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

ADAPTIVE SPECTRUM & SIGNAL ALIGNMENT, INC.	§	
v.	§	CASE NO. 2:24-CV-29-JRG-RSP
AT&T ENTERPRISES, LLC, AT&T MOBILITY LLC, AT&T MOBILITY II LLC, and AT&T SERVICES INC.	§	

CLAIM CONSTRUCTION ORDER

On March 19, 2025, the Court held a hearing to determine the proper construction of disputed terms in United States Patents No. 7,428,669, 7,593,458, 7,991,122, and 9,954,631. Before the Court is the Opening Claim Construction Brief (Dkt. No. 116) filed by Plaintiff Adaptive Spectrum and Signal Alignment, Inc. ("ASSIA" or "Adaptive"). Also before the Court are the Responsive Claim Construction Brief (Dkt. No. 125) filed by Defendants AT&T Enterprises, LLC, AT&T Mobility LLC, AT&T Mobility II LLC, and AT&T Services Inc. ("AT&T"), Plaintiffs' reply (Dkt. No. 129), Defendants' Notice of Supplemental Evidence Related to Claim Construction (Dkt. No. 133), the parties' December 19, 2024 Joint Claim Construction and Prehearing Statement (Dkt. No. 105), and the parties' March 5, 2025 Joint Claim Construction Chart (Dkt. No. 130).

Having reviewed the arguments made by the parties at the hearing and in their claim construction briefing, having considered the intrinsic evidence, and having made subsidiary factual findings about the extrinsic evidence, the Court hereby issues this Claim Construction Order. *See*

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Phillips v. AWH Corp., 415 F.3d 1303, 1314 (Fed. Cir. 2005) (*en banc*); *Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 841 (2015).

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I. BACKGROUND

Plaintiff alleges infringement of United States Patents No. 7,428,669 ("the '669 Patent"), 7,593,458 ("the '458 Patent") (Dkt. No. 116, Ex. C), 7,991,122 ("the '122 Patent") (*id.*, Ex. A), and 9,954,631 ("the '631 Patent") (*id.*, Ex. B) (collectively, the "patents-in-suit").

The parties' briefing presents no claim construction disputes as to the '669 Patent.

The ’458 Patent, titled “FEXT Determination System,” issued on September 22, 2009, and bears an earliest priority date of May 18, 2004. Plaintiff submits that “[t]he ’458 patent provides a way of measuring the NEXT [near-end crosstalk] and FEXT [far-end crosstalk] caused by each line in a group of lines so that appropriate interference cancellation signals can be calculated.” Dkt. No. 116 at 7 (citation omitted). The Abstract of the ’458 Patent states:

> Operational data is utilized to determine the FEXT interference induced by one line into the other DSL line. FEXT interference can be calculated using the NEXT interference measured between the two lines at the upstream ends of the loops and the downstream channel transfer function of one of the loops. Because the NEXT and transfer function constitute a linear time-invariant system, as does the FEXT interference between the lines, the NEXT interference and line transfer function can be multiplied (if in linear format) or added (if in logarithmic format) to approximate the FEXT interference between the lines. The collection of data, calculations and other functions performed in these techniques may be performed by a system controller, such as a DSL optimizer. An Xlog(u,n) quantity is a decibel-magnitude representation of the insertion-loss equivalent of FEXT transfer functions and is defined as the ratio of (1) a line u’s source power into a matched load of 100 Ohms when no binder is present to (2) the power at the output of the subject line when line u is excited with the same source and the binder is present. Xlin(u,n) is the linear equivalent of Xlog(u,n). The Xlog(u,n) and Xlin(u,n) quantities may be represented in specific formats that assist in their use in DSL and other systems. When defined as a line’s insertion loss, Xlin (or equivalently Xlog) does not include the effect of any transmit filter.

The ’122 Patent, titled “DSL System Training,” issued on August 2, 2011, and bears an earliest priority date of June 2, 2005. Plaintiff submits that “[t]he ’122 patent describes a training system that allows an operator to turn on new lines in a network without requiring the operator to shut the network down and restart a lengthy initialization process.” Dkt. No. 116 at 6 (citation omitted). The Abstract of the ’122 Patent states:

> Existing and future standardized VDSL2 and other systems can be integrated into and used with a vectored DSLAM or other vectored or non-vectored DSL system, without a new user disrupting service to other users in the same or a nearby binder, in some cases by using transmit power, CARMASK and/or PSDMASK DSL capabilities to reduce both downstream and upstream training-signal levels so that training of a new DSL line is non-disruptive, despite a lack of knowledge of the pre-existing binder. For vectored systems, the crosstalk from that tone can be

> observed, learned and then added to the vectoring system so that any subsequent excitation on that tone would be eliminated by vector processing. A second tone then can be added in the same way, etc. In non-vectored DSLs that might be operating in a binder or line set, once these non-vectored lines are observed to be present, a vectored line set controller, such as a DSL optimizer, then can anticipate the potential interference from such non-vectored lines.

The '631 Patent, titled "Management System and Methods of Managing Time-Division Duplex (TDD) Transmission Over Copper," issued on April 24, 2018, and bears an earliest priority date of July 27, 2012. Plaintiff submits that "[t]o reduce [interference] effects, the '631 patent teaches that the timeslots for transmitting data upstream and downstream should be scheduled so that they are substantially not simultaneous." Dkt. No. 116 at 6–7 (citations omitted). The Abstract of the '631 Patent states:

> Time division duplex transmission over copper physical channels is managed. In one example, upstream time slots for upstream transmission in a first physical channel are scheduled. Downstream time slots for downstream transmission in a second physical channel are scheduled. Transmission in the upstream time slots is substantially not simultaneous with transmission in the downstream time slots.

Shortly before the start of the March 19, 2025 hearing, the Court provided the parties with preliminary constructions with the aim of focusing the parties' arguments and facilitating discussion. Those preliminary constructions are noted below within the discussion for each term.

II. LEGAL PRINCIPLES

"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*, 415 F.3d at 1312 (quoting *Innova/Pure Water Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). Claim construction is clearly an issue of law for the court to decide. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 970–71 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996). "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." *Teva*, 135 S. Ct. at 841 (citation omitted). "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." *Id.* (citing 517 U.S. 370).

To determine the meaning of the claims, courts start by considering the intrinsic evidence. *See Phillips*, 415 F.3d at 1313; *see also 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. *See Phillips*, 415 F.3d at 1314; *C.R. Bard*, 388 F.3d at 861. Courts give claim terms their 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 entire patent. *Phillips*, 415 F.3d at 1312–13; *accord Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1368 (Fed. Cir. 2003).

The claims themselves provide substantial guidance in determining the meaning of particular claim terms. *Phillips*, 415 F.3d at 1314. First, a term's context in the asserted claim can be very instructive. *Id.* Other asserted or unasserted claims can 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.* at 1315 (quoting *Markman*, 52 F.3d at 979). "[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.'" *Phillips*, 415 F.3d at 1315 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)); *accord Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002). This is true because a patentee may define his own terms, give a claim term a different meaning than the term would otherwise possess, or disclaim or disavow the claim scope. *Phillips*, 415 F.3d at 1316. In these situations, the inventor's lexicography governs. *Id.* The specification may also resolve the meaning of ambiguous claim terms "where the ordinary and accustomed meaning of the words used in the claims lack sufficient clarity to permit the scope of the claim to be ascertained from the words alone." *Teleflex*, 299 F.3d at 1325. 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)); *accord Phillips*, 415 F.3d at 1323.

The prosecution history is another tool to supply the proper context for claim construction because a patent applicant may also define a term in prosecuting the patent. *Home Diagnostics, Inc. v. Lifescan, Inc.*, 381 F.3d 1352, 1356 (Fed. Cir. 2004) ("As in the case of the specification, a patent applicant may define a term in prosecuting a patent."). "[T]he prosecution history (or file wrapper) limits the interpretation of claims so as to exclude any interpretation that may have been disclaimed or disavowed during prosecution in order to obtain claim allowance." *Standard Oil Co. v. Am. Cyanamid Co.*, 774 F.2d 448, 452 (Fed. Cir. 1985).

Although extrinsic evidence can 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 (citations and internal quotation marks omitted). 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 entirely unhelpful to a court. *Id.* Generally, extrinsic evidence is "less reliable than the patent and its prosecution history in determining how to read claim terms." *Id.*

The Supreme Court of the United States has "read [35 U.S.C.] § 112, ¶ 2 to require that a patent's claims, viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2129 (2014). "A determination of claim indefiniteness is a legal conclusion that is drawn from the court's performance of its duty as the construer of patent claims." *Datamize, LLC v. Plumtree Software, Inc.*, 417 F.3d 1342, 1347 (Fed. Cir. 2005) (citations and internal quotation marks omitted), *abrogated on other grounds by Nautilus,* 134 S. Ct. 2120. "Indefiniteness must be proven by clear and convincing evidence." *Sonix Tech. Co. v. Publ'ns Int'l, Ltd.*, 844 F.3d 1370, 1377 (Fed. Cir. 2017).

III. AGREED TERMS

The parties submitted an agreed-upon construction in their December 19, 2024 Joint Claim Construction and Prehearing Statement (Dkt. No. 105 at 1), which the Court sets forth in Appendix A to this Claim Construction Order.

IV. DISPUTED TERMS IN U.S. PATENT NO. 7,991,122

1. "DSL line set"

"DSL line set" ('122 Patent, Claims 14–18, 20)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
"set of one or more DSL lines"	Plain and ordinary meaning; no construction necessary.

Dkt. No. 105, Ex. A at 1; Dkt. No. 116 at 7; Dkt. No. 125 at 25; Dkt. No. 129 at 1; Dkt. No. 130 at 1.

Shortly before the start of the March 19, 2025 hearing, the Court provided the parties with the following preliminary construction: "set of one or more DSL lines."

(a) The Parties' Positions

Plaintiff argues that whereas a lay jury might interpret "set" as requiring two or more items, in this technical context the term "DSL line set" encompasses one or more DSL lines. Dkt. No. 116 at 7; *see id.* at 7–8.

Defendants respond that "ASSIA seeks to import language from the specification into the claims without asserting that lexicography applies (it doesn't)." Dkt. No. 125 at 25 (citation omitted). Defendants argue, for example, that because Claim 14 recites that an operation configuration is determined "for at least one DSL line in the new DSL line set," "Claim 14 thus differentiates a 'line' in the ordinary sense from a 'line set.'" *Id.* at 26.

Plaintiff replies that "ASSIA's proposal reflects the plain meaning of this term as expressed in the claims and specification," and "AT&T's proposal that the term be limited to requiring two or more lines would improperly narrow the claims in contradiction to the '122 Patent's intrinsic evidence." Dkt. No. 129 at 1.

At the March 19, 2025 hearing, the parties reiterated the arguments set forth in their briefing.

(b) Analysis

The parties dispute whether the term "DSL line set" encompasses a single DSL line or instead must include at least two DSL lines.

