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

XR COMMUNICATIONS, LLC, dba VIVATO TECHNOLOGIES,	§	
	§	
Plaintiff,	§	
	§	
v.	§	
	§	
AT&T SERVICES INC., AT&T MOBILITY LLC, and AT&T CORP.,	§	CASE NO. 2:23-CV-00202-JRG-RSP
	§	
Defendants.	§	
	§	
NOKIA OF AMERICA CORPORATION and ERICSSON INC.,	§	
	§	
Intervenors.	§	

CLAIM CONSTRUCTION ORDER

In three consolidated patent cases,[1] XR Communications, LLC, (Vivato) alleges infringement by AT&T Corporation (and 2 affiliates), Verizon Communications, LLC, and T-Mobile USA, Inc., of four patents relating to wireless communication systems: U.S. Patents 7,177,369, 8,289,939, 8,737,511, and 10,715,235. Nokia of America Corporation and Ericsson Inc. have intervened. For simplicity, all defendants and intervenors will be referred to as "Defendants."

The parties dispute the scope of ten groups of terms from the patents. Having considered the parties' briefing and arguments during a September 11, 2024 hearing, the Court resolves the disputes as follows.

[1] The member cases are No. 2:23-CV-00203-JRG-RSP and No. 2:23-CV-00204-JRG-RSP.

I. BACKGROUND

A. U.S. Patent 7,177,369

The ’369 Patent relates to “wireless communication systems, apparatuses and related methods that support wireless communication in a multipath signal propagation environment.” ’369 Patent at 1:15–17. The patent explains that, as wireless subscribers move around, obstacles like buildings, hills, trees, and mountains can interfere with communication and lead to multipath propagation. *See id.* at 1:52–57; *id.* at 3:12–14 (noting “[m]ultipath propagation is primarily the result of reflections and diffraction from objects in the coverage area of the transmitting and receiving antennas.” This can lead to “fading,” which is interference caused by the multipath propagation. *See id.* at 3:15–17. Such interference is particularly problematic for high data rates because, “[a]s the symbol rate increases, . . . multipath fading from one symbol affects the next symbol, making it difficult, if not impossible, for the receiver to identify the desired (next) symbol and therefore determine its information content.” *Id.* at 3:17–21.

One can observe multipath fading by examining the frequency-domain characteristics of the communication. ’369 Patent at 3:22–24. Fading often alters the amplitude and phase modulation content of a received signal. Because of that alteration, symbols with high information content might be difficult to identify. *Id.* at 3:24–31.

The patent describes a number of techniques for dealing with fading, but each of them have drawbacks. For example, a system could implement “equalization”—adjusting the level of the various frequency components—at the receiving node to compensate for fading, but that imposes a significant burden on the receiver. ’369 Patent at 3:38–47. Using OFDM or spread spectrum helps, but both techniques have drawbacks of their own. *Id.* at 3:62–4:29. Alternatively, the problem can be addressed with antenna design, but that approach has its own limitations. *See generally*

id. at 4:49–6:11.

Ultimately, the patent concludes "none of the various techniques provide a simple and cost effective solution to multipath fading." '369 Patent at 6:46–47. From there, the patent presents what it calls the novel solution of "pre-equalization." *Id.* at 6:15–21. As that word suggests, rather than each receiver "equalizing" the received signal, the transmitter equalizes the signal *to be transmitted*. As recited in Claim 1:

> 1. [The] method compris[es]:
>
> identifying at least one multipath transmission delay within a reverse path data signal received from a receiving device;
>
> determining at least one forward path pre-equalization parameter based on said at least one transmission delay; and
>
> modifying a forward path data signal that is to be transmitted to the receiving device based on said at least one forward path pre-equalization parameter, where said modifying includes selectively setting different transmission power levels for at least two Orthogonal Frequency Division Multiplexing (OFDM) tones in said forward path data signal.

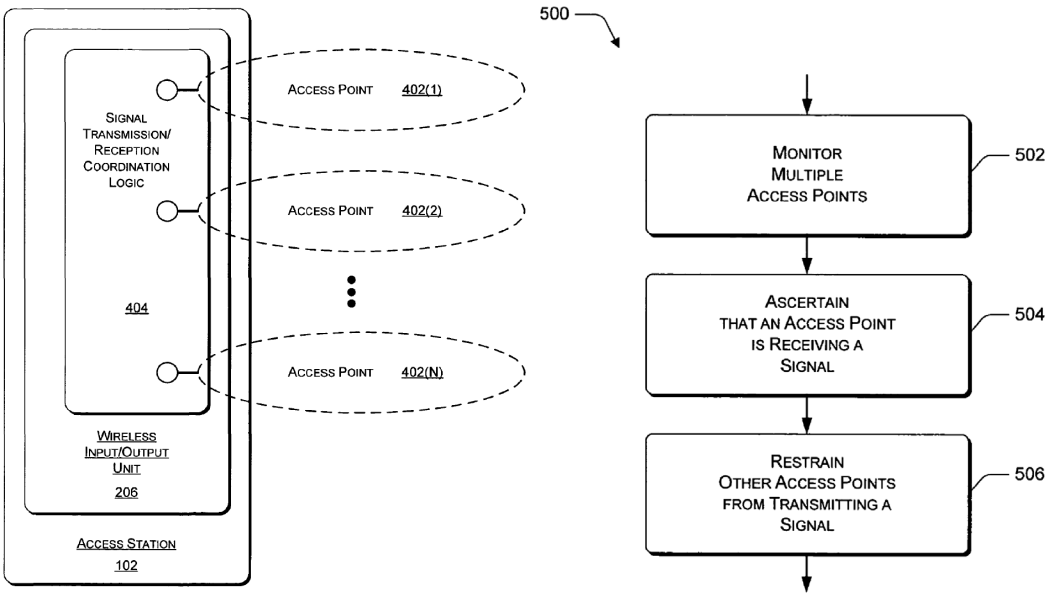
Id. at 16:57–17:3. In other words, the method determines a "forward path pre-equalization parameter" based on a multipath transmission delay, and then modifies a signal to be transmitted based on that parameter to compensate for how the delay affects the signal.

The parties have two disputes from this patent. First, they dispute the scope of "forward path pre-equalization parameter" in Claim 1 and certain dependent claims. Second, Defendants challenge the phrase "substantially reciprocal to" in Claim 12 as indefinite.

B. U.S. Patent 8,289,939

The '939 Patent relates "in general to the coordination of signals being communicated across one or more media." '939 Patent at 1:27–28. Specifically, the patent relates to problems

resulting from multiple transmitters with overlapping coverage areas that potentially cause interference among access points. To avoid that interference, called "thrashing," the patent teaches "coordinating the release of downlink packets with the reception of uplink packets." '939 Patent at 1:30–32.



FIGS. 4–5 of the '939 Patent

Figures 4–5 (above) and the related text show the general idea. At block 502, multiple access points are monitored. For example, access points (402) may be monitored by what the patent calls "signal transmission/reception coordination logic 404." '939 Patent at 6:22–24. At block 504, the method ascertains that an access point is receiving a signal. *Id.* at 6:25–30. Finally, at block 506, the method restrains the other access points from transmitting until the receiving access point 402 stops receiving the signal. *Id.* at 6:31–38.

The disputed terms are found in Claims 15, 20, 21, and 30. Claim 15 recites:

> 15. An apparatus comprising:
>
> a wireless input/output (I/O) unit that is configured to establish a plurality of access points; and

> signal transmission/reception coordination logic that is capable of ascertaining, by monitoring the plurality of access points for received signals, that:
>
> a first access point of the plurality of access points is receiving a first signal on a first channel,
>
> a second access point of the plurality of access points is receiving a second signal that is ongoing on a second channel, the signal transmission/reception coordination logic adapted to restrain at least a third access point of the plurality of access points from transmitting a third signal on a third channel responsive to the ascertaining that the first access point is receiving the first signal and that the second access point is receiving the second signal that is ongoing-on the second channel,
>
> wherein the restraining at least the third access point prevents degradation to the first and second signals.

'939 Patent at 19:38–54.

