time stamp based at least in part of the extracted information of the first time stamp".
>
> …
>
> Fujimori in the same field of endeavor, data communication systems which communicate time stamps via a communication network, discloses extracting information of the first time stamp (extracting information of the first time stamp (previously attached time stamp of the received packet E1) and reproducing time stamp that is one frame time length and relative time value of the first time stamp (previously attached time stamp); Col. 33, lines 53-; Col. 34, lines -7), generating a second time stamp based at least in part of the extracted information of the first time stamp (newly generated time stamp which reproduced by extracting information of the first time stamp (previously attached time stamp of the received packet E1) and reproducing time stamp that is one frame time length and relative time value of the first time stamp (previously attached time stamp); Col. 33, lines 53-; Col. 34, lines -7).

'111 Patent File Wrapper, May 13, 2011 Office Action at 4–5, Dkt. No. 99-3 at 264–65). The applicant argued that Fujimori's "previously attached time stamp of the received packet E1" does not include information that reflects a round trip delay of a network: "Nowhere does Fujimori disclose, or even suggest, that the previously-attached time stamp comprises information that "reflects a round trip delay of a network," as recited in independent claim 1." '111 Patent File Wrapper, July 18, 2011 Response at 13, Dkt. No. 99-3 at 306. The applicant did not address the examiner's characterization of Edmison in the July 18, 2011 Response and this silence cannot alone establish disclaimer of anything in Edmison. Further, there is nothing in the file wrapper that Huawei has identified that suggests "the previously attached time stamp of the received packet E1" in Fujimori is something used to determine a round trip delay.

Ultimately, the prosecution history relied upon by Huawei does not preclude an interpretation of "extracting information of the first time stamp from the first overhead of the first optical transport unit frame, wherein the information reflects a round trip delay of a network," and variants, that encompasses information that is used to determine a round trip delay. Regardless of whether Edmison teaches first time stamp information that is used to determine a round trip delay.

The Court is also not persuaded that Verizon's proposed examples of how information of the first time stamp might reflect a round trip delay inject ambiguity. Nothing in the plain meaning of "reflect" a round trip delay or in Verizon's alternative statement of that as "used to determine" a round trip delay requires more than an approximation. Ultimately, whether a particular implementation of information that reflects a round trip delay is supported and enabled by the description of the invention is a separate issue.

Finally, the Court is not persuaded that any claim language is rendered superfluous by interpreting the reflecting terms to denote information that is used to determine a round trip delay. For example, Claim 1 of the '111 Patent provides that a second time stamp is based at least in part on the extracted information of the first time stamp and that the second time stamp is used to measure the round trip delay of the network. This allows that the second time stamp may include other information and thus does not require that the information of the first time stamp is used to measure the round trip delay.

Ultimately, the Court understands that under the plain meaning of "reflects" (and variants) information that reflects a round trip delay is information that indicates or shows a round trip delay.

Accordingly, Huawei has not proven any claim is indefinite for including any of the terms in dispute. The Court further construes the terms as follows:

- "wherein the first time stamp comprises information reflecting a round trip delay of the network" means "wherein the first time stamp comprises information indicating a round trip delay of the network";
- "information of the first time stamp reflects a round trip delay of a network" means "information of the first time stamp indicates a round trip delay of a network"; and
- "wherein the information reflects a round trip delay of a network" means "wherein the information indicates a round trip delay of a network."

H-2. "digital wrapping circuit"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"digital wrapping circuit" • '111 Patent Claims 4, 5, 8, 9, 14, 15, 18, 19, 29, 33 • '288 Patent Claims 4, 5, 8, 9, 14, 15, 18, 19, 29, 33	indefinite	Plain and ordinary meaning. Alternatively: • an ITU-T G.709 telecommunications circuit

The Parties' Positions

Verizon submits: "A 'digital wrapping circuit' is a well understood term of art in G.709 optical networking." The term "circuit" plainly refers to "a communications connection (i.e., a connection between two nodes)." Thus, "digital wrapping circuit" refers to "a communications circuit involving digitally wrapped communications, such as G.709 or OTN communications." Dkt. No. 85 at 11–13.