Claims 14 and 17 of the '122 Patent, for example, recite (emphasis added):

> 14. A controller comprising:
> a data collection unit configured to collect operational data from a new *DSL line set* and an already-operating *DSL line set*;
> an analysis unit coupled to the collection unit, wherein the analysis unit is configured to:
> analyze the collected operational data;
> determine an operational configuration for at least one DSL line in the new *DSL line set* that will allow the new *DSL line set* to join the already-operating *DSL line set* without disrupting the already-operating *DSL line set*;
> evaluate data received by the new *DSL line set*; and
> evaluate data received by the already-operating *DSL line set*; and
> a control signal generator coupled to the analysis unit, wherein the control signal generator is configured to send control signals to the new *DSL line set* and to the already-operating *DSL line set*, further wherein the control signals comprise signals controlling operation of at least one of the following:
> the new *DSL line set*; or
> the already-operating *DSL line set*; and wherein the controller is configured to evaluate whether crosstalk from the new *DSL line set* affects the already-operating *DSL line set*.
>
> * * *
>
> 17. The controller of claim 14 wherein *the already-operating DSL line set* comprises at least one of the following:
> is a vectored DSL line set;
> *a single DSL line*; or
> a plurality of DSL lines.

Claim 17, by reciting that the already-operating DSL line "set" can comprise "a single DSL line," demonstrates that the term "DSL line set" encompasses a single DSL line. *See Phillips*, 415 F.3d at 1314 ("Because claim terms are normally used consistently throughout the patent, the usage

of a term in one claim can often illuminate the meaning of the same term in other claims.") (citations omitted).

The specification reinforces this understanding by referring to "the transmit power of a DSL line set (which may be one or more DSL lines) . . . ." '122 Patent at 15:17–18.

This is also consistent with the ordinary technical meaning of "set" as encompassing one or more than one, as to which Plaintiff's expert's opinion is persuasive. Dkt. No. 124, Ex. G, Feb. 5, 2025 Brody Decl. ¶ 40.

Defendants urge that the recital of "at least one DSL line in the new DSL line set" in above-reproduced Claim 14 demonstrates that "DSL line" and "DSL line set" have different meanings, but the distinction in this claim language is between a single DSL "line" and a "set" of such lines, wherein the "set" is different from the "line" because the "set" can potentially include more than one "line."

The Court therefore hereby construes "DSL line set" to mean **"set of one or more DSL lines."**

2. Purported Means-Plus-Function Terms

"a data collection unit configured to collect operational data from a new DSL line set and an already-operating DSL line set" ('122 Patent, Claim 14) **"collecting operational data, via a data collection unit, from the new DSL line set and the already-operating DSL line set"** ('122 Patent, Claim 20)	
Plaintiff's Proposed Construction	**Defendants' Proposal**
No construction necessary. These terms are not governed by § 112(f). In the alternative, if § 112(f) does apply, the function . . . is: "collecting operational data from a new DSL line set and an already-operating DSL line set" The corresponding structure includes: a computer, processor, IC, computer module, etc. as described at 13:35–39	Indefinite

"an analysis unit coupled to the collection unit, wherein the analysis unit is configured to: analyze the collected operational data; determine an operational configuration for at least one DSL line in the new DSL line set that will allow the new DSL line set to join the already-operating DSL line set without disrupting the already operating DSL line set; evaluate data received by the new DSL line set; and evaluate data received by the already-operating DSL line set" ('122 Patent, Claim 14) **"performing the following operations, via an analysis unit coupled to the collection unit: analyzing the collected operational data; determining an operational configuration for at least one DSL line in the new DSL line set that will allow the new DSL line set to join the already-operating DSL line set without disrupting the already operating DSL line set; evaluating data received by the new DSL line set; and evaluating data received by the already-operating DSL line set"** ('122 Patent, Claim 20)	
Plaintiff's Proposed Construction	**Defendants' Proposal**
No construction necessary. These terms are not governed by § 112(f). In the alternative, if § 112(f) does apply, the function . . . is: "analyzing the collected operational data; determine an operational configuration for at least one DSL line in the new DSL line set that will allow the new DSL line set to join the already-operating DSL line set without disrupting the already-operating DSL line set; evaluate data received by the new DSL line set; and evaluate data received by the already-operating DSL line set" The corresponding structure includes: "a computer, processor, IC, computer module, etc. as described at 13:55–56"	Indefinite

"a control signal generator coupled to the analysis unit, wherein the control signal generator is configured to send control signals to the new DSL line set and to the already-operating DSL line set, further wherein the control signals comprise signals controlling operation of at least one of the following: the new DSL line set; or the already-operating DSL line set" ('122 Patent, Claim 14) **"sending control signals, via a control signal generator coupled to the analysis unit, to the new DSL line set and to the already-operating DSL line set, further wherein the control signals comprise signals controlling operation of at least one of the following: the new DSL line set; or the already-operating DSL line set"** ('122 Patent, Claim 20)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
No construction necessary. These terms are not governed by § 112(f). In the alternative, if § 112(f) does apply, the function . . . is: "sending control signals to the new DSL line set and to the already-operating DSL line set, further wherein the control signals comprise signals controlling operation of at least one of the following: the new DSL line set; or the already-operating DSL line set;" The corresponding structure includes: a computer, processor, IC, computer module, etc. as described at 13:65-14:18.	Subject to 35 U.S.C. § 112, ¶ 6. Function: "sending control signals to the new DSL line set and to the already-operating DSL line set, further wherein the control signals comprise signals controlling operation of at least one of the following: the new DSL line set; or the already-operating DSL line set" Structure: "[A] DSLAM, modem and/or system operating signal generating means 350 (which can be a computer, processor, IC, computer module, etc. of the type generally known) inside or outside the controller 310." (13:65-14:2).

Dkt. No. 105, Ex. A at 1–5; *see* Dkt. No. 116 at 7–9; *see also* Dkt. No. 125 at 13–15; Dkt. No. 130 at 1–5.

Shortly before the start of the March 19, 2025 hearing, the Court provided the parties with the following preliminary construction: "Plain meaning [Note: not means-plus-function]."

(a) The Parties' Positions

Plaintiff argues that "the use of terms such as 'processing unit,' 'computer,' 'code,' etc. are typically found to be sufficiently structural such that the presumption against means plus function claiming is not rebutted." Dkt. No. 116 at 10 (citations omitted). Plaintiff also argues that "the specification indicates that each component is implemented using known computer processors . . . ." *Id.* at 11 (citations omitted). Alternatively, Plaintiff argues that the specification provides corresponding structure for all of these disputed terms, not just as to the "control signal generator terms" (for which the parties agree there is corresponding structure).

Defendants respond that "[t]he specification repeatedly—and interchangeably—refers to these terms as both 'units' and 'means,' showing the use of 'units' here is nothing but the use of a quintessential nonce word. In light of the patents repeated use of the term 'means' to describe these elements, it is confirmed that these terms recite functional language and do not connote structure." Dkt. No. 125 at 15 (citation omitted); *see id.* at 16–17. Defendants also argue that "nothing in the claims indicates that the 'data collection unit,' 'analysis unit,' or 'control signal generator' are terms that convey a structural meaning to a person of ordinary skill in the art." *Id.* at 20 (citation omitted). Further, Defendants argue that the specification fails to disclose any special-purpose computer or algorithm as corresponding structure for the "data collection unit" terms or the "analysis unit" terms. *Id.* at 21–23. As for "control signal generator," Defendants argue that "[t]he specification identifies a 'DSLAM' or Digital Subscriber Line Access Multiplexer, and a 'modem,' each of which is a special-purpose computer able to carry out the recited function of the 'control signal generator.'" *Id.* at 24.

Plaintiff replies that "each of these claim terms serves as a stand-in for 'a computer, processor, IC, computer module, etc. of the type generally known.'" Dkt. No. 129 at 2 (citing '122

Patent at 13:35–39, 13:55–56 & 13:65–14:18). Plaintiff also argues, for example, that "AT&T cites no authority that a patentee invokes § 112(f) by using the word 'means' in the specification while explicitly avoiding the word 'means' in the claims." *Id.* at 4.

At the March 19, 2025 hearing, the parties reiterated the arguments set forth in their briefing. Defendants also clarified that they are not arguing that the use of the word "means" in the specification gives rise to any presumption under § 112(f). Rather, Defendants argued, use of the word "means" in the specification is evidence that can assist in rebutting the presumption against § 112(f).

(b) Analysis

Title 35 U.S.C. § 112(f) (formerly § 112, ¶ 6) provides: "An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." "In exchange for using this form of claiming, the patent specification must disclose with sufficient particularity the corresponding structure for performing the claimed function and clearly link that structure to the function." *Triton Tech of Tex., LLC v. Nintendo of Am., Inc.*, 753 F.3d 1375, 1378 (Fed. Cir. 2014).

"[T]he failure to use the word 'means' . . . creates a rebuttable presumption . . . that § 112, para. 6 does not apply." *Williamson v. Citrix Online LLC*, 792 F.3d 1339, 1348 (Fed. Cir. 2015) (citations and internal quotation marks omitted). "When a claim term lacks the word 'means,' the 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 (citations and internal quotation marks omitted).

Williamson, in an *en banc* portion of the decision, abrogated prior statements that the absence of the word "means" gives rise to a "strong" presumption against means-plus-function treatment. *Id.* (citation omitted). *Williamson* also abrogated prior statements that this presumption "is not readily overcome" and that this presumption cannot be overcome "without a showing that the limitation essentially is devoid of anything that can be construed as structure." *Id.* (citations omitted). Instead, *Williamson* found, "[h]enceforth, we will apply the presumption as we have done prior to *Lighting World . . . .*" *Id.* (citing *Lighting World, Inc. v. Birchwood Lighting, Inc.*, 382 F.3d 1354, 1358 (Fed. Cir. 2004)).

Here, the disputed terms span nearly the entireties of Claims 14 and 20 of the '122 Patent, which recite (emphasis added):

> 14. A controller comprising:
>
> a *data collection unit* configured to collect operational data from a new DSL line set and an already-operating DSL line set;
>
> an *analysis unit* coupled to the collection unit, wherein the analysis unit is configured to:
>
> analyze the collected operational data;
>
> determine an operational configuration for at least one DSL line in the new DSL line set that will allow the new DSL line set to join the already-operating DSL line set without disrupting the already-operating DSL line set;
>
> evaluate data received by the new DSL line set; and
>
> evaluate data received by the already-operating DSL line set; and
>
> a *control signal generator* coupled to the analysis unit, wherein the control signal generator is configured to send control signals to the new DSL line set and to the already-operating DSL line set, further wherein the control signals comprise signals controlling operation of at least one of the following:
>
> the new DSL line set; or
>
> the already-operating DSL line set; and wherein the controller is configured to evaluate whether crosstalk from the new DSL line set affects the already-operating DSL line set.