The parties have four disputes concerning the '939 Patent. For two terms—"wireless input/output (I/O) unit" and "signal transmission/reception coordination logic"—they dispute whether 35 U.S.C. § 112 ¶ 6 applies and, if so, the corresponding structure. In Claims 15 and 30, they dispute what makes "restraining" an access point "responsive" to ascertaining that a signal is being received. Last, Defendants challenge "the access point" in Claims 20–21 as indefinite.

C. U.S. Patent 8,737,511

The '511 Patent "relates to multiple-input multiple-output (MIMO) wireless communications and beamforming antennas." '511 Patent at 1:5–7. In particular, the patent teaches what it calls a "practical and cost-effective" solution for MIMO and beamforming for "range extension and throughput enhancement." *Id.* at 2:16–21.

The parties dispute the scope of terms and phrases found in Claims 1, 2, 10, 11, and 20. Claim 1 recites:

1. A system comprising:

m antenna arrays configured to receive a propagating radio frequency signal and configured to transmit a propagating radio frequency signal, each of the antenna arrays comprising:

a plurality of antenna elements; and

a beamformer configured to produce n different bi-directional beams using the plurality of antenna elements; and

n multiple-input multiple-output transceivers (MIMO), each MIMO transceiver comprising:

a MIMO receiver configured to process m different received signals, wherein an i-th received signal to a j-th MIMO receiver corresponds to a j-th beam of an i-th antenna array; and

a MIMO transmitter configured to process m different transmit signals, wherein a v-th transmit signal from a z-th MIMO transmitter corresponds to a z-th beam of a v-th antenna array,

wherein m, n, V, and Z are integer number values,

wherein i=1, . . . , m, j=1, . . . , n, and v=1, . . . m,

wherein $n \geq 2$ and $m \geq 2$,

wherein z=1, . . . , w, and

wherein $n \geq w \geq 2$.

'511 Patent at 10:23–46. Independent Claims 10 and 20 include similar language directed to apparatuses. *See id.* at 11:1–25, 12:9–22. Claim 2 and Claim 11 limit the system and apparatus of Claim 1 and 10, respectively, to certain standards. *See id.* at 10:47–46, 11:26–32.

Generally, the parties have two disputes from these claims. First, they dispute the scope of "transceiver." Second, they dispute whether Claims 2 and 11 are limited to the recited standards as they existed at the time the application was filed.

D. U.S. Patent 10,715,235

The ’235 Patent “relates to directed wireless communication,” ’235 Patent at 1:20–21, and is similar in many respects to the ’939 Patent. The patent teaches transmit and receive beamforming networks that help address “inefficiencies and data corruption” when two or more antennas are collocated and have overlapping coverage areas. *Id.* at 1:67–2:3, 2:10–15.

Both independent claims at issue recite “a transceiver operatively coupled to the antenna.” ’235 Patent at 32:37 (Claim 1), 34:38 (Claim 15). The parties dispute the scope of “transceiver.”

II. LEGAL STANDARDS

A. Generally

“[T]he claims of a patent define the invention to which the patentee is entitled the right to exclude.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc). As such, if the parties dispute the scope of the claims, the court must determine their meaning. *See, e.g.*, *Verizon Servs. Corp. v. Vonage Holdings Corp.*, 503 F.3d 1295, 1317 (Fed. Cir. 2007) (Gajarsa, J., concurring in part); *see also Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 390 (1996), *aff’g*, 52 F.3d 967, 976 (Fed. Cir. 1995) (en banc).

Claim construction, however, “is not an obligatory exercise in redundancy.” *U.S. Surgical Corp. v. Ethicon, Inc.*, 103 F.3d 1554, 1568 (Fed. Cir. 1997). Rather, “[c]laim construction is a matter of [resolving] disputed meanings and technical scope, to clarify and when necessary to explain what the patentee covered by the claims . . . .” *Id.* A court need not “repeat or restate every claim term in order to comply with the ruling that claim construction is for the court.” *Id.*

When construing claims, “[t]here is a heavy presumption that claim terms are to be given their ordinary and customary meaning.” *Aventis Pharm. Inc. v. Amino Chems. Ltd.*, 715 F.3d 1363, 1373 (Fed. Cir. 2013) (citing *Phillips*, 415 F.3d at 1312–13). Courts must therefore “look to the

words of the claims themselves . . . to define the scope of the patented invention." *Id.* (citations omitted). The "ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Phillips*, 415 F.3d at 1313. This "person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id.*

Intrinsic evidence is the primary resource for claim construction. *See Power-One, Inc. v. Artesyn Techs., Inc.*, 599 F.3d 1343, 1348 (Fed. Cir. 2010) (citing *Phillips*, 415 F.3d at 1312). For certain claim terms, "the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words." *Phillips*, 415 F.3d at 1314; *see also Medrad, Inc. v. MRI Devices Corp.*, 401 F.3d 1313, 1319 (Fed. Cir. 2005) ("We cannot look at the ordinary meaning of the term . . . in a vacuum. Rather, we must look at the ordinary meaning in the context of the written description and the prosecution history."). But for claim terms with less-apparent meanings, courts consider "those sources available to the public that show what a person of skill in the art would have understood disputed claim language to mean . . . [including] the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art." *Phillips*, 415 F.3d at 1314.

B. Means-Plus-Function Claiming[2]

A patent claim may be expressed using functional language. *See* 35 U.S.C. § 112 ¶ 6 (pre-AIA); *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1347–49 & n.3 (Fed. Cir. 2015) (en banc in relevant portion). Under 35 U.S.C. § 112 ¶ 6, a structure may be claimed as a "means . . . for performing a specified function," and an act may be claimed as a "step for performing a specified function." *Masco Corp. v. United States*, 303 F.3d 1316, 1326 (Fed. Cir. 2002). When it applies, § 112 ¶ 6 limits the scope of the functional term "to only the structure, materials, or acts described in the specification as corresponding to the claimed function and equivalents thereof." *Williamson*, 792 F.3d at 1347.

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

[2] The means-plus-function disputes concern the '939 Patent, which has an effective filing date before the effective date of the Leahy-Smith America Invents Act, Pub. L. No. 112-29, § 3, 125 Stat. 284, 285-93 (2011). The Court therefore refers to the pre-AIA version of the statute.

to "how the function is performed"); *Personalized Media Commc'ns, LLC v. I.T.C.*, 161 F.3d 696, 704 (Fed. Cir. 1998) (noting § 112 ¶ 6 does not apply when the claim includes "sufficient structure, material, or acts within the claim itself to perform entirely the recited function . . . even if the claim uses the term 'means.'" (quotation marks and citation omitted)).

Construing a means-plus-function limitation involves multiple steps.

> The first step in construing such a limitation is a determination of the function of the means-plus-function limitation. The next step is to determine the corresponding structure described in the specification and equivalents thereof. Structure disclosed in the specification is corresponding structure only if the specification or prosecution history clearly links or associates that structure to the function recited in the claim.

Medtronic, Inc. v. Advanced Cardiovascular Sys., Inc., 248 F.3d 1303, 1311 (Fed. Cir. 2001) (citations and quotations omitted). The corresponding structure "must include all structure that actually performs the recited function." *Default Proof Credit Card Sys. v. Home Depot U.S.A., Inc.*, 412 F.3d 1291, 1298 (Fed. Cir. 2005). But § 112 does not permit "incorporation of structure from the written description beyond that necessary to perform the claimed function." *Micro Chem., Inc. v. Great Plains Chem. Co.*, 194 F.3d 1250, 1258 (Fed. Cir. 1999).

"[S]tructure can be recited in various ways, including [by using] 'a claim term with a structural definition that is either provided in the specification or generally known in the art,' or a description of the claim limitation's operation and 'how the function is achieved in the context of the invention.'" *Dyfan, LLC v. Target Corp.*, 28 F.4th 1360, 1366 (Fed. Cir. 2022) (quoting *Apple, Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1299 (Fed. Cir. 2005)). For § 112, ¶ 6 limitations implemented by a programmed general-purpose computer or microprocessor, the corresponding structure described in the patent specification must usually include an algorithm for performing the function. *WMS Gaming Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1349 (Fed. Cir. 1999). In that case, the

corresponding structure is not a general-purpose computer but rather the special-purpose computer programmed to perform the disclosed algorithm. *Aristocrat Techs. Austl. Pty Ltd. v. Int'l Game Tech.*, 521 F.3d 1328, 1333 (Fed. Cir. 2008).