In addition to the claims themselves, Verizon cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '111 Patent col.1 ll.6–7, col.2 ll.18–28. **Extrinsic evidence**: Min Decl. ¶¶ 74–79 (Verizon's Counterclaim Ex. 3, Dkt. No. 85-3); Melendez

Indefiniteness Decl. ¶ 50 (Huawei's Counterclaim Ex. A, Dkt. No. 99-2); '505 Patent col.1 ll.34–40.[33]

Huawei responds: "The term 'digital wrapping circuit' is not a term of art." The '111 and '238 Patents do not explain what a digital wrapping circuit is, or even use the term "digital wrapping circuit" outside of the claim sets. This circuit cannot be a communications circuit (connection between nodes) because the claims require that the circuit have an overhead portion, which "refers to an area in a data frame." Dkt. No. 99 at 16–18.

In addition to the claims themselves, Huawei cites the following **extrinsic evidence** to support its position: Melendez Indefiniteness Decl. ¶¶ 47, 49–54 (Huawei's Counterclaim Ex. A, Dkt. No. 99-2).

Verizon replies: A telecommunications circuit "may include the exchange of information (both overhead and payload)," which comports with the claims directed to an overhead portion of the digital wrapping circuit. Dkt. No. 103 at 7–8.

Verizon cites further **intrinsic evidence** to support its position: '111 Patent fig.1, col.2 ll.8–61.

Analysis

The issue in dispute is whether the meaning of this term is reasonably certain in the context of the claims and the description of the invention. It is.

It is reasonably certain that the "digital wrapping circuit" of the claims refers to a G.709 telecommunications circuit. While the '111 and '288 Patents do not use the term "digital wrapping circuit" outside of the claim sets, the meaning of the phrase is reasonably certain based on the

[33] Verizon references other extrinsic evidence in its brief but did not submit exhibits of this evidence.

meanings of the constituent words. The '111 and '288 Patents are directed to measuring latency between nodes in a telecommunications network and specifically in an Optical Transport Network. *See, e.g.*, '111 Patent col.1 l.49 – col.2 l.7. The patents also teach that communication in a network involves "digitally wrapped packet transmissions." *Id.* at col.1 ll.6–7. The extrinsic evidence of record indicates that "digital wrapping" has a customary meaning in the art of OTN. For instance, the '505 Patent teaches:

> In an OTN, the technology for mapping and wrapping client signals to make them suitable for transmission in the OTN is called Digital Wrapping (DW) technology. DW technology involves technical means such as Optical Channel Transport Unit (OTU) mapping, multiplexing structures, time division multiplexing of Optical Channel Data Unit-k (ODUk), and client signal mapping.

'505 Patent col.1 ll.34–40. Verizon's expert explains how "digital wrapper," "digitally wrap," and variants are used in a variety of technical publications and dictionaries to refer to particular OTN network configurations. Min Decl. ¶ 79, Dkt. No. 85-3. While Huawei's expert opines that "digital wrapping circuit" is not a term of art, he also recognizes that "digital wrapper" has meaning in the art of OTN. Melendez ¶¶ 47, 50–51, Dkt. No. 99-2. Thus, the record establishes that the concept of "digital wrapping" is well understood in the art, as is the concept of a telecommunications circuit. In context, it is reasonably certain that a "digital wrapping circuit" refers to a particularly configured telecommunications circuit connecting nodes of an OTN.

Accordingly, the Court holds that Huawei failed to prove that any claim is indefinite for including the term "digital wrapping circuit" and construes the term as follows:

- "digital wrapping circuit" means "ITU-T G.709 telecommunications circuit."

H-3. "… the first time stamp [is/was/…] inserted …"

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"wherein the first time stamp was inserted into one of a frame alignment overhead portion, an optical channel transporting unit overhead portion, an optical channel data unit overhead portion, and an optical channel payload unit overhead portion of a first overhead of a first optical transport unit frame based on at least a characteristic of the first time stamp" • '288 Patent Claims 1, 12	wherein a determination to insert the first time stamp into … was based on at least a characteristic of the first time stamp, …	Plain and ordinary meaning.
"transmitting the first time stamp associated with the first location inserted into one of a frame alignment overhead portion, an optical channel transporting unit overhead portion, an optical channel data unit overhead portion, and an optical channel payload unit overhead portion of a first overhead of a first optical transport unit frame based on at least a characteristic of the first time stamp to a second location via a network" • '288 Patent Claim 6	transmitting the first time stamp associated with the first location, wherein a determination to insert the first time stamp into one of … was based on at least a characteristic of the first time stamp, …	Plain and ordinary meaning.
"wherein the first time stamp is inserted into one of the frame alignment overhead portion, the optical channel transporting unit overhead portion, the optical channel data unit overhead portion, and the optical channel payload unit overhead portion of the first overhead of the first optical transport unit frame based on at least a characteristic of the first time stamp" • '288 Patent Claims 16, 26, 30	wherein determining to insert the first time stamp into one of … is based on at least a characteristic of the first time stamp, …	Plain and ordinary meaning.