* * *

20. A computer program product comprising:

a machine readable medium; and

program instructions contained in the machine readable medium, the program instructions specifying a method of training a new DSL line set to join an already-operating DSL line set, the method comprising:

collecting operational data, via a *data collection unit*, from the new DSL line set and the already-operating DSL line set;

performing the following operations, via an *analysis unit* coupled to the collection unit:

analyzing the collected operational data[;]

determining an operational configuration for at least one DSL line in the new DSL line set that will allow the new DSL line set to join the already-operating DSL line set without disrupting the already-operating DSL line set;

evaluating data received by the new DSL line set; and

evaluating data received by the already-operating DSL line set; and

sending control signals, via a *control signal generator* coupled to the analysis unit, to the new DSL line set and to the already-operating DSL line set, further wherein the control signals comprise signals controlling operation of at least one of the following:

the new DSL line set; or

the already-operating DSL line set; and

wherein the controller is configured to evaluate whether crosstalk from the new DSL line set affects the already-operating DSL line set.

On one hand, Defendants urge that the words "unit" and "generator" are non-structural, citing cases such as *Egenera*, *Diebold*, and *Advanced Ground Information Systems*. *Egenera, Inc. v. Cisco Sys.*, 972 F.3d 1367, 1373 (Fed. Cir. 2020) (quoting *Williamson*, 792 F.3d at 1350) (finding that "'[g]eneric terms such as 'mechanism,' 'element,' 'device,' and other . . . verbal constructs may be used in a claim in a manner that is tantamount to using the word 'means' because they 'typically do not connote sufficiently definite structure' and therefore may invoke [§ 112(f)]"); *Diebold Nixdorf, Inc. v. Int'l Trade Comm'n*, 899 F.3d 1291, 1297 (Fed. Cir. 2018) (holding that the term "cheque standby unit" is subject to § 112(f)); *Advanced Ground Info. Sys. v. Life360, Inc.*, 830 F.3d 1341, 1347 (Fed. Cir. 2016) ("The term 'symbol generator' invokes the

application of § 112(f) because it fails to describe a sufficient structure and otherwise recites abstract elements 'for' causing actions, or elements 'that can' perform functions.") (internal citations omitted).

On the other hand, the body of each claim recites objectives and operations of the "data collection unit" and "analysis unit," which weighs against applying 35 U.S.C. § 112(f). *See Linear Tech. Corp. v. Impala Linear Corp.*, 379 F.3d 1311, 1319–21 (Fed. Cir. 2004); *cf. Samsung Elecs. Am., Inc. v. Prisua Eng'g Corp.*, 948 F.3d 1342, 1354 (Fed. Cir. 2020) ("As used in the claims of the [patent-in-suit], the term 'digital processing unit' clearly serves as a stand-in for a 'general purpose computer' or a 'central processing unit,' each of which would be understood as a reference to structure in this case, not simply any device that can perform a particular function.") (citations omitted).

This principle applies with even greater force as to "control signal generator," wherein on its face the term "signal generator" carries structural connotations, particularly in the recited context of sending control signals to control the operation of a DSL line set.

In addition to *Samsung*, *id.*, Plaintiff cites the Federal Circuit's non-precedential *VDPP* decision as well as the precedential *Dyfan* decision, both of which are further persuasive that the "unit" and "generator" terms here at issue connote structure in the context of DSL line sets and the recited limitations. *VDPP, LLC v. Vizio, Inc.*, No. 2021-2040, 2022 WL 885771, at *3–*4 (Fed. Cir. Mar. 25, 2022) (reversing means-plus-function treatment of "a processor adapted to") (discussing *Dyfan, LLC v. Target Corp.*, 28 F.4th 1360 (Fed. Cir. 2022) (finding that "code" and "application" limitations were not means-plus-function)).

Figure 3A of the '122 Patent reinforces this conclusion (illustrating "Collecting Means (e.g., computer, IC, etc.)" 320, "Analyzing Means (e.g., computer, IC, etc." 340, and "Operating mode instruction signal generating means (e.g., computer, IC, etc." 350).

Defendants emphasize that the specification uses the word "means" with reference to data collection, analysis, and control signals:

> The DSL control unit 300 includes a data collection unit 320 identified as a *collecting means* and an analysis unit 340 identified as *analyzing means*. As seen in FIG. 3A, the *collecting means 320* (which can be a computer, processor, IC, computer module, etc. of the type generally known) may be coupled to NMS 150, ME 144 at AN 140 and/or the MIB 148 maintained by ME 144, any or all of which may be part of an ADSL and/or VDSL system for example. Data also may be collected through the broadband network 170 (for example, via the TCP/IP protocol or other protocol or means outside the normal internal data communication within a given DSL system). One or more of these connections allows the DSL control unit to collect operational data from the system. Data may be collected once or over time. In some cases, the *collecting means 320* will collect on a periodic basis, though it also can collect data on-demand or any other non-periodic basis (for example, when a DSLAM or other component sends data to the state transition control unit), thus allowing the DSL control unit 300 to update its information, operation, etc., if desired. Data collected by *means 320* is provided to the *analyzing means 340* (which also can be a computer, processor, IC, computer module, etc. of the type generally known) for analysis and any decision regarding operation of a new DSL line, any vectored lines in the new line's binder and, possibly, any non-vectored, non-cooperative and/or "rogue" communication lines in the binder (or anywhere else that might affect performance of the vectored system). Moreover, analysis may include evaluating data for other purposes contemplated by other embodiments of the present invention, as will be appreciated by those skilled in the art.
>
> In the exemplary system of FIG. 3A, the *analyzing means 340* is coupled to a DSLAM, modem and/or system operating *signal generating means 350* (which can be a computer, processor, IC, computer module, etc. of the type generally known) inside or outside the controller 310. This *signal generator 350* is configured to generate and send instruction signals to modems and/or other components of the communication system (for example, ADSL and/or VDSL transceivers and/or other equipment, components, etc. in the system).

'122 Patent at 13:35–14:6 (emphasis added); *see id.* at 14:26–29 ("This collection of reference data may be stored, for example, as a library 348 in the controller 310 of FIG. 3A and used by the

analyzing means 340 and/or collecting means 320."); 14:34–36 ("The collecting means 320 and analyzing means 340 may be software modules, hardware modules or a combination of both . . . .").

The use of the word "means" in the specification, however, does not significantly affect the Court's analysis because the presumption of means-plus-function treatment arises based on usage of the word "means" in the claims, not the specification. If anything, the use of "means" in the specification demonstrates that the patent drafter deliberately chose *not* to use the word "means" in the claims, so as *not* to invoke means-plus-function claiming.

On balance, considering all of the cited authorities as well as the context provided by the claim language and the disclosures in the specification, these disputed terms connote structure and Defendants do not persuasively rebut the presumption against means-plus-function treatment for these non-means terms.

The Court therefore hereby expressly rejects Defendants' arguments that these terms are governed by 35 U.S.C. § 112, ¶ 6. Defendants present no alternative proposed constructions, and no further construction is necessary.

The Court accordingly hereby construes these disputed terms to have their **plain meaning**.

3. "machine readable medium"

"machine readable medium" ('122 Patent, Claim 20)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
No construction necessary. In the alternative: "tangible medium of a computer program product"	"transitory or non-transitory machine readable medium"

Dkt. No. 105, Ex. A at 5; Dkt. No. 116 at 13.

In their responsive claim construction brief, Defendants submit that "in an effort to streamline briefing and reduce the burden on this Court, AT&T agrees to the drop the 'machine readable medium' term identified by AT&T in claim 20 of the '122 patent." Dkt. No. 125 at 1. In their March 5, 2025 Joint Claim Construction Chart, the parties submitted as to this term: "No construction necessary." Dkt. No. 130 at 5.

The Court therefore does not further address this term in the '122 Patent.

V. DISPUTED TERMS IN U.S. PATENT NO. 9,954,631

4. "substantially not simultaneous"

"substantially not simultaneous" ('631 Patent, Claims 1, 34)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
No construction necessary	Indefinite

Dkt. No. 105, Ex. A at 5; Dkt. No. 116 at 15; Dkt. No. 125 at 5; Dkt. No. 129 at 4; Dkt. No. 130 at 5.

Shortly before the start of the March 19, 2025 hearing, the Court provided the parties with the following preliminary construction: "Plain meaning."

(a) The Parties' Positions

Plaintiff argues that "the specification provid[es] explicit teachings on what is and what is not simultaneous transmission." Dkt. No. 116 at 16. Plaintiff also argues that "the Federal Circuit has repeatedly explained that terms of degree do not render a patent invalid as indefinite." *Id.* at 17.

Defendants respond that "it is not clear what 'substantially' means in this context in that the '631 patent does not provide any standard for measuring the term of degree." Dkt. No. 125 at 5; *see id.* at 6 ("Given the specification's clear disclosure of eliminating overlap entirely, it is unclear what 'substantially not simultaneous' means in the claims."). Defendants further argue: "While the '631 patent does contemplate that there may be some overlap (only when NEXT cancellation is used, which is not recited in the claims), it also contemplates that steps can be taken to entirely eliminate overlap (as seemingly contemplated by the claims). The conflation between these two, combined with the fact that the claims and specification provide no standard for measuring the NEXT cancellation, renders the claims indefinite." *Id.* at 8.

Plaintiff replies that "the '631 Patent explains what simultaneous transmission and non-simultaneous transmission are, and it provides examples of systems with no simultaneous transmission and substantially no simultaneous transmission." Dkt. No. 129 at 4 (citation omitted). Plaintiff argues that "[t]he amount of overlap is tied to the amount of NEXT to be mitigated or removed," and "[a] POSITA would understand how to implement the claimed invention with this goal in mind." Dkt. No. 129 at 5 (citation omitted).

At the March 19, 2025 hearing, Defendants cited deposition testimony by Plaintiff's expert that any amount of overlap below 50% could be "substantially not simultaneous." *See* Dkt. No. 133. In response, Plaintiff agreed that a goal articulated by the specification is to avoid or minimize simultaneous transmissions and that any overlap therefore should be small.

(b) Analysis

Claim 1 of the '631 Patent, for example, recites (emphasis added):

> 1. A method in a data communications system for managing multiple time division physical channels that are subject to crosstalk, the method comprising:
>
> scheduling upstream time slots for upstream transmission in a first physical channel; and

> scheduling downstream time slots for downstream transmission in a second physical channel, wherein transmission in the upstream time slots is *substantially not simultaneous* with transmission in the downstream time slots.

The Court of Appeals for the Federal Circuit, both before and after *Nautilus*, has explained that words of approximation such as "substantially" usually do not give rise to indefiniteness. *See, e.g., Ironburg Inventions Ltd. v. Valve Corp.*, 64 F.4th 1274, 1284, 1287–91 (Fed. Cir. 2023) (affirming rejection of indefiniteness challenge as to "substantially the full distance between the top edge and the bottom edge"); *Exmark Mfg. Co. v. Briggs & Stratton Power Prods. Grp., LLC*, 879 F.3d 1332, 1345–47 (Fed. Cir. 2018) (affirming finding that "elongated and substantially straight" was not indefinite); *Tinnus Enters., LLC v. Telebrands Corp.*, 846 F.3d 1190, 1206 (Fed. Cir. 2017) ("substantially filled"); *Deere & Co. v. Bush Hog, LLC*, 703 F.3d 1349, 1359 (Fed. Cir. 2012) ("This court has repeatedly confirmed that relative terms such as 'substantially' do not render patent claims so unclear as to prevent a person of skill in the art from ascertaining the scope of the claim. . . . The criticized words ['approach each other,' 'close to,' 'substantially equal,' and 'closely approximate'] are ubiquitous in patent claims.") (citation and internal quotation marks omitted); *Verve LLC v. Crane Cams, Inc.*, 311 F.3d 1116, 1120 (Fed. Cir. 2002) ("Expressions such as 'substantially' are used in patent documents when warranted by the nature of the invention, in order to accommodate the minor variations that may be appropriate to secure the invention."); *Ecolab Inc. v. Envirochem, Inc.*, 264 F.3d 1358, 1367 (Fed. Cir. 2001) ("like the term 'about,' the term 'substantially' is a descriptive term commonly used in patent claims to 'avoid a strict numerical boundary to the specified parameter'") (quoting *Pall Corp. v. Micron Separations, Inc.*, 66 F.3d 1211, 1217 (Fed. Cir. 1995)). As to the present disputed term, the word "substantially" is being used in such a permissible manner, and to find otherwise might amount to finding that the

word "substantially" categorically gives rise to indefiniteness, which would be inconsistent with the above-cited authorities.