C. Indefiniteness

"[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014). The claims "must be precise enough to afford clear notice of what is claimed" while recognizing that "some modicum of uncertainty" is inherent due to the limitations of language. *Id.* at 908.

"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). And in the context of § 112 ¶ 6, "[t]he party alleging that the specification fails to disclose sufficient corresponding structure must make that showing by clear and convincing evidence." *TecSec, Inc. v. IBM*, 731 F.3d 1336, 1349 (Fed. Cir. 2013) (quoting *Budde v. Harley-Davidson, Inc.*, 250 F.3d 1369, 1380–81 (Fed. Cir. 2001)).

III. THE LEVEL OF ORDINARY SKILL IN THE ART

The level of ordinary skill in the art is the skill level of a hypothetical person who is presumed to have known the relevant art at the time of the invention. *In re GPAC*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). In resolving the appropriate level of ordinary skill, courts consider the types of and solutions to problems encountered in the art, the speed of innovation, the sophistication of the technology, and the education of workers active in the field. *Id.* Importantly, "[a] person of ordinary skill in the art is also a person of ordinary creativity, not an automaton." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007).

Here, neither party proposes a level of ordinary skill in its briefing, but their experts characterize skilled artisans similarly. Vivato's expert says a skilled artisan at the time of invention "would have a bachelor's degree in electrical engineering or the equivalent and 2–3 years of work experience with digital wireless communication." Vojcic Decl., Dkt. No. 81-14 ¶ 16. Defendants' expert says a skilled artisan is someone that "would have had at least a Bachelor's degree in an academic area emphasizing electrical engineering or a similar discipline, and at least two years of experience in the field working with, teaching, or researching wireless communication networks." Proctor Decl., Dkt. No. 86-2 ¶ 36. The Court sees these proposed skill levels as equivalent, and no party argues the Court must resolve any differences between these skill levels to properly construe the disputed terms.

IV. THE DISPUTED TERMS

A. "forward path pre-equalization parameter" / "determining at least one forward path pre-equalization parameter based on said at least one transmission delay" / "modifying a forward path data signal that is to be transmitted to the receiving device based on said at least one forward path pre-equalization parameter" ('369 Patent, Claims 1, 13, 21, 32, 33, 41)

Term	Vivato's Construction	Defendants' Construction
"forward path pre-equalization parameter" "determining at least one forward path pre-equalization parameter based on said at least one transmission delay"	Plain and ordinary meaning, i.e., a pre-equalization parameter for modifying a forward path signal to reduce unwanted effects associated with multipath fading between the transmitter and the receiver that is determined based on said at least one multipath transmission delay"	Plain and ordinary meaning

"modifying a forward path data signal that is to be transmitted to the receiving device based on said at least one forward path pre-equalization parameter"	Plain and ordinary meaning, wherein "pre-equalization" has its plain and ordinary meaning, i.e., "modifying a signal to reduce unwanted effects associated with multipath fading between the transmitter and the receiver"	Plain and ordinary meaning

Claim 1 recites "determining at least one *forward path pre-equalization parameter*" and "modifying a forward path data signal that is to be transmitted to the receiving device based on said at least one *forward path pre-equalization parameter*." '369 Patent at 16:61–66 (emphasis added). Various dependent claims then limit how to determine that "forward path pre-equalization parameter" and what does the "determining." For example, Claim 13 requires the "determining" to be "performed by a transmitting device," *id.* at 17:53–54, and Claim 21 requires the "determining" to include "determining at least one angle of arrival of [a] reverse path data signal with respect to at least one transmitting device receive antenna," *id.* at 18:25–27.

In essence, the parties dispute the scope of "forward path pre-equalization parameter." Vivato frames the dispute as whether the "pre-equalization parameter" must be based on "multipath transmission delay," and it opposes Defendants' IPR contention that simply modifying power levels for OFDM tones would satisfy the "pre-equalization parameter" requirement. Dkt. No. 81 at 2. Instead, says Vivato, the PTAB understood "pre-equalization parameter" as a parameter used "to account for properties of a propagation path between a transmitter and a receiving device, where the parameter is based on at least one multipath transmission delay identified from a reverse path data signal received from the receiving device and where a forward path data signal is modified based on the parameter." *Id.* at 2 (quoting Decision Denying Institution, Dkt. No. 81-13 at 15).

In response, Defendants call Vivato's construction "legally flawed." Dkt. No. 86 at 2.

Defendants mainly object to requiring steps to be performed for an intended purpose. *Id.* They also criticize Vivato's construction as wrongly treating a passage from the specification as definitional. *Id.* at 2–3.

In its reply, Vivato proposes an alternative construction: "a parameter used for pre-equalization, that is, to account for properties of a propagation path between a transmitter and a receiving device." Dkt. No. 88 at 1. It then criticizes Defendants' position as reading "pre-equalization" out of the phrase "pre-equalization parameter." *Id.*

The Court generally agrees with Vivato. Defendants' position gives no independent meaning to "pre-equalization," and instead suggests the claim itself defines what that term means. *See* Hr'g Tr., Dkt. No. 96 at 8:9–10 ("The claim says what the modifying has to do."). The structure of Claim 1, however, is not written in a way that defines "forward path pre-equalization parameter" using the subsequent claim language. Nor does the ordinary meaning of "pre-equalization" or "equalization" refer to adjusting power levels of OFDM tones for no reason or purpose.

Instead, "pre-equalization" refers to "emphasiz[ing] the magnitude of some frequency components with respect to the magnitude of others, to reduce adverse effects, such as noise, in subsequent parts of the system." Authoritative Dict. of IEEE Standard Terms, Dkt. No. 81-11 at 859. This definition largely aligns with the specification's explanation that pre-equalization "substantially reduces unwanted effects associated with multipath fading." '369 Patent at 7:18–20. Thus, a construction that, for example, reads on randomly changing power levels of frequency components would be improper.

Defendants note the PTAB rejected Vivato's attempt to limit "pre-equalization parameter" to something "associated with multipath fading between the transmitter and the receiver." Dkt. No. 86 at 3 (quoting Decision Denying Institution, Dkt. No. 81-13 at 16). But the PTAB was only

construing "pre-equalization." Here, the Court construes "forward path pre-equalization parameter," and thus must give some meaning to "forward path." That the previous step of the claim requires the "forward path pre-equalization parameter" to be based on a "transmission delay within a reverse path data signal" conveys to a skilled artisan that the determined parameter refers to the *specific* adverse effect of multipath fading. Accordingly, the Court construes "forward path pre-equalization parameter" as "a pre-equalization parameter for modifying a forward path signal to reduce unwanted effects associated with multipath fading between the transmitter and receiver."

B. "substantially reciprocal to" ('369 Patent, Claim 12)

Vivato's Construction	Defendants' Construction
No construction necessary	Indefinite term of degree

This dispute concerns Claims 1–3 and 12. Claim 1 recites

> 1. A method comprising:
>
> identifying at least one multipath transmission delay within a reverse path data signal received from a receiving device;
>
> determining at least one forward path pre-equalization parameter based on said at least one transmission delay; and
>
> modifying a forward path data signal that is to be transmitted to the receiving device based on said at least one forward path pre-equalization parameter, where said modifying includes selectively setting different transmission power levels for at least two Orthogonal Frequency Division Multiplexing (OFDM) tones in said forward path data signal.

'369 Patent at 16:57–17:3. Claims 2–3 add the steps of receiving the reverse path data signal and transmitting the modified forward path data signal over reverse and forward transmission paths, respectively:

> 2. The method as recited in claim 1, further comprising: receiving said reverse path data signal over at least one reverse

transmission path.

3. The method as recited in claim 2, further comprising: transmitting said modified forward path data signal over at least one forward transmission path.

Id. at 17:4–9. Finally, Claim 12 requires the reverse transmission path of Claim 2 to be "substantially reciprocal" to the forward transmission path of Claim 3. *Id.* at 17:47–49.

The parties dispute whether "substantially reciprocal" in Claim 12 is an indefinite term of degree. Defendants say "[t]he specification does not provide a definite measuring stick for assessing substantial reciprocity." Dkt. No. 86 at 4. But according to Vivato, the patent explains what "substantially reciprocal" means. Dkt. No. 81 at 7. In its view, "substantially reciprocal" is not a term of degree, but a modifier "added to clarify that the channel need not be reciprocal for *all* times but rather only for a 'given moment in time.'" *Id.* at 8. In fact, says Vivato, the specification *defines* "substantially reciprocal" as "reciprocal for 'a given moment in time . . . .'" Dkt. No. 88 at 2 (quoting '369 Patent at 2:13–16).