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"wherein the first time stamp is inserted into the one of the frame alignment overhead portion, the optical channel transporting unit overhead portion, the optical channel data unit overhead portion, and the optical channel payload unit overhead portion of the first overhead of the first optical transport unit frame based on at least a characteristic of the first time stamp" • '288 Patent Claim 22	wherein determining to insert the first time stamp into the one of … is based on at least a characteristic of the first time stamp, …	Plain and ordinary meaning.

Because the parties' arguments and proposed constructions with respect to these terms are related, the Court addresses the terms together.

The Parties' Positions

Verizon submits: These terms are plainly directed to inserting a time stamp into an overhead portion "based on" a characteristic of a time stamp. This inserting does not require actively determining to insert. Dkt. No. 85 at 21–24.

In addition to the claims themselves, Verizon cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '111 Patent fig.4, col.6 ll.21–54, col.7 ll.7–12, col.7 ll.30–35, col.8 ll.19–23, col.8 ll.41–46. **Extrinsic evidence**: Min Decl. ¶¶ 115–16 (Verizon's Counterclaim Ex. 3, Dkt. No. 85-3).

Huawei responds: These claims plainly require that that first time stamp is inserted into one of several overhead options "based on" one of several specified characteristics of the time stamp. Thus, "the system must evaluate these characteristics to determine where to insert the time stamp." In fact, the "based on" limitation was added during prosecution to distinguish from inserting into a preassigned overhead based solely on the identity of the time stamp. Dkt. No. 99 at 18–21.

In addition to the claims themselves, Huawei cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '288 Patent col.6 ll.31–40; '288 Patent File Wrapper March 26, 2014 Response at 15 (Huawei's Counterclaim Ex. E, Dkt. No. 99-6 at 225–43, 239). **Extrinsic evidence**: Melendez Second Decl.[34] ¶¶ 31–43 (Huawei Counterclaim Ex. D, Dkt. No. 99-5).

Verizon replies: The claims plainly "do not include any active 'determining' step." As described in the patents, these terms encompass a situation where "timestamps having a certain characteristic are always inserted into ***the same overhead portion***" (Verizon's emphasis). Thus, the overhead portion may be predetermined. "The only requirement is that the size, amount, or type of timestamp was (at some point) considered in determining where to insert that timestamp." Dkt. No. 103 at 8–10.

Verizon cites further **intrinsic evidence** to support its position: '288 Patent File Wrapper March 26, 2014 Response at 15 (Huawei's Counterclaim Ex. E, Dkt. No. 99-6 at 225–43, 239).

Analysis

The issue in dispute appears to be whether the claims at issue require determining where to insert the time stamp. They do not.

The claim language at issue does not suggest an active step of determining where to insert the time stamp. The claims provide significant context informing the meaning of these terms. For instance, Claim 1 of the '288 Patent provides:

> 1. A method, comprising:
> a second location receiving a first time stamp associated with a first location, ***wherein the first time stamp was inserted into one of a frame alignment overhead portion, an optical channel transporting unit overhead portion, an optical channel data unit overhead portion, and an optical channel payload unit overhead portion of a first overhead of a first optical transport***

[34] Declaration of Dr. Jose Luis Melendez on Claim Construction (Nov. 6, 2020).

> ***unit frame based on at least a characteristic of the first time stamp, wherein the characteristic of the first time stamp is at least one of a size of the first time stamp, an amount of the first time stamp and a type of the first time stamp***;
> extracting information of the first time stamp from the first overhead of the first optical transport unit frame;
> generating a second time stamp based at least in part on the extracted information of the first time stamp associated with the first location, wherein the second time stamp includes at least part of the extracted information of the first time stamp; and
> transmitting the second time stamp in a second overhead of a second optical transport unit frame to the first location wherein the second time stamp is used to measure a round trip delay of a network.