Defendants cite the Court's indefiniteness finding as to the term "substantially blur free" in *Clear Imaging Research, LLC v. Samsung Elecs. Co., Ltd., et al.*, No. 2:19-CV-00326, 2020 WL 6384731, at *20 (E.D. Tex. Oct. 30, 2020) (Payne, J.). The Court noted that "both 'blur free' and 'substantially blur free' are used in the patents and the distinction between these two terms is not clear." *See id.*, at *20–*21. The Court noted an apparent distinction in the patent "that 'substantially blur free' is not the same as 'clear and sharp' but rather that 'blur free' is 'clear and sharp.'" *Id.*, at *20. Critically, images where the blur was described in the specification as "substantially reduced" were still described as "blur free."

This distinction in *Clear Imaging Research* is significantly different that the issue in the present case. Neither side suggests any lack of clarity regarding the meaning of "simultaneous." The word "substantially" does not give rise to any lack of reasonable certainty but rather "accommodate[s] the minor variations that may be appropriate to secure the invention," *Verve*, 311 F.3d at 1120, and "avoid[s] a strict numerical boundary to the specified parameter," *Ecolab*, 264 F.3d at 1367 (quoting *Pall*, 66 F.3d at 1217).

Further, the specification provides additional context for understanding "substantially not simultaneous." The specification refers to Figure 4 of the '631 Patent as illustrating Near-End Crosstalk ("NEXT"):

> The downstream and upstream misalignment causes NEXT 41, 42 in the nearby line. As shown, the $Line_1$ $frame_1$ upstream slot 45-1 begins before the $Line_2$ $frame_2$ downstream slot 43-2 completes. During this overlap, NEXT 41 is much higher. After the $Line_2$ $frame_2$ downstream slot 43-2 ends and the upstream slot 45-2 begin [*sic*], NEXT 41 is greatly reduced. A similar overlap occurs in $frame_2$.

'631 Patent at 3:46–52. Figure 4 of the '631 Patent is reproduced here:

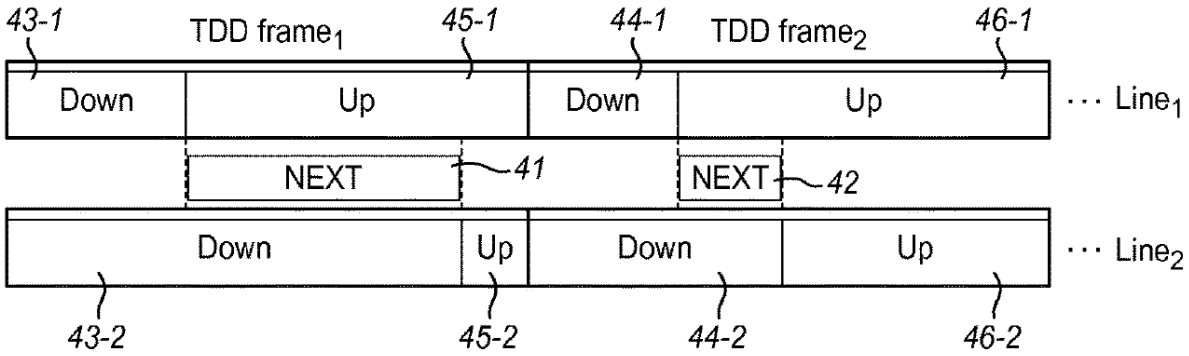

FIG. 4

The specification further discloses:

> NEXT cancellation eliminates most of the NEXT from downstream signals into upstream signals, allowing *some overlap* between downstream and upstream time slots. NEXT from upstream signals into downstream signals occurs primarily at the subscriber ends of the lines where the upstream signals are strongest. *The amplitude of this NEXT may be low enough to be ignored* due to the attenuation that occurs on drop and inside wires. Transmitting upstream and downstream simultaneously in the same frequencies is known as full-duplex operation, and generally also requires line hybrids and echo cancellers. Compatibility with VDSL2 may be enabled by using NEXT cancellation at the TU-O end of the lines and by not allowing upstream transmission in the VDSL2 downstream frequency bands unless the NEXT is low at the subscriber end of the lines. Different bit loadings may be used when transmitting upstream and downstream simultaneously, and when transmitting in only one direction.
>
> With NEXT cancellation, management of the TDD system proceeds as described elsewhere here, except that some overlap between downstream and upstream time slots may be allowed in some cases or in some time slots. The combination of time slot and frequency-band allocations can be dynamically adjusted for each environment.

’631 Patent at 4:42–65 (emphasis added).

> After the time slot durations are calculated, the start and end times of each time slot in the next TDD frame are calculated. This may be a simple assignment anchored at a fixed time such as the beginning or end of a TDD frame. Or it may involve a more involved solution, such as an iterative solution. FIG. 9 is a process flow diagram of an example of computing the start and end times of each time slot in a next or subsequent TDD frame.
>
> At 900, the next downstream (DS) time slot, the next upstream (US) time slot, and the next off time locations are assigned to arbitrary locations in the next TDD frame.

> At 910, it is checked whether the downstream time slot is *overlapping* with another upstream time slot, or vice versa, whether the upstream time slot is *overlapping* with another downstream time slot. If there is *no overlap*, then the allocations in step 900 are accepted, and no further action is needed.
>
> If there is an *overlap*, then at 920, the entire downstream time slot assignment or the entire upstream time slot assignment is moved forward or backward in time, by a predetermined amount or by a random amount. The choice of DS or US is based on whether the *overlapping* time slot is a DS slot or a US slot from 910.
>
> After this adjustment, the operations at 910 are repeated, and if there are no more overlaps, then no further action is required. However, if there still is an overlap, either with the downstream time slot or with the upstream time slot, then the operations at 920 are repeated. If after the adjustments the *non-overlapping* conditions cannot be met, then the DS or the US time slot durations are decreased (depending on which one had the *overlapping* issue), and the initial assignment at 900 is repeated.

Id. at 8:28–54 (emphasis added).

Even if the above-cited authorities regarding the common claim drafting usage of "substantially" were not considered, this above-reproduced guidance provided by the specification is sufficient under *Nautilus*. *See* 134 S. Ct. at 2128 n.5 (citing *Eibel Process Co. v. Minn. & Ontario Paper Co.*, 261 U.S. 45, 58, 65–66 (1923) (Taft, J.), as "upholding as definite a patent for an improvement to a paper-making machine, which provided that a wire be placed at a 'high' or 'substantial elevation,' where 'readers . . . skilled in the art of paper making and versed in the use of the . . . machine' would have 'no difficulty . . . in determining . . . the substantial [elevation] needed' for the machine to operate as specified") (ellipses and square bracketed text are the Court's in *Nautilus*); *id.* at 2129 ("The definiteness requirement . . . mandates clarity, while recognizing that absolute precision is unattainable.").

The opinions of Defendants' expert to the contrary are unpersuasive. Dkt. No. 125, Ex. A, Feb. 19, 2025 Gitlin Decl. at ¶¶ 85–92. Even accepting Defendants' argument that the cited disclosures are limited to Near-End Crosstalk ("NEXT"), which is not recited by the claims, the

disclosures of potential overlap are nonetheless informative as to the usage of "substantially." In light of the above-cited disclosure, a person of skill in the art would read the term "substantially not simultaneous" in a performance-based context, allowing for "minor variations" that do not substantially impede proper performance of the system. *See Verve*, 311 F.3d at 1120; *see, e.g.,* '631 Patent at 4:47–49 (disclosing that, in some circumstances, crosstalk "may be low enough to be ignored"). Finally, the deposition testimony of Plaintiff's expert, submitted by Defendants and discussed by the parties during the March 19, 2025 hearing, does not give rise to indefiniteness. *See* Dkt. No. 133.

The Court therefore hereby expressly rejects Defendants' indefiniteness argument. Defendants present no alternative proposed construction, and no further construction is necessary.

The Court accordingly hereby construes "substantially not simultaneous" to have its **plain meaning**.

5. "physical channel"

"physical channel" ('631 Patent, Claims 1, 9, 11, 14, 33, 34, 35, 37)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
No construction necessary.	"a channel that transmits in only the upstream or the downstream, not both"

Dkt. No. 105, Ex. A at 5; Dkt. No. 116 at 18; Dkt. No. 125 at 1; Dkt. No. 129 at 6; Dkt. No. 130 at 5.

Shortly before the start of the March 19, 2025 hearing, the Court provided the parties with the following preliminary construction: "a channel that can be used for communications in either an upstream direction or a downstream direction, but not both."

(a) The Parties' Positions

Plaintiff argues that "[b]ecause this term uses ordinary words that are readily understandable in light of the specification, no construction is necessary." Dkt. No. 116 at 18. Plaintiff argues that Defendants' proposal should be rejected because "[n]either the plain language of this term, the claims, nor the specification indicate that it refers to a channel that can only transmit in the upstream or downstream, not both." *Id.*

Defendants respond that, to overcome a prior art rejection, "ASSIA chose to definitively characterize the term 'physical channel' during prosecution to exclude bidirectional transmission on a single line, meaning that each physical channel include only unidirectional transmission." Dkt. No. 125 at 1 (citation omitted). "Without ASSIA's express disclaimer," Defendants argue, "there is no doubt that the claims were unpatentable . . . ." *Id.* at 3 (citation omitted). Defendants also submit that, in response to a subsequent rejection during prosecution, "Applicant once again confirmed its disclaimer of bidirectional transmissions on a single physical channel." *Id.* at 4 (citations omitted).

Plaintiff replies:

> At most, AT&T identifies a statement from the applicant that the asserted Cioffi reference has no need for separate upstream and downstream channels. According to AT&T, this implies that the '631 Patent's claims do require separate upstream and downstream channels. However, prosecution disclaimer cannot be based on this type of inference.