The Court agrees with Defendants. First, the language Vivato cites is not definitional. Rather, it simply requires the reverse path to be "substantially reciprocal" to the forward path at some moment in time. *See* '369 Patent at 2:13–16 (noting "it is preferred that the reverse transmission path be substantially reciprocal to the forward transmission path, for example, at a given moment in time between a base station device and a consumer premise equipment device"). Notably, it does not provide any objective bounds for when a path is "substantially" reciprocal.

Second, "substantially" is a term of degree. To avoid that conclusion, at least in its

briefing,[3] Vivato tries to shift the argument from one of geometry to one of time. For example, it points to an excerpt from the specification about *channel* reciprocity, but that's not what Claim 12 concerns. Rather, Claim 12 already accounts for when the paths must be "substantially reciprocal"—when the modified signal is transmitted as required by Claim 3.

Having concluded "substantially reciprocal" is a term of degree, the Court must find objective boundaries for how to determine when two paths are "substantially reciprocal." *See One-E-Way, Inc. v. I.T.C.*, 859 F.3d 1059, 1068 (Fed. Cir. 2017) (noting "the claims, read in context 'must provide objective boundaries for those of skill in the art,'" and "the written description is 'key' to the indefiniteness inquiry for a term of degree"). Vivato's briefing is silent on the issue, but at the hearing Vivato argued that "two signals can be reciprocal, but there may be moments when there is interference, when some things happen when they're not [reciprocal]. And so instead of just saying 'reciprocal', it says 'substantially reciprocal.'" Hr'g Tr., Dkt. No. 96 at 17:10–14. Even so, that doesn't explain how much or how little interference would make the paths "substantially reciprocal" "when some things happen."

At the hearing, Vivato also pointed to what it called a "more concrete example" in which the specification explains, "[i]f TDD is used, then the channel can be assumed to be reciprocal for durations (coherence time) of approximately 10 ms." Hr'g Tr., Dkt. No. 96 at 17:15–23 (citing '369 Patent at 10:67–11:2). But again, this doesn't provide objective boundaries for determining when two paths are *substantially* reciprocal and when they are not.

Vivato says Defendants haven't carried their burden of showing indefiniteness. Hr'g Tr.,

[3] At the hearing, Vivato seemed to concede this term is a term of degree. *See* Hr'g Tr., Dkt. No. 96 at 18:11–13 ("It may be a term of degree, Your Honor. I don't know if I would fight you too hard on that.").

Dkt. No. 96 at 18:3–8. But challenged with finding *something* in the intrinsic record for how to determine whether two transmission paths are *substantially* reciprocal, Vivato comes up short. Accordingly, the Court holds this term is an indefinite term of degree.

C. "wireless input/output (I/O) unit" ('939 Patent, Claims 15, 30)

Vivato's Construction	Defendants' Construction
No construction necessary; plain and ordinary meaning; not subject to means-plus-function treatment under 35 U.S.C. § 112 (6). Alternatively, should the term be treated as a means-plus-function limitation: not indefinite. **Function:** establish a plurality of access points **Structure:** wireless input/output unit 206 and equivalents thereof.	Means-plus-function under § 112, ¶ 6 and indefinite. **Function**: establish a plurality of access points **Structure**: none disclosed

Both claims at issue require "a wireless input/output (I/O) unit that is configured to establish a plurality of access points." '939 Patent at 20:29–30 (Claim 15); *see also id.* at 22:4–5 (Claim 30). The parties dispute whether the "wireless I/O unit" is a means-plus-function term and, if it is, whether the specification discloses sufficient corresponding structure to a skilled artisan.

Asserting this is not a means-plus-function term, Vivato first argues § 112 ¶ 6 does not apply because the word "means" is missing from the limitation. Dkt. No. 81 at 12. Vivato then points to the Central District of California's rejection of § 112 ¶ 6 and its holding that the term is analogous to the "wireless device means" in *Skky, Inc. v. Mindgeek, s.a.r.l*, 859 F.3d 1014 (Fed. Cir. 2017). *Id.* Finally, Vivato notes the disclosed "inputs, outputs, structural connections, and operations of the wireless I/O unit" are sufficiently definite structure. *Id.* at 13 (citing '939 Patent at 5:38–43, 5:57–58).

Defendants respond that the presumption this is not a means-plus-function term is overcome because the term does not connote sufficiently definite structure and a skilled artisan would not understand the scope of the term in light of the recited function. Dkt. No. 86 at 7. They point to their expert's testimony that the term is not a standard term of art, and say the California court in *D-Link Systems* only applied the first prong of *Williamson*. *Id.* at 8.

The Court agrees with Vivato that this is not a means-plus-function term. "The correct inquiry, when 'means' is absent from a limitation, is whether the limitation, read in light of the remaining claim language, specification, prosecution history, and relevant extrinsic evidence, has sufficiently definite structure to a person of ordinary skill in the art." *Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1298 (Fed. Cir. 2014). Here, a skilled artisan would understand this language simply refers to wireless transmitters and receivers and their associated antennas. For example, Figure 2 shows the unit as comprising an antenna array and part of an access station (102) connected to the ethernet backbone (204). Figure 3 shows wireless communication beams emanating from the antenna array of Figure 2. And Figure 4 shows the unit as comprising "signal transmission/reception coordination logic," and the specification explains the unit establishes "access points" "in accordance with an IEEE 802.11-based standard." '939 Patent at figs.2–4, 5:42–43.

Defendants' position on § 112 ¶ 6 treatment for this term largely turns on what it means to "establish a plurality of access points," as recited in the relevant limitations. They assert "the intrinsic record does not disclose any specific structure that corresponds to or even explains what the function 'establishing a plurality of access points' means." *See* Dkt. No. 86 at 8. Citing their expert's declaration, Defendants say a skilled artisan would not know what the claimed function means even after reviewing the specification. *Id.* (citing Proctor Decl., Dkt. No. 86-2 ¶¶ 87–90).

The Court disagrees. Reviewing the specification as a whole, a skilled artisan would

understand "establishing an access point" simply means providing the structure to enable wireless communication to and from the access station. Figure 2, for example, shows beams transmitted from an antenna array that correspond to the "access points" of Figure 4. *Compare* '939 Patent fig.2, *with id.* fig.4. Figure 5 and the claim language further show the "access points" are simply about wireless access to the access station by reciting that the access points "receive" and "transmit." '939 Patent at fig.5, 20:35–38. In light of this intrinsic evidence, Defendants' position that a skilled artisan would not understand the term as having "sufficiently definite structure" is not persuasive. Accordingly, the Court holds this is not a means-plus-function term, and will give it a "plain and ordinary meaning" construction.

D. "signal transmission/reception coordination logic" ('939 Patent, Claims 15, 30)

Vivato's Construction	Defendants' Construction
No construction necessary; plain and ordinary meaning; not subject to means-plus-function treatment under 35 U.S.C. § 112 (6). Alternatively, should the term be treated as a means-plus-function limitation: **Function:** Claim 15: ascertaining, by monitoring the plurality of access points for received signals, that: a first access point of the plurality of access points is receiving a first signal on a first channel, a second access point of the plurality of access points is receiving a second signal that is ongoing on a second channel, restrain[ing] at least a third access point of the plurality of access points from transmitting a third signal on a third channel responsive to the ascertaining that the first access point is receiving the first signal and that the second access point is receiving the second signal that is ongoing-on the second channel, wherein the restraining at least the third access point prevents degradation to the first and second signals. Claim 30: ascertaining, by monitoring the plurality of access points for received signals, that a first access point of the plurality of access points is receiving a first signal on a first channel, restrain[ing] at least a second access point of the plurality of access points from transmitting a second signal on a second channel different from the first channel responsive to the ascertaining that the first access point is receiving the first signal. **Structure**: Signal transmission/reception logic 404 and/or MAC coordinator logic 606 and/or 6:1–51 and/or 6:65–7:20 and/or 9:11-59 and/or 11:19–12:21 and/or 14:28–15:22 and/or 15:23–65 and 8:12–55 and equivalents thereof.	Means-plus-function under § 112, ¶ 6 and indefinite. **Function:** Claim 15: "ascertaining, by monitoring the plurality of access points for received signals, that:" (i) "a first access point of the plurality of access points is receiving a first signal on a first channel," (ii) "a second access point of the plurality of access points is receiving a second signal that is ongoing on a second channel," (iii) "restrain[ing] at least a third access point of the plurality of access points from transmitting a third signal on a third channel responsive to the ascertaining that the first access point is receiving the first signal and that the second access point is receiving the second signal that is ongoing-on the second channel, wherein the restraining at least the third access point prevents degradation to the first and second signals" Claim 30: (i) "ascertaining, by monitoring the plurality of access points for received signals, that a first access point of the plurality of access points is receiving a first signal on a first channel" and (ii) "restrain[ing] at least a second access point of the plurality of access points from transmitting a second signal on a second channel different from the first channel responsive to the ascertaining that the first access point is receiving the first signal." **Structure:** none disclosed

As with the previous dispute, the parties dispute whether this is a means-plus-function term.