'288 Patent col.9 ll.22–44 (emphasis added). Notably, the claim does not require "inserting," but only that the time stamp "was inserted" into one of the overheads based on one of the characteristics. Thus, even if "inserting" necessarily entails "determining," it would be improper to require actively determining where to insert the time stamp to satisfy this claim.

Ultimately, the claim language is clear without construction, it requires that the time stamp is inserted into an overhead "based on" the recited characteristics. This plainly does not encompass stamps that are inserted in an overhead irrespective of the recited characteristics. Rather, the claims are plainly directed to a first time stamp that was inserted into one of several overheads "based on" one or more of the claim-recited characteristics of the

Accordingly, the Court rejects Huawei's proposed constructions and determines that these terms have their plain and ordinary meanings without the need for further construction.

H-4. Alleged Means-Plus-Function Terms

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"A non-transitory computer readable storage media comprising code to perform the acts of the method of claim [1/6/22]" • '111 Patent Claim 23–25 • '288 Patent Claims 23–25	Indefinite. In addition, based on positions taken by Verizon, these terms are governed by 35 U.S.C. § 112 ¶ 6 and lack corresponding structure.	Plain and ordinary meaning.
"receiving module" • '111 Patent Claims 12, 16 • '288 Patent Claims 12, 16	Based on positions taken by Verizon, these terms are governed by 35 U.S.C. § 112 ¶ 6 and lack corresponding structure.	Not governed by 35 U.S.C. § 112, ¶ 6, plain and ordinary meaning. Alternatively: • **function**: receiving a timestamp • **structure**: an ITU-T G.709 network interface as described, e.g., in '111 patent at 2:8-4:59; 6:55-7:2; Figs. 1-3
"processing module" • '111 Patent Claim 12 • '288 Patent Claim 12	Based on positions taken by Verizon, these terms are governed by 35 U.S.C. § 112 ¶ 6 and lack corresponding structure.	Not governed by 35 U.S.C. § 112, ¶ 6, plain and ordinary meaning. Alternatively: • **function**: storing the information of the first time stamp from the first overhead of the first optical transport unit frame • **structure**: a processing unit, a storage unit and/or other various network elements as described, e.g., in '111 patent at 2:18-5:2; 6:65-7:13; Figs. 1-3

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"processing module" • '111 Patent Claims 16, 20 • '288 Patent Claims 16, 20	Based on positions taken by Verizon, these terms are governed by 35 U.S.C. § 112 ¶ 6 and lack corresponding structure.	Not governed by 35 U.S.C. § 112, ¶ 6, plain and ordinary meaning. Alternatively: • **function**: processing the second time stamp associated with the second location to measure the time of a signal through the network • **structure**: a processing unit, a storage unit and/or other various network elements as described, e.g., in '111 patent at 2:18-5:2; 6:65-7:13; Figs. 1-3
"generating module" • '111 Patent Claim 12 • '288 Patent Claim 12	Based on positions taken by Verizon, these terms are governed by 35 U.S.C. § 112 ¶ 6 and lack corresponding structure.	Not governed by 35 U.S.C. § 112, ¶ 6, plain and ordinary meaning. Alternatively: • **function**: generate a second time stamp based at least in part on the extracted information of the first time stamp associated with the first location • **structure**: an ITU-T G.709 network interface as described, e.g., in 111 patent at 2:18-5:2; 6:65-7:13; Figs. 1-3

Disputed Term	Huawei's Proposed Construction	Verizon's Proposed Construction
"generating module" • '111 Patent Claim 16 • '288 Patent Claim 16	Based on positions taken by Verizon, these terms are governed by 35 U.S.C. § 112 ¶ 6 and lack corresponding structure.	Not governed by 35 U.S.C. § 112, ¶ 6, plain and ordinary meaning. Alternatively: • **function**: generate a first time stamp associated with the first location • **structure**: an ITU-T G.709 network interface as described, e.g., in 111 patent at 2:18-5:2; 6:65-7:13; Figs. 1-3
"transmission module" • '111 Patent Claims 12, 14–16, 18, 19 • '288 Patent Claims 12, 14–16, 18, 19	Based on positions taken by Verizon, these terms are governed by 35 U.S.C. § 112 ¶ 6 and lack corresponding structure.	Not governed by 35 U.S.C. § 112, ¶ 6, plain and ordinary meaning. Alternatively: • **function**: transmitting a timestamp • **structure**: an ITU-T G.709 network interface as described, e.g., in '111 patent at 2:18-5:2; 6:65-7:13; Figs. 1-3

Because the parties' arguments and proposed constructions with respect to these terms are related, the Court addresses the terms together.