Dkt. No. 129 at 6. "Moreover," Plaintiff argues, "AT&T's proposal is plainly inconsistent with the intrinsic evidence, which describes a time division *duplex* system." *Id.* Plaintiff further argues:

> Recognizing the weakness of its position, AT&T attempts to infer a disclaimer by arguing that the only way to distinguish the '631 Patent claims from Cioffi would be to interpret the claims as requiring separate physical channels. However, this inference is legally improper, particularly here where Cioffi was not even cited as the primary reference by the examiner. It is also technically incorrect. Cioffi describes a system where the upstream and downstream time slots are pre-set to

> prevent any overlap between upstream and downstream transmission. In contrast, the '631 Patent provides for scheduling timeslots so that they can be adjusted as necessary.

Id. at 6–7 (citing '631 Patent at 8:64–9:50).

At the March 19, 2025 hearing, Plaintiff argued that there was no relevant disclaimer during prosecution but rather that the patentee merely argued that the art combinations proposed by the Examiner were inappropriate. Defendants responded that the patentee expressly disclaimed bidirectional channels and that the Examiner expressly relied on that disclaimer.

(b) Analysis

Claim 1 of the '631 Patent, for example, recites (emphasis added):

> 1. A method in a data communications system for managing multiple time division *physical channels* that are subject to crosstalk, the method comprising:
>
> scheduling upstream time slots for upstream transmission in a first *physical channel*; and
>
> scheduling downstream time slots for downstream transmission in a second *physical channel*, wherein transmission in the upstream time slots is substantially not simultaneous with transmission in the downstream time slots.

Plaintiff notes that the Background section of the '631 Patent states:

> TDD (Time Division Duplex) systems transmit downstream (network to subscriber) data and upstream (subscriber to network) data in distinct time slots of the same physical channel.

'631 Patent at 1:24–27; *see id.* at 4:14–27 & Fig. 6.

Neither side contends that the ordinary meaning of "physical channel" in this context is limited to only upstream or only downstream and not both. Rather, the parties dispute whether the patentee narrowed the meaning of this term during prosecution.

Prosecution disclaimer "preclud[es] patentees from recapturing through claim interpretation specific meanings disclaimed during prosecution." *Omega Eng'g v. Raytek Corp.*, 334 F.3d 1314, 1323 (Fed. Cir. 2003). "As a basic principle of claim interpretation, prosecution

disclaimer promotes the public notice function of the intrinsic evidence and protects the public's reliance on definitive statements made during prosecution." *Id.* at 1324. "[F]or prosecution disclaimer to attach, our precedent requires that the alleged disavowing actions or statements made during prosecution be both clear and unmistakable." *Id.* at 1325–26 (footnote omitted).

During prosecution, the Examiner rejected all pending claims as unpatentable over "Williams" (United States Patent Application Publication No. 2014/0003307) and "Cioffi" (United States Patent No. 5,887,032). Dkt. No. 116, Ex. E, Dec. 23, 2016 Office Action at 2 (ASSIA_AT&T-070697). The Examiner stated:

> Regarding claims 1, 34, and 37, Williams teaches a method in a data communications system for managing multiple time division physical channels, the method comprising scheduling upstream time slots for upstream transmission in a physical channel [Para. 17, 18, Claim 1, 2, 11]; and scheduling downstream time slots for downstream transmission in a physical channel, wherein transmission in the upstream time slots is substantially not simultaneous with transmission in the downstream time slots [Para. 17, 18, Claim 1, 2, and 11].
>
> However, Williams doesn't explicitly teach about a first and second physical channels that are subjected to crosstalk.
>
> Cioffi teaches first physical channel (line) for downstream and second physical channel for upstream that are subjected to crosstalk [fig. 6 and related description].

Dkt. No. 125, Ex. E, Dec. 23, 20216 Office Action at 2 (ASSIA_AT&T-070697).

The patentee responded:

> Despite the . . . deficiencies in the Office Action, Applicants also contend that *Williams teaches away from having a first physical channel for downstream and a second physical channel for upstream* that are subjected to crosstalk. For example, Williams states in paragraph [0008] that "SWl, SW2, SW3 to prevent or ameliorate interference ingresses, i.e., one or more of the switches SW0, SWl, SW2, SW3 may be controllably closed to prevent interference from a corresponding portion of the system 10, and oscillation in the case of amplifiers" which strongly suggests that the channel used in Williams is not subject to crosstalk.
>
> Further, *there are no separate physical channels for downstream and upstream in Williams. Instead, both upstream and downstream transmission is on the same*

> *channel* which is time multiplexed by the switches SW0, SWI, SW2, SW3. This deficiency is not cured by Cioffi.
>
> *. . . Cioffi does not disclose having separate channels for upstream and downstream. Instead, the alleged lines [of] Cioffi appear to be bi-directional. Therefore, Cioffi does not have the need for having separate channels for upstream and downstream.* As such, Cioffi and Williams together or alone do not disclose a method in a data communications system for managing multiple time division physical channels that are subject to crosstalk, the method comprising . . . .

Id., Ex. E, Mar. 16, 2017 Amendment Under 37 C.F.R. § 1.111 at 10 (ASSIA_AT&T-070729). The patentee submitted that these arguments applied to all independent claims. *Id.* at 8 (ASSIA_AT&T-070727).

The patentee thus definitively distinguished Williams and Cioffi as having one or more bi-directional lines rather than having a unidirectional line for upstream and a separate unidirectional line for downstream. *Omega Eng'g*, 334 F.3d at 1324.

The Examiner expressly relied on the patentee's statements:

> Applicant's arguments, see Page 10, filed 3/16/2017, with respect to *Cioffi teaching not having upstream and downstream physical channel* have been fully considered and are persuasive. The previous rejection has been withdrawn.

Dkt. No. 125, Ex. E, May 30, 2017 Office Action at 2 (ASSIA_AT&T-070750) (emphasis in original). The Examiner withdrew the Williams/Cioffi rejection and issued a new rejection based on Williams and the "Liu" reference (United States Patent No. 6,754,261). The Examiner stated:

> Williams teaches that the present invention could be configured for use with any coaxial line, however, Williams doesn't explicitly teach having a first physical channel for upstream and second physical channel for downstream transmission.
>
> Liu teaches having first physical channel for downstream and second physical channel for upstream that are subjected to crosstalk [Col. 1 line 51–61, Col. 2 lines 45–50, fig. 1].

Id. at 3 (ASSIA_AT&T-070751).

The patentee responded by referring to a distinction between, on one hand, "upstream transmission and downstream transmission are on the same channel," and, on the other hand, "separate physical channels for downstream and upstream":

> First, Applicant respectfully points out that in Williams' disclosure, the upstream transmission and downstream transmission are on the same channel which is time multiplexed by the switches SW0, SW1, SW2, SW3. Therefore, any combination of a reference that teaches *separate* physical channels for downstream and upstream will change the principle of operation of Williams because the purpose of the switches will be meaningless. . . .
>
> Second, Liu's disclosure is focused on determining sampling time for a time-domain equalizer divides [*sic*] an over-sampled sequence into a plurality of individual Nyquist rate sequences (abstract, and summary of invention). While on the other hand, the current patent application is related to managing time division duplex transmission over copper physical channels. Although Liu only mentioned briefly and once in background section that "The upstream channel and the downstream channel may share the same physical communication link or occupy different physical communication links", Liu is not at the same field of endeavor as the claimed invention, nor reasonably pertinent to the problem faced by the inventor. . . .
>
> . . . [T]here is no place in Liu to explicitly disclose or suggest scheduling upstream transmission for first [physical channel] and downstream transmission for second physical channel to reduce signal distortion.

Id., Aug. 29, 2017 Response to Non-Final Office Action at 10–11 (ASSIA_AT&T-070791–92) (emphasis modified).

Thus, here again the patentee definitively distinguished art as not adequately teaching using separate physical channels for downstream and upstream. *See Omega Eng'g*, 334 F.3d at 1324. There was no equivocation or ambiguity in this regard. Rather, the patentee argued that the purported deficiency in the Examiner's rejection could not be remedied by citing Liu because Liu was purportedly too far afield. The patentee's above-reproduced definitive statements regarding Williams and Cioffi should be given effect in the Court's construction. *See id.*; *see also Southwall Techs., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1576 (Fed. Cir. 1995) ("Claims may not be

construed one way in order to obtain their allowance and in a different way against accused infringers.").

The Court therefore hereby construes "physical channel" to mean **"a channel that can be used for communications in either an upstream direction or a downstream direction, but not both."**

6. "machine-readable medium"

"machine-readable medium" ('631 Patent, Claim 34)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
No construction necessary. In the alternative: "tangible medium of a computer program product"	"transitory or non-transitory machine readable medium"

Dkt. No. 105, Ex. A at 5; Dkt. No. 116 at 20; Dkt. No. 125 at 8; Dkt. No. 129 at 7; Dkt. No. 130 at 6.

Shortly before the start of the March 19, 2025 hearing, the Court provided the parties with the following preliminary construction: "transitory or non-transitory machine-readable medium."

(a) The Parties' Positions

Plaintiff argues that "[t]he Federal Circuit has explained that common software claim phrases such as 'machine readable medium' do not encompass intangible embodiments that would render a claim invalid under § 101." Dkt. No. 116 at 13 (citations omitted); *see id.* at 20 (referring to arguments as to same term in '122 Patent). Plaintiff urges that "a POSITA would understand that a machine-readable medium is a physical computer storage device that can store software for performing the claimed invention," "[b]ut if a construction is adopted, it should exclude intangible

embodiments, such as the transitory signals suggested by AT&T." *Id.* at 15; *see id.* at 20 (referring to arguments as to same term in '122 Patent). Plaintiff argues that "the claim is not drafted to cover transitory media, and even if this claim term were interpreted so broadly, the Court should find that the claim excludes such invalidating embodiments based on prosecution disclaimer and judicial correction." *Id.* Plaintiff also submits: "Because of an Office printing error, the term 'non-transitory' was omitted from [this claim in] the issued patent. Nonetheless, the applicant's unequivocal statement that this claim does not cover transitory media (made through agreement to the Examiner's proposed amendment) is plainly a disclaimer of claim scope." *Id.* at 21. Plaintiff also cites authorities regarding the doctrine of judicial correction in the context of PTO printing office errors. *See id.* at 22.

Defendants respond that "[a]pplying the analysis in *Sequoia Technologies, LLC v. Dell, Inc.*, claim 34 of the '631 patent plainly captures both transitory and non-transitory signals." Dkt. No. 125 at 8 (citing 66 F.4th 1317 (Fed. Cir. 2023)). Defendants also argue that "the specification explicitly contemplates transitory signals to store and communicate code and data." Dkt. No. 125 at 9. Further, Defendants submit that, during prosecution, although the patentee agreed to add "non-transitory" to the claim, the patentee never actually did so. *Id.* Finally, Defendants argue that the doctrine of judicial correction is inapplicable because the purportedly appropriate correction is not apparent on the face of the patent. *Id.* at 10.

Plaintiff replies that "this term is properly construed to encompass tangible media absent a clear disclaimer that broadens the term to encompass transitory media," and "[n]o such broadening disclaimer exists." Dkt. No. 129 at 7 (citation omitted). Plaintiff also argues that "[f]ollowing th[e] Examiner's Amendment, there was nothing left for ASSIA to do," "[a]nd regardless, both the predicate agreement by ASSIA and the recorded Examiner's Amendment present clear

evidence of disclaimer in the intrinsic record." *Id.* at 8. Plaintiff urges that "[e]ither the claim is limited to non-transitory media, in which case ASSIA's proposal is correct, or it mistakenly omits the word non-transitory, which can be corrected." *Id.* (citation omitted).