If it is, they generally agree on the recited function, but dispute whether the specification discloses structure corresponding to that function.

Two other courts have construed this term. The Central District of California previously considered this a means-plus-function term but found sufficient corresponding structure to avoid a holding of indefiniteness. *See* Special Master's Report, Dkt. No. 81-7 at 44. The Western District of Texas, however, concluded this is not a means-plus-function term. Cl. Constr. Order, Dkt. No. 81-8 at 5.

1. Whether this is a means-plus-function term

Vivato offers two reasons why this is not a means-plus-function term. First, "the '939 patent teaches a POSITA to implement the [recited] logic . . . in the baseband processing layer of off-the-shelf processing chips in a wireless routing device." Dkt. No. 81 at 17 (citing '939 Patent at 18:38–44). Thus, says Vivato, a skilled artisan would understand "this term recites definite structure, because it is implemented in the physical structure of the baseband processing layer of the processor chip, which is an off-the-shelf component." *Id.* Second, the context of the surrounding claim language and corresponding embodiments show the logic is structure because it is contained within and coupled to other physical structures. *Id.* at 18. Vivato argues these facts are analogous to those of *Dyfan v. Target Corp.*, 28 F.4th 1360 (Fed. Cir. 2022), in which the appellate court reversed the district court's conclusion that "code" and "application" were means-plus-function terms. *Id.* at 18–19.

Defendants respond that "logic" is a well-known nonce word, and that the prefix "signal transmission/reception coordination" doesn't impart structure and merely describes the logic's function. Dkt. No. 86 at 15. They note the Northern District of California's construction of similar language—"search receiver logic"—as a means-plus-function term without corresponding

structure and the Federal Circuit's affirmance of that position. *Id.* at 16 (referring to *XR Commc'ns, LLC v. Ruckus Wireless, Inc.*, 2021 WL 3918136 (N.D. Cal. Sept. 1, 2021). Further, they distinguish *Dyfan* based on the extrinsic evidence in that case showing the recited functions could be performed by off-the-shelf software, and emphasize there is no such evidence here. *Id.* at 17. Moreover, the specification does not say the recited "logic" is available in off-the-shelf chips, but only that the logic may be *implemented using* off-the-shelf-chips. *Id.* at 17–18.

The Court agrees with Defendants. At most Vivato shows evidence the term connotes *some* structure, but that is not *Williamson*'s question. Rather, *Williamson* asks whether a skilled artisan would understand the term denotes s*ufficiently definite* structure, and Vivato presents no evidence it does. Instead, it confuses *Williamson*'s requirement with a requirement that the limitation simply refer to a physical object. *See, e.g.*, Dkt. No. 81 at 17 (arguing a skilled artisan would understand the term recites "definite structure, because it is implemented in the physical structure of the baseband processing layer of the processor chip"); *id.* at 18 (arguing a skilled artisan would understand the term is "a structure because it is contained within and coupled to other physical structures"); *id.* at 19 (arguing the disputed term is "even *more* structural" than the "application" term in *Dyfan* because it is embodied in a physical circuit structure in the baseband processing layer of an off-the-shelf chip). The test is not whether the limitation recites a physical object, but whether a skilled artisan would know what that physical object is.

Dyfan doesn't help Vivato. In *Dyfan*, the limitation at issue recited "code configured to be executed by at least one of the plurality of mobile devices, the code, when executed, configured to" perform about 10 different steps. *Dyfan*, 28 F.4th at 1363–64. The district court held "code" was a means-plus-function term because there was no "algorithm for the claimed special-purpose computer-implemented function." *Id.* at 1364. The appellate court, however, concluded the district

court ignored key evidence—the unrebutted deposition testimony of Target's expert—regarding how a skilled artisan would understand the term. *Id.* at 1367. That expert testified a skilled artisan "would have known that the claimed function of displaying information could be implemented using 'off-the-shelf' code or applications." *Id.* at 1368. The appellate court concluded that testimony showed "code" did not recite "purely functional language," and therefore § 112 ¶ 6 did not apply. *Id.* at 1369.

Here, unlike the facts of *Dyfan*, there is no such unrebutted expert testimony that one can purchase "signal transmission/reception coordination logic" off the shelf, or what would even be purchased. At best, the intrinsic record merely reflects the logic can be *implemented using* "off-the-shelf chips," but that says nothing about what the logic (i.e., the "structure") is. Accordingly, the Court holds Defendants have overcome the presumption that § 112 ¶ 6 does not apply, and that this is a means-plus-function term.

2. Whether there is corresponding structure

Defendants argue the patent doesn't disclose any corresponding structure for "signal transmission/reception coordination logic." They point to Figure 4, which they say "merely restates the claimed functionality, without any [indication] of how to implement it or what it involves." Dkt. No. 86 at 18–19 (citing '939 Patent at 6:19–52). Defendants acknowledge the specification discloses "restraining on the same channel in response to ascertaining reception on a first channel," but argue that disclosure does not pertain to the recited function, which requires restraining transmission on a *different* channel than the channel on which the reception is detected. *Id.* at 20.

Vivato counters that Figure 4 shows "direct linkage to the claimed functions." Dkt. No. 81 at 20 (quoting '939 Patent at 6:39–53). It says the "signal transmission/coordination logic 404" is not the "black box" Defendants suggest, because the specification teaches the logic "may be

implemented at the baseband layer in a system that utilizes off-the-shelf chips," and the logic is "operating at the baseband level." *Id.* at 21 (quoting '939 Patent at 18:25–31).

The Court agrees with Defendants that Vivato's proposed corresponding structure is wrong. Figure 4, on which both parties rely, doesn't help with the corresponding-structure inquiry. Rather, the description of Figure 4 simply restates the same function set forth in the claims. So does Figure 5, which is a 3-step flowchart that includes the same steps from Claims 15 and 30. In fact, that Vivato's proposed "corresponding structure" does nothing to identify the steps of the logic highlights the problem. Although the specification explains where the logic might be operating—the baseband level—Vivato fails to identify what the logic *is*.

The other figures to which Vivato points help answer that question. Figure 7 shows a method of using the "MAC coordinator logic" of Figure 6 to implement the steps of Figure 5. Thus, to "monitor the multiple access points," as shown in Step 502 of Figure 5 and as recited in the first step of the disputed term's function, Figure 7 shows the "MAC coordinator logic 606" monitoring "indicators acquired from multiple BB units," as shown in Step 702. As the specification explains with respect to Figures 6–7:

> [M]ultiple receive indicators that are accepted at MAC coordinator logic 606 from multiple BB units 608(1, 2 . . . N) are monitored. At block 704, *it is determined whether an affirmative signal reception indicator from a BB unit is detected.* For example, of the multiple receive indicators accepted at MAC coordinator logic 606, [the logic] determines whether at least one receive indicator is detected to indicate that the originating BB unit(s) 608 is(are) receiving a signal. As described above, if a MAC 604 and associated BB unit 608 transmit a signal on the same channel as that of a signal being received (e.g., by a different MAC 604/BB unit 608 pair) during that signal reception, the signal being received may be thrashed.
>
> *If no indicator is determined to affirmatively indicate that a signal is being received (at block 704), the monitoring (of block 702) is continued*. For example, as long as MAC coordinator logic 606 fails to detect a signal reception via the

> receive indicators, MAC coordinator logic 606 continues to monitor the receive indicators from BB units 608(1, 2 . . . N). *If, on the other hand, an affirmative signal reception indicator from a BB unit has been detected (at block 704), then at block 706 instruction(s) are provided to multiple MACs that are associated with the multiple BB units to restrain signal transmission therefrom.* For example, if MAC coordinator logic 606 detects (e.g., through a logical "OR" operation) that at least one receive indicator indicates that a signal reception is occurring, then MAC coordinator logic 606 provides a constructive receive indicator to MACs 604(1, 2 [. . .] N) that affirmatively indicates a signal reception is occurring in order to restrain them from initiating or otherwise causing a signal transmission.