The Parties' Positions

Verizon submits: The "code to perform" claims do not include any means-plus-function limitations. The "module" terms are all plainly structural when read in the proper context: they each refer to a "hardware/software module with various … capabilities within the ITU-T G.709 network." In any event, each of the modules is supported by a disclosure of structure in the patents. Dkt. No. 85 at 13–21.

In addition to the claims themselves, Verizon cites the following intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '111 Patent figs.1–3, col.2 l.8 – col.5 l.2, col.6 l.55 – col.7 l.2. **Extrinsic evidence**: Min Decl. ¶¶ 82–84, 86–106, 109–14 (Verizon's Counterclaim Ex. 3, Dkt. No. 85-3).

Huawei responds: "If the 'modules' in Verizon's patents provide sufficient disclosure of structure to avoid the application on § 112 ¶ 6 at the first step of the analysis, then Huawei's patents certainly provide that much disclosure and more." Similarly, "if the Court concludes that a POSITA would understand the 'code to perform' of Verizon's patents to refer to known OTN structure, it should reach the same result with respect to Huawei's patents." If § 112, ¶ 6 applies to these terms, then the '111 and '282 Patents fail the structural disclosure requirement because they fail to disclose any algorithms or structures for the functions of the "code to perform" or "module" limitations. Dkt. No. 99 at 21–27.

In addition to the claims themselves, Huawei cites the following **extrinsic evidence** to support its position: Melendez Indefiniteness Decl. ¶¶ 55–89 (Huawei's Counterclaim Ex. A, Dkt. No. 99-2); Bortz Decl. at ¶¶ 106–07, 109-10, 112 (Dkt. No. 82-11); Min Decl. ¶¶ 82, 90, 105, 112 (Verizon's Counterclaim Ex. 3, Dkt. No. 85-3).

Verizon replies: The "module" terms of the Verizon patents are different in character from the "module" and "unit" terms of the Huawei patents: The Verizon-patent modules refer to "well-known G.709 sending, receiving, or processing circuity." In contrast, the Huawei-patent modules and units "constitute coined terms and phrases that a POSITA would not associate with any definite structure." The code-to-perform claims are *Beauregard* claims and are therefore not governed by § 112, ¶ 6. Dkt. No. 103 at 10–13.

Verizon cites further intrinsic and extrinsic evidence to support its position: **Intrinsic evidence**: '111 Patent fig.6, col.7 ll.3–65. **Extrinsic evidence**: Min Decl. ¶¶ 48–51, 85, 107–08 (Verizon's Counterclaim Ex. 3, Dkt. No. 85-3).

Analysis

There are two issues in dispute. First, whether these terms should be governed by 35 U.S.C. § 112, ¶ 6. Second, if the terms are governed by § 112, ¶ 6, whether the '111 and '288 Patents satisfy the disclosure requirements of the statute. The Court determines that these terms are not governed by § 112, ¶ 6 and therefore does not address the second issue.

This issue is similar to that addressed in the alleged means plus function terms from the '433 Patent. For reasons similar to those stated there, the Court determines that the claims of the '111 and '288 Patent provide sufficient structural context to sustain the presumption against applying § 112, ¶ 6.

Accordingly, the Court determines that Defendant has failed to establish that these terms should be governed by § 112, ¶ 6 or that any claim is indefinite for including any of the terms.

V. CONCLUSION

The Court adopts the constructions set forth above, as summarized in the following table. The parties are **ORDERED** that they may not refer, directly or indirectly, to each other's claim-construction positions in the presence of the jury. Likewise, the parties are **ORDERED** to refrain from mentioning any portion of this opinion, other than the actual definitions adopted by the Court, in the presence of the jury. Any reference to claim-construction proceedings is limited to informing the jury of the definitions adopted by the Court.

The parties are hereby **ORDERED** to file a Joint Notice within fourteen (14) days of the issuance of this Memorandum Opinion and Order indicating whether the case should be referred

for mediation. If the Parties disagree about whether mediation is appropriate, the Parties should set forth a brief statement of their competing positions in the Joint Notice.