At the March 19, 2025 hearing, Plaintiff argued that the prosecution history sets forth a disclaimer or, at the very least, is explicit intrinsic evidence as to what the patentee intended to claim. Plaintiff argued that an attempt by the Examiner to add the word "non-transitory" does *not* demonstrate that "machine-readable medium" encompasses transitory; Plaintiff emphasized that the claim already recites instructions, which Plaintiff argued implies the use of a non-transitory medium. Plaintiff suggested that, as a matter of furthering the prosecution of the patent, the patentee had no reason to oppose the Examiner Amendment because, in Plaintiff's view, the amendment had no effect on the scope of the claim. Defendants responded that the claim does not recite "storing" instructions but rather recites "having" instructions, which Defendants argued comports with encompassing transitory machine-readable media.

(b) Analysis

Claim 34 of the '631 Patent recites (emphasis added):

> 34. A *machine-readable medium* having instructions that when operated on by the machine cause the machine to perform operations comprising:
>
> scheduling upstream time slots for upstream transmission in a first physical channel of multiple time division physical channels in a data communication system in which the physical channels are subject to crosstalk; and
>
> scheduling downstream time slots for downstream transmission in a second physical channel subject to crosstalk from the upstream time slots, wherein transmission in the upstream time slots is substantially not simultaneous with transmission in the downstream time slots.

Unlike the *Sequioa Technologies* case discussed by the parties, the claim here at issue does not recite a "recording medium" and does not otherwise recite "storing" instructions. *See Sequoia Techs., LLC v. Dell, Inc.*, 66 F.4th 1317, 1323–26 (Fed. Cir. 2023).

The plain language of Claim 34 thus encompasses a transitory medium. Moreover, the specification discloses:

> As described herein, *instructions* may refer to *specific configurations of hardware* such as application specific integrated circuits (ASICs) configured to perform certain operations or having a predetermined functionality or *software instructions* stored in memory embodied in a *non-transitory computer readable medium*. Thus, the techniques shown in the figures can be implemented using code and data stored and executed on one or more electronic devices (e.g., a UE, an eNB, etc.). Such electronic devices store and communicate (internally and/or with other electronic devices over a network) code and data using machine-readable media, such as *non-transitory* machine-readable storage media (e.g., magnetic disks; optical disks; random access memory; read only memory; flash memory devices; phase-change memory) and *transitory* machine-readable communication media (e.g., electrical, optical, acoustical or other form of propagated signals—such as carrier waves, infrared signals, digital signals, etc.).

'631 Patent at 18:63–19:13 (emphasis added).

Plaintiff argues that this passage merely discloses what electronic devices may generate (Dkt. No. 116 at 21 n.3), but on its face this disclosure explains that a "machine-readable" medium may be "non-transitory" or may be "transitory." Plaintiff's reliance on *Sequoia* is therefore unavailing. *See* 66 F.4th at 1323–26. This also distinguishes the present case from, for example, the *CXT* case cited by Plaintiff, in which the Court found no indication that the patentee used the word "medium" to encompass transitory signals. *See CXT Sys., Inv. v. Acad., Ltd.*, No. 2:18-CV-00171, -232, -233, -235, 2020 WL 9936131, at *11 (E.D. Tex. Feb. 3, 2020).

Thus, the term "machine-readable medium," as recited in issued Claim 34 of the '631 Patent, encompasses transitory signals.

Plaintiff submits that the absence of the word "non-transitory" from issued Claim 34 was a PTO printing error. During prosecution, the Examiner stated as follows in an interview summary:

> Applicant representative agreed to add "non-transitory" in claim 34 in order to overcome 101 issue.

Dkt. No. 125, Ex. E, Jan. 24, 2018 Examiner-Initiated Interview Summary (ASSIA_AT&T-070832). The Examiner then allowed the claim and included the addition of "non-transitory" as an Examiner's Amendment:

EXAMINER'S AMENDMENT

> 2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.
>
> Authorization for this examiner's amendment was given in a telephone interview with Dai Xin on 1/24/2018.
>
> The application has been amended as follows:
>
> - Claim 40 is cancelled.
>
> - Claim 34, in line 1, add "non-transitory" before "machine-readable"

Id., Corrected Notice of Allowability at 2 (ASSIA_AT&T-070834) (formatting modified).

When the PTO issued the '631 Patent, the phrase "non-transitory" did *not*, however, appear in issued Claim 34.

Plaintiff argues that, even if the plain meaning of "machine-readable medium" is found to include transitory signals, the scope of "machine-readable medium" does *not* include transitory signals because the scope of this term was narrowed by prosecution disclaimer or, alternatively, the phrase "non-transitory" should be added by the Court by applying the doctrine of judicial correction.

Prosecution disclaimer "preclud[es] patentees from recapturing through claim interpretation specific meanings disclaimed during prosecution." *Omega Eng'g v. Raytek Corp.*, 334 F.3d 1314, 1323 (Fed. Cir. 2003). "As a basic principle of claim interpretation, prosecution disclaimer promotes the public notice function of the intrinsic evidence and protects the public's

reliance on definitive statements made during prosecution." *Id.* at 1324. "[F]or prosecution disclaimer to attach, our precedent requires that the alleged disavowing actions or statements made during prosecution be both clear and unmistakable." *Id.* at 1325–26 (footnote omitted).

Plaintiff's attempt to find a prosecution disclaimer here is contorted because the Examiner, not the patentee, purported to amend the claim. The above-reproduced Examiner-Initiated Interview Summary states that the patentee agreed to add "non-transitory," but Plaintiff presents no evidence that the patentee submitted any such amendment to the PTO, and although the Examiner's Amendment purported to do so, the issued Claim 34 does not include "non-transitory." Even assuming that the absence of "non-transitory" was an inadvertent PTO error, Plaintiff identifies no authority for finding prosecution disclaimer based on either: (a) the PTO's expression of an intent to do something that it ultimately did not do; or (b) a patentee's agreement to add language without any action by the patentee to add the language.

The Court therefore rejects Plaintiff's attempt to rely on a purported prosecution disclaimer. Plaintiff's alternative suggestion at the March 19, 2025 hearing—that the patentee having agreed to the Examiner Amendment is explicit intrinsic evidence of the patentee's intent when using the term "machine-readable medium"—is unpersuasive, particularly when considering the above-reproduced disclosure in the specification showing that the patentee understood the term "machine-readable medium" as encompassing transitory signals. '631 Patent at 18:63–19:13

Plaintiff's remaining argument is that the Court should now add "non-transitory" to the claim as a judicial correction. As a general matter, judicial correction of an error in a patent may be available "only if (1) the correction is not subject to reasonable debate based on consideration of the claim language and the specification and (2) the prosecution history does not suggest a different interpretation of the claims." *Novo Indus., L.P. v. Micro Molds Corp.*, 350 F.3d 1348,

1357 (Fed. Cir. 2003); *see LG Elecs., Inc. v. Quanta Computer Inc.*, 566 F. Supp. 2d 910, 913 (W.D. Wis. 2008) (noting the "nearly impossible standard for judicial correction of a patent" and citing *Novo*, 350 F.3d 1348, which "refus[ed] to correct 'a' to 'and' because other possibilities for correction existed").

Plaintiff cites *Hoffer v. Microsoft Corp.*, in which a PTO printing error resulted in a dependent claim referring to "claim 38." 405 F.3d 1326, 1331 (Fed. Cir. 2005). The district court had declined to correct the error, and the Federal Circuit reversed, noting that "[a]bsent evidence of culpability or intent to deceive by delaying formal correction, a patent should not be invalidated based on an obvious administrative error." *Id.*

Because the patent at issue in *Hoffer* had less than 38 claims, the presence of an error was apparent on the face of the patent. *See id.*

In the present case, by contrast, no error is apparent on the face of the claim language. *Hoffer* is therefore distinguishable. *See id.*

Plaintiff also cites *TracBeam, L.L.C. v. AT&T, Inc.*, in which this Court replaced one word with another word based on evidence of a PTO printing error. *See* No. 6:11-CV-96, 2013 WL 250532, at *18 (E.D. Tex. Jan. 23, 2013) (Davis, J.) ("Based on the prosecution history, the term Mn should have been printed as 'Mp.'") (footnote omitted). *TracBeam* is not binding authority and, to whatever extent *TracBeam* might be considered persuasive, the Federal Circuit's subsequent binding precedential decision in *H-W Technology* compels otherwise. *H-W Tech., L.C, v. Overstock.com, Inc.*, 758 F.3d 1329, 1334 (Fed. Cir. 2014)

In *H-W Technology*, the Federal Circuit found that when the PTO omits claim language upon issuance of a patent, a district court does not have authority to add the omitted language—even if "[t]he parties appear to agree that the PTO's error is clear on the face of the prosecution

history"—because the Federal Circuit "has already deemed evidence of error in the prosecution history alone insufficient to allow the district court to correct the error." 758 F.3d at 1334. Rather, the Federal Circuit found:

> [T]he error is not "evident from the face of the patent." Claim 9 reads coherently without the missing limitation. Nothing in the surrounding claim language indicates that the limitation was missing. Although other claims do contain the missing limitation, the inclusion of that limitation in one claim does not necessitate, or even fairly indicate, that the limitation should be included in all other claims.

Id. at 1333. Under *H-W Technology*, evidently the onus is on the patentee to review the issued claims for printing errors, not on the public to scour the prosecution history for evidence of any wayward claim language.

Because the claim reads coherently in its as-issued form, and because the omission of a word is not otherwise apparent on the face of the patent, Plaintiff does not satisfy the requirements of the doctrine of judicial correction for the proposed correction of adding the word "non-transitory." *See id.*; *see also Novo*, 350 F.3d at 1357.