'939 Patent at 10:30–60 (emphasis added). In other words, the recited "restraining other access points from transmitting a signal" is implemented, at least in this embodiment, by providing a receive indicator to the MACs rather than, for example, by controlling the "RF part" of the access station or by remotely controlling operation of the access point. *See* '939 Patent at fig.7 (item 706). The embodiment of Figure 12 operates similarly. *Id.* at 17:54–55 (explaining the MAC coordinator logic 606 of Figure 12 operates analogously to the MAC coordinator logic 606 of Figure 6); *id.* at 18:14–16 (noting the "MAC coordinator logic 606 of FIG. 12 is an example of a distributed signal transmission/reception coordination logic 404").

This sufficiently discloses an algorithm for performing the recited function. That algorithm is "(1) accepting multiple receive indicators from multiple BB units; (2) determining whether an affirmative signal reception indicator from a BB unit is detected in the indicators; (3) providing instructions to the MACs that are associated with any BB units for which an affirmative reception indicator is detected to restrain signal transmission." The corresponding structure is therefore a general purpose processor programmed to implement these algorithmic steps, and equivalents thereof.

E. "restrain . . . responsive to the ascertaining that the first access point is receiving the first signal and that the second access point is receiving the second signal that is ongoing-on the second channel" ('939 Patent, Claim 15); "restrain . . . responsive to the ascertaining that the first access point is receiving the first signal" ('939 Patent, Claim 30)

Vivato's Construction	Defendants' Construction
No construction necessary; plain and ordinary meaning.	Plain and ordinary meaning, which is: **Claim 15:** "while the first access point is ascertained to be receiving the first signal and the second access point is ascertained to be receiving the second signal that is ongoing-on the second channel" **Claim 30:** "while the first access point is ascertained to be receiving the first signal"

This dispute concerns the capabilities of the recited "signal transmission/reception coordination logic" in Claims 15 and 30. Claim 15 recites:

> signal transmission/reception coordination logic that is capable of ascertaining . . . that:
>
> a first access point . . . is receiving a first signal on a first channel,
>
> a second access point . . . is receiving a second signal that is ongoing on a second channel, the signal transmission/reception coordination logic adapted to restrain at least a third access point of the plurality of access points from transmitting a third signal on a third channel responsive to the ascertaining that the first access point is receiving the first signal and that the second access point is receiving the second signal that is ongoing-on the second channel . . . .

'939 Patent at 20:31–45. To summarize, this language requires "signal transmission/reception coordination logic" (1) capable of ascertaining two access points are receiving signals on respective channels, and (2) adapted to restrain a third access point from transmitting responsive to the "ascertaining." Claim 30 includes similar language, but contemplates only one ascertained signal. *See id.* at 22:6–14.

Defendants ask the Court to clarify what it means to "restrain" transmission "responsive to" ascertaining that an access point is receiving a signal. Dkt. No. 86 at 22. More specifically, the dispute concerns whether the claims read on instrumentalities in which the "restraining" happens when the first and second signals are no longer being received. Dkt. No. 81 at 24. Vivato characterizes Defendants' position as "exclud[ing] any embodiments where the restraining or ascertaining functions are based, in whole or in part, on historical information (e.g., restraining *later that hour* or *later that day* based on ascertaining that an access point is receiving a signal *that hour* or *that day*)." *Id.* at 25.

Vivato gives a number of reasons why Defendants' position is wrong. First, the claim language, by referring to "received signals," "contradicts any argument that the 'ascertaining' or 'restraining' must be done in real-time." Dkt. No. 81 at 25. Also, Defendants' construction improperly excludes an embodiment in which the network periodically scans and restrains transmissions. *Id.* at 26. Moreover, the specification "indicates that the claims cover an embodiment in which restraints are imposed by predicting what each access point is *expected* to receive in the future," which is inconsistent with Defendants' construction. *Id.* at 27. Vivato also notes the Central District of California's rejection of the same construction Defendants now propose. *Id.* at 24.

In response, Defendants cite four excerpts from the specification they say require the "ascertaining" and "restraining" to happen at the same time. Dkt. No. 86 at 23 (citing '939 Patent at 5:58–64, 6:35–38, 6:42–46, 11:39–42). They also note "the patent's objective of avoiding interference (or 'thrashing') between downlink and uplink signals." *Id.* at 23 (citing '939 Patent at 8:66–9:4). Defendants call Vivato's arguments nonsensical because the intrinsic record refers to "coordinating the release of downlink packets with the reception of uplink packets," and "stopping downlink transmission based on an already completed uplink signal does nothing for the collision

management." *Id.* at 24.

Defendants have the better position. Vivato effectively reads the third and fourth limitations of Claim 15 as reciting a capability of the logic ascertaining an access point "is receiving <u>or has previously received</u> a [first/second] signal on a [first/second] channel," which contradicts the present-tense "is receiving" language of the claims. Moreover, Claim 15 requires the "second signal" to be "ongoing on a second channel," and its final limitation requires the restraining to prevent degradation to the first and second signals, suggesting those signals are still being transmitted when the "restraining" happens. '939 Patent at 20:45–47.

Vivato's arguments to the contrary are not persuasive. For one, although the claims recite "receiv<u>ed</u> signals," context shows those words mean "signals *to be received*" rather than "signals that have *already been received*." Regarding Vivato's argument that Defendants' interpretation excludes certain embodiments, even if that assertion is accurate, there is no requirement that each independent claim cover every disclosed embodiment. *See Cisco Sys. v. XR Commc'ns, LLC*, 835 Fed. Appx. 590, 593 (Fed. Cir. 2020) (noting "[t]here is no requirement that 'each and every claim ought to be interpreted to cover each and every embodiment'" (quoting *PPC Broadband, Inc. v. Corning Optical Commc'ns RF, LLC*, 815 F.3d 747, 755 (Fed. Cir. 2016)).

Vivato's position only makes sense if a "signal" refers to multiple transmissions that happen over some period of time. For example, if the "signal" to be ascertained were a series of once-an-hour status updates, Vivato's interpretation of the claim language would, after "ascertaining" the first of those updates, adjusting later transmissions to prevent interference with the remaining updates.

But the specification doesn't support that interpretation. Instead, the patent shows a "signal" corresponds to the transmission of a packet. *See id.* at '939 Patent at 1:27–33 (explaining the

disclosure relates "to preventing the thrashing of signals (e.g., packets) by coordinating the release of downlink packets with the reception of uplink packets"). In fact, the Background identifies one of the problems to be solved as "packet collisions." *Id.* at 1:67–2:5 (noting also that "inefficiencies may multiply unchecked if two or more centralized points of emanation happen to be positioned so as to have overlapping coverage areas"); *see also id.* at [57] (describing an exemplary method as including the step of "detecting whether at least one respective indicator of the multiple respective indicators is affirmatively indicating that a signal is being received; and if so, providing at least one instruction to at least two [MACs], the at least one instruction retraining the [MACs] from causing a transmission").

Notably, this conclusion is consistent with how the Court construes the "signal transmission/reception coordination logic" recited in both claims. As the specification explains with respect to Figures 4 and 6:

> *[A]bsent additional control/logic*, a packet being received by (i) the given first access point 402(*x*) and/or (ii) the given first MAC 604(*x*)/BB unit 608(*x*) pair can be thrashed (e.g., altered, destroyed, interfered with, rendered unusable for its intended purpose, etc.) by a transmission from (i) the second access point 402(*y*) and/or (ii) the second MAC 604(*y*)/BB unit 608(*y*) pair.