Section	Term	Construction
A-1	"data blocks containing data only" • '433 Patent Claims 1, 6,	data blocks containing data only (not control characters)
	"data block group containing data blocks only" • '433 Patent Claims 10, 14	data block group containing data blocks only (not control characters)
A-2	"control block buffer" • '433 Patent Claims 1, 6	buffer for control blocks only
	"data block buffer" • '433 Patent Claims 1, 6	buffer for data blocks only
A-3	**1.** A sending method for adapting a payload bandwidth for data transmission, comprising: … placing the control blocks into a control block buffer as a control block group, setting a first identifier to identify the control block group, setting a second identifier to identify a last control block in the control block group, and placing the data blocks, as a data block group, into a data block buffer; setting a third identifier by using four bits of each control block to identify a block type of each of the control blocks; and setting a fourth identifier by using a space smaller than or equal to three bits of each control block to identify positions of each of the control blocks in the N 66B coding blocks. • '433 Patent Claim 1	plain and ordinary meaning (not necessarily in the order recited in the claim)

Section	Term	Construction
A-4	"an acquisition unit configured to acquire N 66B coding blocks each of which contains 64B" • '433 Patent Claim 6	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"an acquisition unit configured to acquire a (64*N+1)B coding block" • '433 Patent Claim 14	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	a position recovery subunit configured to recover the control blocks to their positions in the N 66B coding blocks • '433 Patent Claim 14	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a conversion unit configured to encode the acquired N 66B coding blocks into a (64*N+1)B coding block" • '433 Patent Claim 6	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a decoding subunit configured to decode the N 66B coding blocks to obtain data blocks containing data only and different types of control blocks each of which contains at least one control characters" • '433 Patent Claim 6	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a conversion unit configured to decode the (64*N+1)B coding block to recover N 66B coding blocks each of which contains 64B" • '433 Patent Claim 14	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6

Section	Term	Construction
	"a decoding subunit configured to decode the (64*N+1)B coding block to obtain a first identifier for identifying a control block group, a second identifier for identifying a last control block in the control block group, a third identifier for identifying the positions of the control blocks in the N 66B coding blocks, and a fourth identifier for identifying a block type of each of the control blocks" • '433 Patent Claim 14	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a control block group discrimination subunit configured to place the control blocks into a control block buffer as a control block group, set a first identifier to identify the control block group, set a second identifier to identify a last control block in the control block group, and place the data blocks, as a data block group, into a data block buffer" • '433 Patent Claim 6	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a type discrimination subunit configured to set a third identifier by using four bits to identify a block type of each of the control blocks" • '433 Patent Claim 6	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a position discrimination subunit configured to set a fourth identifier" • '433 Patent Claim 6	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a control block group determination subunit configured to determine the control block group and a data block group containing data blocks only" • '433 Patent Claim 14	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6

Section	Term	Construction
	"a control block type determination subunit configured to determine a type of each of the control blocks in the N 66B coding blocks" • '433 Patent Claim 14	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
B-1	"the mapping the single low-rate traffic signal to the single low-rate traffic OPU is performed using a General Framing Procedure (GFP) or other adaptation protocols" • '151 Patent Claims 1, 7	plain and ordinary meaning
B-2	"transmitting the ODUk via the OTN" • '151 Patent Claim 1	plain and ordinary meaning
	"transmitting a low-rate traffic signal in an Optical Transport Network (OTN)" • '151 Patent Claims 7, 12	plain and ordinary meaning
B-3	"rate rank" • '151 Patent Claims 1, 6	plain and ordinary meaning
B-4	"adapted to" • '151 Patent Claims 7–13	plain and ordinary meaning
	"configured to" • '151 Patent Claim 12	plain and ordinary meaning
C-1	"in groups of M bytes" • '982 Patent Claims 1, 5, 9, 12	in a M-byte granularity
C-2	"Lower Order Optical Channel Data Unit (LO ODU) signal" • '982 Patent Claims 1, 5, 9, 12	plain and ordinary meaning
	"Higher Order Optical Channel Payload Unit (HO OPU)" • '982 Patent Claims 1, 5, 9, 12	plain and ordinary meaning