The Court therefore hereby construes "machine-readable medium" to mean **"transitory or non-transitory machine-readable medium."**

7. "means for scheduling upstream/downstream time slots for upstream/downstream transmission in a first/second physical channel"

"means for scheduling upstream time slots for upstream transmission in a first physical channel" ('631 Patent, Claim 37)	
Pl.'s Proposed Construction	**Defendants' Proposed Construction**
Under 35 U.S.C. § 112(6), the function for this term is: "scheduling upstream time slots for upstream transmission in a first physical channel"	Subject to 35 U.S.C. § 112, ¶ 6. Function: "scheduling upstream time slots for upstream transmission in a first physical channel" (claim 37)

The corresponding structure for this term includes: a TDD management system, a scheduling module, and/or equivalents thereof as described in the Summary, Fig. 12, 3:22-26; 5:36-56; 5:61-62; 6:6-8; 8:10-13; 9:41-10:42; 11:11-15; 13:7-33; 13:42-47; 13:62-66; 14:24-34; 14:47-15:3; 16:13-19; and 16:45-18:23.	Structure: Structure includes a TDD management system, which "includes a memory 1295 coupled directly or through a bus to a processor or processors 1296. The memory may be a hard drive, nonvolatile memory, solid state memory, or a combination of different memory types for different purposes. The processor may also include its own internal memory. The memory may, for example, store instructions to be executed and the processor may execute the stored instructions. The processor may also implement or execute implementing logic 1260 having logic to implement the methodologies discussed herein. System 1200 includes one or more communications buses 1215 to connect the various illustrated components and to transfer transactions, instructions, requests, and data within the system among the components and other peripheral devices. The system further includes a management interface 1225 coupled to the bus and to external management devices, for example, to receive requests, return responses, and otherwise interface with network elements located separately from the system. This information may include Operations Support System (OSS) data and Management Information Database (MIB) parameters. These network elements may include access nodes, a central office, vectoring units, crossboxes, TU-Rs, and TU-Os. The system further includes a LAN (Local Area Network) interface 1230 coupled to the bus and externally to communicate information via a LAN based connection, including collecting network information, reporting information and diagnostics to other entities within the network, and for initiating instructions and commands over the network. The system further includes a WAN (Wide Area Network) interface 1235 coupled to the bus and to an external WAN, to communicate information via a WAN based connection for similar purposes and to reach other more remote devices." '631 patent at 14:47-15:13. OR Structure includes a scheduling or analysis module of a management device, which "is coupled to the bus [and] includes a collection module 1270, analysis module 1275, diagnostics module 1280, and implementation module 1285. Management Device 1201 may be installed and configured in a compatible system 1200 as is depicted by FIG. 12A, or provided separately so as to operate in conjunction with

	appropriate implementing logic 1260 or other software." Id. at 15:45-51. "The modules of the management device 1201 may be provided as separate components coupled to the bus 1215 as shown or may be incorporated into the processor or memory or another component. The management device may include its own processing and memory resources that interact with the processor and the external interfaces. The management device may include more or fewer modules than those shown. The TDD management system of FIG. 12 is provided only as an example and may be modified to suit different implementations. It may also be incorporated into another component such as an access node, or a TU-O. In one embodiment, the management system is provided as a card in a system rack with a backplane interface to communicate with local and remote network elements." *Id.* at 16:6-19.
"means for scheduling downstream time slots for downstream transmission in a second physical channel subject to crosstalk from the upstream time slots" ('631 Patent, Claim 37)	
Pl.'s Proposed Construction	**Defendants' Proposed Construction**
Under 35 U.S.C. § 112(6), the term under construction should be "means for scheduling downstream time slots for downstream transmission in a second physical channel subject to crosstalk from the upstream time slots." The function for this term is: "scheduling upstream [*sic*] time slots for upstream [*sic*] transmission in a first physical channel subject to crosstalk from the upstream time slots" The corresponding structure for this term includes: [same as for "means for scheduling upstream time slots for upstream transmission in a first physical channel," above]	Subject to 35 U.S.C. § 112, ¶ 6. Function: "scheduling downstream time slots for downstream transmission in a second physical channel subject to crosstalk from the upstream time slots" (claim 37) Structure: [same as for "means for scheduling upstream time slots for upstream transmission in a first physical channel," above]

Dkt. No. 105, Ex. A at 5–12; Dkt. No. 125 at 10–11; *see* Dkt. No. 116 at 22–24; Dkt. No. 130 at 6–15.

Shortly before the start of the March 19, 2025 hearing, the Court provided the parties with the following preliminary construction: "Function: 'scheduling upstream time slots for upstream transmission in a first physical channel' / 'scheduling downstream time slots for downstream transmission in a second physical channel subject to crosstalk from the upstream time slots'"; and "Corresponding Structure: 'a TDD management system, including scheduling module 1275; and equivalents thereof.'"

(a) The Parties' Positions

Plaintiff argues that Defendants' proposed corresponding structure errs by "includ[ing] individual components (*e.g.*, a LAN interface, a WAN interface, etc.) of the preferred TDD management system/module embodiments" and by including individual components that are "optional even in the preferred embodiment." Dkt. No. 116 at 24–25.

Defendants respond that "ASSIA asks this Court to exclude the explicit, necessary corresponding structure of that system as recited in the specification." Dkt. No. 125 at 12.

Plaintiff replies that "AT&T proposes structure for these terms without demonstrating that the structure actually performs the recited function." Dkt. No. 129 at 9.

At the March 19, 2025 hearing, Plaintiff proposed modifying the Court's preliminary construction so as to remove the word "including," and Plaintiff cited disclosure that the modules can be separate. *See* '631 Patent at 16:6–9. Plaintiff also argued that the LAN and WAN interfaces perform *related* functions but do not perform the claimed function here at issue and therefore are not part of the corresponding structure.

(b) Analysis

Legal principles regarding 35 U.S.C. § 112(f) are discussed above as to the '122 Patent. The parties agree that these disputed terms in the '631 Patent are means-plus-function terms, and the parties agree on the claimed function. The parties dispute the proper corresponding structure.

Plaintiff identifies "a TDD management system, a scheduling module, and/or equivalents thereof," and Plaintiff cites several disclosures in the specification as setting forth these structures, such as:

> At 1106, the TDD management system schedules upstream time slots for upstream transmission in one or more physical channels. A[t] 1108, the TDD management system schedules downstream time slots for downstream transmission in one or more physical channels.
>
> * * *
>
> The scheduling module 1275 analyzes the information retrieved by the collection module and generates upstream and downstream time slot schedules including, as appropriate, off times and active transmission times.

'631 Patent at 13:62–66 & 15:55–58. The "scheduling module 1275" is disclosed as being part of a TDD management system." *See id.* at 14:47–48 ("FIG. 12 is a block diagram of a TDD management system 1200 in one example.") & Fig. 12.

The disclosed "TDD Management System" also includes, for example, a "LAN (Local Area Network) interface" and a "WAN (Wide Area Network) interface." *Id.* at 15:4–13.

Defendants' argument appears to be that the phrases "TDD management system" and "scheduling module" do not connote sufficient structure for performing the claimed functions, and Defendants discuss *TecSec, Inc. v. IBM*, 731 F.3d 1336, 1347 (Fed. Cir. 2013), and *Lighting World, Inc. v. Birchwood Lighting, Inc.*, 382 F.3d 1354, 1359–60 (Fed. Cir. 2004). *See* Dkt. No. 125 at 12.

These legal precedents cited by Defendants, however, pertain to the first step of the means-plus-function analysis, namely whether a claim term connotes sufficient structure to avoid being

subject to means-plus-function treatment under 35 U.S.C. § 112(f). Here, the parties agree that the terms at issue are means-plus-function terms. The legal principles regarding the "distinct" first step of means-plus-function analysis are therefore inapplicable. *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1296 (Fed. Cir. 2014) ("while these two 'structure' inquiries are inherently related, they are distinct"), *overruled on other grounds by Williamson*, 792 F.3d 1339. Rather, the dispute here pertains to the second step of means-plus-function analysis, namely whether the specification discloses sufficient corresponding structure.

As for the proper corresponding structure, Plaintiff submits authority that: "The individual components, if any, of an overall structure that corresponds to the claimed function are not claim limitations. Rather, the claim limitation is the overall structure corresponding to the claimed function." *Odetics, Inc. v. Storage Tech. Corp.*, 185 F.3d 1259, 1268 (Fed. Cir. 1999); *see Asyst Techs., Inc. v. Empak, Inc.*, 268 F.3d 1364, 1370 (Fed. Cir. 2001) ("Structural features that do not actually perform the recited function do not constitute corresponding structure and thus do not serve as claim limitations.").

The corresponding structure, however, is not merely a TDD management system and a scheduling module as abstract ideas but rather *as disclosed* in the specification. *See* 35 U.S.C. § 112(f) (". . . such claim shall be construed to cover the corresponding structure, material, or acts *described in the specification* and equivalents thereof") (emphasis added). For this reason, the parties' extensive proposed citations to the specification are unnecessary and would tend to confuse rather than clarify the constructions. Also, any disputes about whether various disclosed components and features are required or are disclosed as optional has been mooted by Defendants' agreement that any features disclosed as optional are indeed optional. Dkt. No. 125 at 13.

Finally, Plaintiff persuasively argued at the March 19, 2025 hearing that the specification discloses that the scheduling module 1275 could be implemented separately, so the claim construction should set forth corresponding structures as alternatives. *See* '631 Patent at 16:6–9; *see, e.g. Ishida Co., Ltd. v. Taylor*, 221 F.3d 1310, 1316 (Fed. Cir. 2000) (patents may "disclose[] alternative structures for accomplishing the claimed function") (citations omitted); *Micro Chem., Inc. v. Great Plains Chem. Co.*, 194 F.3d 1250, 1258 (Fed. Cir. 1999) ("When multiple embodiments in the specification correspond to the claimed function, proper application of § 112, ¶ 6 generally reads the claim element to embrace each of those embodiments.") (citation omitted).

Any remaining dispute, such as regarding whether an accused instrumentality meets (or is equivalent to) the disclosed corresponding structure, is a factual question of infringement for the finder of fact rather than a legal question for claim construction. *See PPG Indus. v. Guardian Indus. Corp.*, 156 F.3d 1351, 1355 (Fed. Cir. 1998) ("after the court has defined the claim with whatever specificity and precision is warranted by the language of the claim and the evidence bearing on the proper construction, the task of determining whether the construed claim reads on the accused product is for the finder of fact"); *see also Acumed LLC v. Stryker Corp.*, 483 F.3d 800, 806 (Fed. Cir. 2007) ("[t]he resolution of some line-drawing problems . . . is properly left to the trier of fact") (citing *PPG*, 156 F.3d at 1355); *Eon Corp. IP Holdings LLC v. Silver Spring Networks, Inc.*, 815 F.3d 1314, 1318–19 (Fed. Cir. 2016) (citing *PPG*, 156 F.3d at 1355; citing *Acumed*, 483 F.3d at 806).

The Court therefore hereby construes these disputed terms as set forth in the following chart:

Term	Construction
"means for scheduling upstream time slots for upstream transmission in a first physical channel"	Function: **"scheduling upstream time slots for upstream transmission in a first physical channel"** Corresponding Structure: **"a TDD management system, or scheduling module 1275; and equivalents thereof"**
"means for scheduling downstream time slots for downstream transmission in a second physical channel subject to crosstalk from the upstream time slots"	Function: **"scheduling downstream time slots for downstream transmission in a second physical channel subject to crosstalk from the upstream time slots"** Corresponding Structure: **"a TDD management system, or scheduling module 1275; and equivalents thereof"**

VI. DISPUTED TERMS IN U.S. PATENT NO. 7,593,458

8. "A method of evaluating operational characteristics of a multi-line, vectored Digital Subscriber Line (DSL) system having a plurality of crosstalking lines in a common communication channel (channel)"

"A method of evaluating operational characteristics of a multi-line, vectored Digital Subscriber Line (DSL) system having a plurality of crosstalking lines in a common communication channel (channel)" ('458 Patent, Cl. 1)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
No construction necessary; this preamble is non-limiting.	Preamble is limiting

Dkt. No. 105, Ex. A at 1; Dkt. No. 116 at 25; Dkt. No. 125 at 26; Dkt. No. 129 at 9; Dkt. No. 130 at 1.