'939 Patent at 8:59–65 (emphasis added); *see also id.* at 5:60–64 (noting the logic "coordinates uplink signal receptions and downlink signal transmissions across different access points 402 so as to avoid or at least reduce the frequency at which downlink signals are transmitted at a first access point 402(*y*) *while uplink signals are being received at a second access point* 402(*x*)" (emphasis added); *id.* at 6:31–38 (noting the logic "may restrain access points 402(2 . . . N) from transmitting signals *until access point 402(1) ceases receiving the signal*"); *id.* at 10:39–42 ("[I]f a MAC 604 and associated BB unit 608 transmit a signal on the same channel as that of a signal being received (e.g., by a different MAC 604/BB unit 608 pair) *during that signal reception*, the

signal being received may be thrashed." (emphasis added)).

Finally, regarding Vivato's reliance on the California court's order, that court addressed a different issue. Specifically, the court considered whether the claims require the "ascertaining" and "restraining" to be contemporaneous, and concluded there is no such requirement. *See* Special Master's Report, Dkt. No. 81-7 at 63 (noting "Defendants have not demonstrated that one action being 'responsive to' another action necessarily requires the actions to be contemporaneous"); *see also* Order Adopting Special Master's Report, Dkt. No. 81-8 at 11–12. This Court agrees that is not a requirement of the claims, in part because the invention would not know to "restrain" transmission until it first "ascertains" reception.

But the "restraining" must happen in response to the signal *being received*, and not what an access point is *expecting* to receive in the future. That aligns with the present-tense language of the claims, Claim 15's requirement that the "restraining" prevent degradation to the first and second signals, the underlying problem to be solved by the patent, and the corresponding structure of the "coordination logic" recited in both claims. Because that requirement is clear from the claim language, and Defendants' construction might confuse a jury into thinking the "ascertaining" and "receiving" must be contemporaneous, the Court will give these phrases "plain and ordinary meaning" constructions.

F. "the access point" ('939 Patent, Claims 20–21)

Vivato's Construction	Defendants' Construction
"the first access point"	Indefinite for lack of antecedent basis

This is an antecedent-basis dispute involving Claims 15, 20, and 21.[4] Claim 15 refers to

[4] The Joint Cl. Constr. Chart also identified Claims 33–34, Dkt. No. 89 at 12, but Defendants withdrew the indefiniteness challenge to those claims, Dkt. No. 86 at 26 n.10.

first and second access points that are receiving first and second signals, respectively. '939 Patent at 20:35–38. Claim 20, which depends from Claim 15, recites that "the signal received by *the access point* comprises at least one uplinked packet." *Id.* at 20:60–61 (emphasis added). Claim 21, which also depends from Claim 15, recites "the signal received by *the access point* comprises at least a portion of an uplinked packet." *Id.* at 20:62–64 (emphasis added).

The parties' arguments are short. Defendants argue "the access point" of the dependent claims could refer to either "the first access point" or "the second access point" of Claim 15, and a skilled artisan would not know which because both receive signals. Dkt. No. 86 at 26–27. Vivato points to the California court's Order and the Special Master's Report, the latter of which concludes "'the ascertaining' refers back to the 'ascertaining' and 'receiving' that are recited as to 'a first access point.'" Dkt. No. 81 at 27–28 (quoting Special Master's Report, Dkt. No. 81-7 at 70).

The Court agrees with Defendants. Notably, the Special Master's Report concerns only Claims 33–34, which recite identical language but depend from Claim 30. For those claims, the Special Master's reasoning makes sense. Like Claim 15, Claim 30 recites a "first access point" and a "second access point." '939 Patent at 22:6–14. But unlike Claim 15, only the "second access point" of Claim 30 is restrained, and only the "first access point" receives a signal. *Id.* Thus, a skilled artisan would be reasonably certain the recitation of "the access point" in Claims 33–34 refers back to "the first access point" of Claim 30.

The same logic does not hold for Claim 15, which recites "first," "second," and "third access points," with the "third access point" being "restrained." A skilled artisan would not understand from the context of the claim language or other intrinsic evidence whether "the access point" in Claims 20–21 refers to the "first access point," "second access point," either, or both, and Vivato does nothing to explain why the Special Master's reasoning concerning Claims 33–34 should apply

to the language of Claims 21–22. The Court therefore holds those claims are indefinite.

G. "transceiver" ('235 Patent, Claims 1, 15, 18, 19)

Vivato's Construction	Defendants' Construction
No construction necessary; plain and ordinary meaning	"a single unit comprising a transmitter and a receiver, with common circuit components"

Claims 1 and 15 recite "a transceiver operatively coupled to the antenna." '235 Patent at 32:37–39; *see also id.* at 34:38 (reciting, in Claim 15, "a transceiver operatively coupled to the antenna"). Vivato implies the ordinary meaning of the term does not require "common circuit components" between a transmitter and receiver, as Defendants' construction requires. Dkt. No. 81 at 30. It then notes Defendants identify no disavowal or lexicography to change that meaning. *Id.*

Defendants' arguments are based on Vivato's statements in an IPR proceeding concerning the '376 Patent, which is a sibling to the '235 Patent and has the same disclosure. In that proceeding, Vivato called a "transceiver" a "single unit comprising a transmitter and a receiver, with common circuit components for transmitting and receiving." Dkt. No. 86 at 28 (citing Patent Owner Resp., Dkt. No. 86-6 at 29). Vivato also explained "a combination of a transmitter with an unrelated receiver, e.g., a receiver for a different communication technology, is not a 'transceiver.'" *Id.* (citing an expert declaration).

The question is what effect to give these statements by Vivato. On this thin record, the Court is not convinced "with common circuit components" is part of the proper construction of "transceiver," and questions what those "common circuit components" are. Notably, Vivato's IPR statements limit the "common circuit components" to components "for transmitting and receiving," but Defendants' construction does not. Nor is the Court convinced the proper scope of "transceiver" should be open-ended with the word "comprising." The summary-judgment stage or trial

will provide a more developed factual record as to the scope of the term. For now, however, the Court will give "transceiver" a "plain and ordinary meaning" construction.

H. "n multiple-input multiple-output transceivers (MIMO) ('511 Patent, Claims 1, 10)

Vivato's Construction	Defendants' Construction
No construction necessary; plain and ordinary meaning	"a single unit comprising a MIMO transmitter and a MIMO receiver, with common circuit components"

Both claims at issue recite "n multiple-input multiple-output transceivers (MIMO), each MIMO transceiver comprising: a MIMO receiver configured to process m different received signals, . . . wherein an i-th received signal to a j-th MIMO receiver corresponds to a j-th beam of an i-th antenna array; and a MIMO transmitter configured to process m different transmit signals . . . ." '511 Patent at 10:23–46; *see also id.* at 11:1–25. Vivato objects to Defendants' construction "to the extent it suggests that the transmitter circuit components need to be common with the receiver circuit components." Dkt. No. 81 at 28.

This dispute mirrors the dispute concerning the "transceiver" term discussed *supra*. For the same reasons, the Court will adopt a "plain and ordinary meaning" construction.

I. "MIMO transmitter . . ." / "MIMO receiver . . ." ('511 Patent, Claims 1, 10, 20)

Vivato's Construction	Defendants' Construction
No construction necessary; plain and ordinary meaning	**MIMO transmitter:** "transmitter that processes MIMO signals for transmission **MIMO receiver:** "receiver that processes received MIMO signals"

The parties dispute whether "MIMO transmitters" and "MIMO receivers" process "MIMO signals." Vivato stresses that "MIMO" modifies "transmitter" and "receiver" rather than "signal."

Dkt. No. 88 at 10. Defendants note some agreement between the parties, but "to the extent there is no agreement" on whether MIMO transmitters and receivers process MIMO signals there is a dispute about scope. Dkt. No. 86 at 30.

The Court agrees with Vivato. Defendants provide no evidence on the meaning of "MIMO signal," and that term doesn't appear in the specification or the claims. Nor do Defendants offer evidence their construction comports with the ordinary meaning of either "MIMO transmitters" and "MIMO receivers." Moreover, each of the claims already requires the MIMO receiver and MIMO transmitter "to process m different received [and transmit] signals[, respectively]," where $m \geq 2$. '511 Patent at 10:34–41 (Claim 1), 11:12–17 (Claim 10), 12:30–34 (Claim 20). Defendants don't explain how those requirements are different from what it calls a "MIMO signal," if they even are.