Section	Term	Construction
C-3	"[encapsulating / encapsulate] overhead information to an overhead area of the ODTU signal" • '982 Patent Claims 1, 5	plain and ordinary meaning
C-4	"time slot" • '982 Patent Claims 1	tributary slot
C-5	"tributary slot" • '982 Patent Claims 4–5, 8–9, 11-12, 14	plain and ordinary meaning
C-6	"Optical Channel Data Tributary Unit (ODTU) signal" • '982 Patent Claims 1, 5, 9, 12	plain and ordinary meaning
D-1	"client signal byte number Cn" • '236 Patent Claims 1, 7, 13–15	number of client signal bytes
D-2	"if the Cn transported in the OTN frame needs to be [increased / decreased]" • '236 Patent Claims 1–3, 7–9, 15	plain and ordinary meaning
	"the Cn transported in the OTN frame doesn't need to be increased or decreased" • '236 Patent Claims 1, 9	plain and ordinary meaning
D-3	"an acquiring unit" • '236 Patent Claims 7, 11, 12	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a client signal byte number Cn generating unit" • '236 Patent Claim 7	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a first processing unit" • '236 Patent Claim 7	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a second processing unit" • '236 Patent Claim 7	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6

Section	Term	Construction
	"a determining unit" • '236 Patent Claim 8, 9	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"an identifying unit" • '236 Patent Claim 8	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"an identifying unit" • '236 Patent Claim 9	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a filling unit" • '236 Patent Claim 8	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a filling unit" • '236 Patent Claim 9	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a parsing unit" • '236 Patent Claim 11	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a restoring unit" • '236 Patent Claim 10	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
E-1	"Optical Channel Data Tributary Unit (ODTU) [frame]" • '505 Patent Claims 1–4	plain and ordinary meaning
	"ODTU [frame]" • '505 Patent Claims 1–4	plain and ordinary meaning
E-2	"n-bit data units" • '505 Patent Claims 2, 3	plain and ordinary meaning
	"n indicating the number of the multiple OPUk TSs" • '505 Patent Claims 2, 3	plain and ordinary meaning
E-3	"Optical Channel Payload Unit-k Tributary Slot (OPUk TS)" • '505 Patent Claims 1–4	plain and ordinary meaning

Section	Term	Construction
E-4	"a first unit configured to …" • '505 Patent Claims 3, 4	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a second unit configured to …" • '505 Patent Claims 3, 4	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a third unit configured to …" • '505 Patent Claims 3, 4	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a fourth unit configured to …" • '505 Patent Claims 3, 4	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a fifth unit configured to…" • '505 Patent Claims 3, 4	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a sixth unit configured to …" • '505 Patent Claims 3, 4	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"wherein the first unit, second unit, third unit, fourth unit, fifth unit and sixth unit are structural entities collectively comprising one or more processors instructed by one or more software programs"[35] • '505 Patent Claims 3, 4	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
F-1	"judging … whether the identifier contained in the fault alarm message is different from a fault identifier record stored in the second node" • '253 Patent Claim 1	plain and ordinary meaning
	"judge … whether the identifier extracted from the fault alarm message is different from the fault information stored in the fault information storing module" • '253 Patent Claim 4	plain and ordinary meaning

[35] The parties list this term in the P.R. 4-5(d) Chart, but do not propose any specific constructions.

Section	Term	Construction
	"judge … whether the identifier contained in the fault alarm message is different from a fault identifier record stored in the second node" • '253 Patent Claim 6	plain and ordinary meaning
	"determining … whether the identifier contained in the fault alarm message is different from a fault identifier record stored in the first node" • '253 Patent Claim 9	plain and ordinary meaning
	"determine whether the identifier contained in the fault alarm message is different from a fault identifier record stored in the first node" • '253 Patent Claim 14	plain and ordinary meaning
F-2	"configured to" • '253 Patent Claims 4, 6, 14	plain and ordinary meaning
F-3	"null" • '253 Patent Claim 12	plain and ordinary meaning
F-4	"an alarm message processing module, configured to: receive a fault alarm message; forward the fault alarm message downstream; extract, from the received fault alarm message, an identifier indicating a second node that detects a link fault occurring in a link connected to a port of the second node; and send the identifier to a judging module" • '253 Patent Claim 4	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a fault information storing module, configured to store fault information which includes a collection of identifiers of received fault alarm messages" • '253 Patent Claim 4	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6