Shortly before the start of the March 19, 2025 hearing, the Court provided the parties with the following preliminary construction: "The preamble recital of 'a multi-line, vectored Digital Subscriber Line (DSL) system having a plurality of crosstalking lines in a common communication channel (channel)' is limiting. [Note: the remainder of the preamble is not limiting]."

(a) The Parties' Positions

Plaintiff argues that this preamble is "descriptive of the body of the claim" and "does not give any meaning or vitality to the claim even where it provides antecedent bases for the 'plurality of crosstalking lines' and the 'common communication channel.'" Dkt. No. 116 at 26. Alternatively, Plaintiff argues that "[t]o the extent the Court finds the 'plurality of crosstalking lines' and the 'common communication channel' recited in the preamble provides antecedent bases for the same terms in the body of the claims and is more than a mere description of the claimed invention, only those elements should be construed as limiting." *Id.* at 27.

Defendants respond that "[t]he plain claim language requires that the preamble of Claim 1 of the '458 Patent is limiting." Dkt. No. 125 at 26 (citation omitted). In particular, Defendants argue that "the preamble recites the particular type of system for which operational characteristics are evaluated (i.e., a multi-line, vectored DSL system) and provides the antecedent basis for 'a plurality of crosstalking lines' and 'a common communication channel (channel).'" *Id.* at 27.

Plaintiff replies that "a multi-line, vectored Digital Subscriber Line (DSL) system" appears only in the preamble and is a non-limiting statement of purpose. Dkt. No. 129 at 9.

At the March 19, 2025 hearing, the parties reiterated the arguments set forth in their briefing.

(b) Analysis

> In general, a preamble limits the invention if it recites essential structure or steps, or if it is 'necessary to give life, meaning, and vitality' to the claim. *Pitney Bowes*[,

> *Inc. v. Hewlett-Packard Co.*], 182 F.3d [1298,] 1305 [(Fed. Cir. 1999)]. Conversely, a preamble is not limiting 'where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention.' *Rowe v. Dror*, 112 F.3d 473, 478, 42 USPQ2d 1550, 1553 (Fed. Cir. 1997).

Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc., 289 F.3d 801, 808 (Fed. Cir. 2002);

"When limitations in the body of the claim rely upon and derive antecedent basis from the preamble, then the preamble may act as a necessary component of the claimed invention." *Eaton Corp. v. Rockwell Int'l Corp.*, 323 F.3d 1332, 1339 (Fed. Cir. 2003).

In some cases, a preamble may also be limiting if it states a "fundamental characteristic of the claimed invention," "serves to focus the reader on the invention that is being claimed," or "states the framework of the invention." *On Demand Mach. Corp. v. Ingram Indus., Inc.*, 442 F.3d 1331, 1343 (Fed. Cir. 2006). Also, a preamble may be limiting if it sets forth a feature "underscored as important by the specification." *Deere & Co. v. Bush Hog, LLC*, 703 F.3d 1349, 1358 (Fed. Cir. 2012) (quoting *Catalina*, 289 F.3d at 808).

Nonetheless, "the purpose or intended use of the invention . . . is of no significance to claim construction . . . ." *See Pitney Bowes*, 182 F.3d at 1305. This principle has sometimes been characterized as "the presumption against reading a statement of purpose in the preamble as a claim limitation." *Marrin v. Griffin*, 599 F.3d 1290, 1294–95 (Fed. Cir. 2010); *see Allen Eng'g Corp. v. Bartell Indus.*, 299 F.3d 1336, 1346 (Fed. Cir. 2002) ("Generally, the preamble does not limit the claims."); *see also Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 769–71 (Fed. Cir. 2018) (in preamble reciting "[a] computer network for providing an information delivery service for a plurality of participants," finding "information delivery service" to be non-limiting because it "merely describe[s] intended uses for what is otherwise a structurally complete invention").

Claim 1 of the ’458 Patent recites (emphasis added):

> 1. A method of evaluating operational characteristics of a multi-line, vectored Digital Subscriber Line (DSL) system having *a plurality of crosstalking lines* in *a common communication channel (channel)*, the method comprising:
>
> exciting *the plurality of crosstalking lines* in *the channel* with a known sequence of input symbols applied to *the crosstalking lines*;
>
> acquiring output data from a primary line among the plurality of lines in *the channel*, the output data comprising the known sequence of input symbols after having been affected by crosstalk coupling among *the plurality of crosstalking lines in the channel*;
>
> ordering *the crosstalking lines* based on a comparison between the known sequence of input symbols used to excite *the crosstalking lines* and the output data acquired from the primary line;
>
> generating a data quantity representative of the crosstalk coupling between the primary line and each of *the crosstalking lines* based on the ordering of *the crosstalking lines*; and
>
> sending instructions to one or more modems communicatively interfaced with *the plurality of crosstalking lines* in *the channel* based on the data quantity generated.

The preamble recital of “a plurality of crosstalking lines in a common communication channel” thus provides antecedent basis for the recitals of “the plurality of crosstalking lines,” “the crosstalking lines,” and “the channel” in the body of the claim.

Plaintiff submits that the Federal Circuit has found that a preamble may contain a limiting portion and a non-limiting portion. *TomTom, Inc. v. Adolph*, 790 F.3d 1315, 1324 (Fed. Cir. 2015).

Here, however, the portion of the preamble that provides antecedent basis (“a plurality of crosstalking lines in a common communication channel (channel)”) is intertwined with the “system” portion of the preamble, particularly in light of the usage of the word “having” to connect the “system” portion of the preamble with the portion that provides antecedent basis (“a multi-line, vectored Digital Subscriber Line (DSL) system *having* a plurality of crosstalking lines . . .”). Because the “lines” and “channel” are introduced as being part of “a multi-line, vectored Digital Subscriber Line (DSL) system,” the applicable precedent is therefore *Proveris Scientific Corp. v. Innovasystems, Inc.*, 739 F.3d 1367, 1373 (Fed. Cir. 2014) (“The phrase ‘the image data’ clearly

derives antecedent basis from the 'image data' that is defined in greater detail in the preamble as being 'representative of at least one sequential set of images of a spray plume.'"). The phrase "a multi-line, vectored Digital Subscriber Line (DSL) system" is therefore limiting.

As for whether "evaluating operational characteristics" is also a limitation, at least one Federal Circuit decision noted that it was "disinclined to sanction finding a preamble 'partially' limiting by splicing it," finding that the claim drafters "us[ed] both the preamble and the body of the claim to define the claimed invention." *Bio-Rad Laboratories, Inc. v. 10X Genomics Inc.*, 967 F.3d 1353, 1371 (Fed. Cir. 2020). The phrase "evaluating operational characteristics," however, is a statement of purpose and is not intertwined with the remaining portions of the preamble. *TomTom*, 790 F.3d at 1324. In the context of this claim, this statement of purpose is not limiting. *See Marrin*, 599 F.3d at 1294–95 ("[T]he mere fact that a structural term in the preamble is part of the claim does not mean that the preamble's statement of purpose or other description is also part of the claim.").

The Court therefore finds that **the preamble recital of "a multi-line, vectored Digital Subscriber Line (DSL) system having a plurality of crosstalking lines in a common communication channel (channel)" is limiting.**

9. "on a periodic basis"

"on a periodic basis" ('458 Patent, Claim 4)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
"at fixed intervals"	Plain and ordinary meaning; no construction necessary.

Dkt. No. 105, Ex. A at 1; Dkt. No. 116 at 27; Dkt. No. 125 at 29; Dkt. No. 129 at 10; Dkt. No. 130 at 1.

Shortly before the start of the March 19, 2025 hearing, the Court provided the parties with the following preliminary construction: "at fixed intervals of time."

(a) The Parties' Positions

Plaintiff argues that "the plain and ordinary meaning of the term 'periodic,' refers to something that occurs at fixed intervals," but lay members of the jury may mistakenly believe that this term has a colloquial meaning, *i.e.*, 'every once in a while,'" so Plaintiff argues that its proposal "clarifies that the plain (technical) meaning applies for this term." Dkt. No. 116 at 27.

Defendants respond that "nothing in the claim language itself limits the term to 'fixed intervals,'" and Defendants argue that the specification distinguishes "non-periodic" as being in response to an event or a request. Dkt. No. 125 at 29–30.

Plaintiff replies that "the plain and ordinary meaning of the term 'periodic,' refers to something that occurs at fixed intervals," which Plaintiff argues is supported by intrinsic and extrinsic evidence. Dkt. No. 129 at 10.

At the March 19, 2025 hearing, Defendants argued that "fixed" is too narrow because the interval should be permitted to vary. Plaintiff responded that the interval need not remain unchanged forever, but Plaintiff urged that "periodic" connotes regularity rather than merely being "from time to time."

(b) Analysis

Claim 4 of the '458 Patent recites (emphasis added):

> 4. The method of claim 1, wherein the output data from the primary line is collected over time *on a periodic basis*.

The specification discloses:

> Data may be collected once or *over time*. In some cases, the collecting means 520 will collect *on a periodic basis,* though it also can collect data *on-demand or any other non-periodic basis* (for example, whenever a DSLAM or other component

> sends data to the compliance control unit), thus allowing the crosstalk interference calculation unit 500 to update its information, etc., if desired. Data collected by means 520 is provided to the analyzing means 540 for analysis and any calculations to determine Xlog, Xlin or any other analysis required by embodiments of the present invention.

'458 Patent at 13:65–14:8 (emphasis added).

The specification thus discloses that an example of "non-periodic" is when a particular event occurs. This is consistent with Plaintiff's proposal that "periodic," by contrast, refers to a period of time rather than being triggered by an event.

This is also consistent with Plaintiff's extrinsic evidence of the technical meaning of "periodic" in the relevant art, which defines "periodic tasks" as "[t]asks that have to be processed at *regular* intervals." Dkt. No. 116, Ex. F, *The Authoritative Dictionary of IEEE Standards Terms* 809 (7th ed. 2000) (p. 4 of 5 of Ex. F) (emphasis added). Further, although "claims of unrelated patents must be construed separately," *e.Digital Corp. v. Futurewei Techs., Inc.*, 772 F.3d 723, 727 (Fed. Cir. 2014), Plaintiff's citation of *Apple Inc. v. Andrea Elecs. Corp.*, 949 F.3d 697, 709 (Fed. Cir. 2020), is of some persuasive value because, in construing "periodically" as "at regular intervals of time," the Federal Circuit relied in part on expert opinion regarding use of "periodically" in the field of audio signal processing.

The Court hereby construes "on a periodic basis" to mean **"at regular intervals of time."**

VII. CONCLUSION

The Court adopts the constructions set forth in this opinion for the disputed terms of the patent-in-suit. 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.

APPENDIX A

Term	Parties' Agreement
"coupled to" ('122 Pat., Cls. 14, 20)	"a connection between two elements and/or components either directly together, or indirectly, for example via one or more intervening elements or via a wireless connection, where appropriate"

Dkt. No. 105 at 1; Dkt. No. 130 at 1.