At the hearing, Defendants focused on Vivato's reply, which accused Defendants of "fail[ing] to support requiring importing the requirement for '*MIMO* signals,' at least since 'signals other than MIMO may be used as well.'" Dkt. No. 88 at 10 (quoting '511 Patent at 3:32–35). This, say Defendants, suggests Vivato intends to read the claims on signals other than MIMO signals. *See* Hr'g Tr., Dkt. No. 96 at 106:3–5 ("[W]hat they did at the end in their reply brief indicates that they are going to try to point to radio transceivers here.").

But infringement of these claims doesn't turn on the type of signal. Rather, infringement turns on the presence of MIMO transmitters and receivers in the accused device or system. Yet Defendants' construction focuses on what it thinks a MIMO transceiver *does* rather than what a MIMO transceiver *is*, and the Court is unclear how that helps clarify the scope of the claim, especially considering nothing in the records explains "MIMO signals." Accordingly, the Court rejects Defendants' position and will give these terms "plain and ordinary meaning" constructions.

J. "2nd Generation Partnership Project (3GPP) Long Term Evolution (LTE) 3GPP LTE-Advanced, 3GPP LTE-TDD, 3GPP LTE-FDD" ('511 Patent, Claims 2, 11)

Vivato's Construction	Defendants' Construction
No construction necessary; plain and ordinary meaning. Alternatively, "3rd Generation Partnership Project (3GPP) Long Term Evolution (LTE), 3GPP LTE-Advances, 3GPP LTE-TDD, 3GPP LTE-FDD	"one of the 3GPP LTE, LTE-Advanced, LTE-TDD or LTE-FDD standards that existed at the time of invention"

Claim 2 limits the system of Claim 1 to a system "configured to substantially comply with one or more of Electrical and Electronic Engineers (IEEE) 802.11a/b/g/n/ac (WiFi), IEEE 802.16 (WiMAX), 2nd Generation Partnership Project (3GPP) Long Term Evolution (LTE), 3GPP LTE-Advanced, 3GPP LTE-TDD, 3GPP LTE-FDD, High Speed Packet Access (HSPA), and HSPA+." '511 Patent at 10:47–52. Claim 11 recites identical language further limiting the apparatus of Claim 10. *Id.* at 11:26–32.

The parties dispute whether this phrase limits the system and apparatus of Claims 1 and 10 to the recited standards as they existed at the time of the invention. Vivato argues it doesn't, because a skilled artisan would understand these standards are updated from time to time. Dkt. No. 81 at 30. It urges the Court to adopt Judge Albright's construction of "plain and ordinary meaning." *Id.* Defendants counter with this Court's decision in *BillJCo, LLC v. Cisco Sys., Inc.*, No. 2:21-CV-00181-JRG, 2022 WL 782740 (E.D. Tex. Mar. 14, 2022), in which Chief Judge Gilstrap limited "Bluetooth communications interface" to Bluetooth standards that existed at the time of invention. Defendants also quote the Special Master's Report, which construed "an 802.11 standard" as "one of the IEEE 802.11 standards that existed at the time of the invention." Dkt. No. 86 at 30 (quoting Special Master's Report, Dkt. No. 81-7 at 37 (quoting *PC Connector Sols. LLC v. SmartDisk Corp.*,

406 F.3d 1359, 1363 (Fed. Cir. 2005)).

The Court agrees with Defendants. "A claim cannot have different meanings at different times; its meaning must be interpreted as of its effective filing date." *PC Connector Sols. LLC v. SmartDisk Corp.*, 406 F.3d 1359, 1363 (Fed. Cir. 2005); *see also Kopykake Enters. v. Lucks Co.*, 264 F.3d 1377, 1383 (Fed. Cir. 2001) ("[W]hen a claim term understood to have a narrow meaning when the application is filed later acquires a broader definition, the literal scope of the term is limited to what it was understood to mean at the time of filing."); *Fundamental Innovation Sys. Int'l LLC v. Samsung Elecs. Co.*, No. 2:17-CV-145-JRG-RSP, 2018 WL 647734, at *11 (E.D. Tex. 2018 Jan. 31, 2018) (citing cases and concluding "the term 'USB' in the patents-in-suit should be limited to the Universal Serial Bus standards that existed at the time of the claimed invention").[5] The Court therefore adopts Defendants' construction of "one of the 3GPP LTE, LTE-Advanced, LTE-TDD or LTE-FDD standards that existed at the time of invention."

V. CONCLUSION

Disputed Term	The Court's Construction
"forward path pre-equalization parameter" ('369 Patent, Claims 1, 13, 21, 32, 33, 41)	"pre-equalization parameter for modifying a forward path signal to reduce unwanted effects associated with multipath fading between the transmitter and the receiver"
"substantially reciprocal to" ('369 Patent, Claim 12)	Indefinite
"wireless input/output (I/O) unit" ('939 Patent, Claims 15, 30)	Plain and ordinary meaning

[5] The Court can neither agree nor disagree with Judge Albright's construction because neither party has presented his reasoning or even the parties' arguments.

"signal transmission/reception coordination logic" ('939 Patent, Claims 15, 30)	Governed by 35 U.S.C. § 112 ¶ 6 **Function:** Claim 15: "ascertaining, by monitoring the plurality of access points for received signals, that:" (i) "a first access point of the plurality of access points is receiving a first signal on a first channel," (ii) "a second access point of the plurality of access points is receiving a second signal that is ongoing on a second channel," (iii) "restrain[ing] at least a third access point of the plurality of access points from transmitting a third signal on a third channel responsive to the ascertaining that the first access point is receiving the first signal and that the second access point is receiving the second signal that is ongoing-on the second channel, wherein the restraining at least the third access point prevents degradation to the first and second signals" Claim 30: (i) "ascertaining, by monitoring the plurality of access points for received signals, that a first access point of the plurality of access points is receiving a first signal on a first channel" and (ii) "restrain[ing] at least a second access point of the plurality of access points from transmitting a second signal on a second channel different from the first channel responsive to the ascertaining that the first access point is receiving the first signal" **Structure:** "(1) accepting multiple receive indicators from multiple BB units; (2) determining whether an affirmative signal reception indicator from a BB unit is detected in the indicators; (3) providing instructions to the MACs that are associated with any BB units for which an affirmative reception indicator is detected to restrain signal transmission," Fig. 7, col.10 ll.22–60, and equivalents

"restrain . . . responsive to the ascertaining that the first access point is receiving the first signal and that the second access point is receiving the second signal that is ongoing-on the second channel" ('939 Patent, Claim 15)	Plain and ordinary meaning
"restrain . . . responsive to the ascertaining that the first access point is receiving the first signal" ('939 Patent, Claim 30)	Plain and ordinary meaning
"the access point" ('939 Patent, Claims 20–21)	Indefinite
"transceiver" ('235 Patent, Claims 1, 15, 18, 19)	Plain and ordinary meaning
"n multiple-input multiple-output transceivers (MIMO) ('511 Patent, Claims 1, 10)	Plain and ordinary meaning
"MIMO transmitter . . ."; "MIMO receiver . . ." ('511 Patent, Claims 1, 10, 20)	Plain and ordinary meaning
"2nd Generation Partnership Project (3GPP) Long Term Evolution (LTE) 3GPP LTE-Advanced, 3GPP LTE-TDD, 3GPP LTE-FDD" ('511 Patent, Claims 2, 11)	"one of the 3GPP LTE, LTE-Advanced, LTE-TDD or LTE-FDD standards that existed at the time of invention"

The Court **ORDERS** each party not to refer, directly or indirectly, to its own or any other party's claim-construction positions in the presence of the jury. Likewise, the Court **ORDERS** the parties to refrain from mentioning any part of this opinion, other than the actual positions adopted by the Court, in the presence of the jury. Neither party may take a position before the jury that

contradicts the Court's reasoning in this opinion. Any reference to claim construction proceedings is limited to informing the jury of the positions adopted by the Court.

SIGNED this 14th day of November, 2024.

ROY S. PAYNE
UNITED STATES MAGISTRATE JUDGE