Section	Term	Construction
	"the judging module, configured to: judge, according to the identifier extracted from the received fault alarm message and the fault information stored in the fault information storing module, whether the identifier extracted from the fault alarm message is different from the fault information stored in the fault information storing module; and if the identifier extracted from the fault alarm message is different from the fault information stored in the fault information storing module, instruct a forwarding table flushing module to clear a forwarding table of the first node in which the ring protection apparatus locates" • '253 Patent Claim 4	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a first module, configured to determine whether the identifier contained in the fault alarm message is different from a fault identifier record stored in the first node" • '253 Patent Claim 14	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"a second module, configured to clear a forwarding table of the first node if the identifier contained in the fault alarm message is different from the fault identifier record stored in the first node" • '253 Patent Claim 14	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
G-1	"a link where a normally blocked port locates" • '485 Patent Claims 8, 10	port that is ordinarily blocked and not blocked just because there is a fault
G-2	"Automatic Protection Switching (APS) packet in Ethernet protection switching mechanism" • '485 Patent Claim 8	plain and ordinary meaning

Section	Term	Construction
H-1	"wherein the first time stamp comprises information reflecting a round trip delay of the network" • '111 Patent Claims 6, 16, 22, 30	wherein the first time stamp comprises information indicating a round trip delay of the network
	"wherein the information of the first time stamp reflects a round trip delay of a network" • '111 Patent Claim 12	information of the first time stamp indicates a round trip delay of a network
	"wherein the information reflects a round trip delay of a network" • '111 Patent Claims 1, 26	wherein the information indicates a round trip delay of a network
H-2	"digital wrapping circuit" • '111 Patent Claims 4, 5, 8, 9, 14, 15, 18, 19, 29, 33 • '288 Patent Claims 4, 5, 8, 9, 14, 15, 18, 19, 29, 33	ITU-T G.709 telecommunications circuit
H-3	"wherein the first time stamp was inserted into one of a frame alignment overhead portion, an optical channel transporting unit overhead portion, an optical channel data unit overhead portion, and an optical channel payload unit overhead portion of a first overhead of a first optical transport unit frame based on at least a characteristic of the first time stamp" • '288 Patent Claims 1, 12	plain and ordinary meaning

Section	Term	Construction
	"transmitting the first time stamp associated with the first location inserted into one of a frame alignment overhead portion, an optical channel transporting unit overhead portion, an optical channel data unit overhead portion, and an optical channel payload unit overhead portion of a first overhead of a first optical transport unit frame based on at least a characteristic of the first time stamp to a second location via a network" • '288 Patent Claim 6	plain and ordinary meaning
	"wherein the first time stamp is inserted into one of the frame alignment overhead portion, the optical channel transporting unit overhead portion, the optical channel data unit overhead portion, and the optical channel payload unit overhead portion of the first overhead of the first optical transport unit frame based on at least a characteristic of the first time stamp" • '288 Patent Claims 16, 26, 30	plain and ordinary meaning
	"wherein the first time stamp is inserted into the one of the frame alignment overhead portion, the optical channel transporting unit overhead portion, the optical channel data unit overhead portion, and the optical channel payload unit overhead portion of the first overhead of the first optical transport unit frame based on at least a characteristic of the first time stamp" • '288 Patent Claim 22	plain and ordinary meaning

Section	Term	Construction
H-4	"A non-transitory computer readable storage media comprising code to perform the acts of the method of claim [1/6/22]" • '111 Patent Claim 23–25 • '288 Patent Claims 23–25	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"receiving module" • '111 Patent Claims 12, 16 • '288 Patent Claims 12, 16	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"processing module" • '111 Patent Claim 12 • '288 Patent Claim 12	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"processing module" • '111 Patent Claims 16, 20 • '288 Patent Claims 16, 20	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"generating module" • '111 Patent Claim 12 • '288 Patent Claim 12	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"generating module" • '111 Patent Claim 16 • '288 Patent Claim 16	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6
	"transmission module" • '111 Patent Claims 12, 14–16, 18, 19 • '288 Patent Claims 12, 14–16, 18, 19	plain and ordinary meaning, not governed by 35 U.S.C. § 112, ¶ 6

So ORDERED and SIGNED this 15th day of January, 2021.

RODNEY GILSTRAP
UNITED STATES DISTRICT JUDGE