

**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF TEXAS
DALLAS DIVISION**

COMMSCOPE TECHNOLOGIES LLC,)	
)	
Plaintiff,)	No. 3:16-cv-477
Counterclaim Defendant,)	
)	Jury Trial Demanded
v.)	
)	
DALI WIRELESS, INC.,)	
Defendant,)	
Counterclaim Plaintiff,)	
)	
v.)	
)	
COMMSCOPE CONNECTIVITY LLC,)	
Counterclaim Defendant.)	

CLAIM CONSTRUCTION ORDER

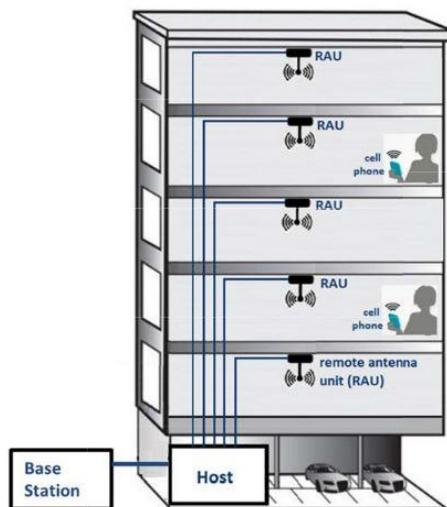
Plaintiff CommScope Technologies LLC (“CommScope”) sued Dali Wireless, Inc. (“Dali”) for infringing U.S. Patent Nos. 9,332,402; 8,577,286; 8,326,218; 7,639,982; and 7,848,747. Dali asserted counterclaims for infringement of U.S. Patent Nos. 9,031,521 and 9,531,473. On September 12, 2017, the Court held a claim construction hearing to determine the proper construction of disputed claim terms in U.S. Patent Nos. 7,848,747 (“the ‘747 patent”), 9,031,521 (“the ‘521 patent”), and 9,531,473 (“the ‘473 patent”). At the hearing, the Court directed the parties to further confer on several terms. The parties submitted their Amended Joint Claim Construction Statement on September 26, 2017. (ECF No. 90).

Having reviewed the claims, specifications, and submitted extrinsic evidence, and having considered the parties’ arguments and the applicable law, the Court issues this Claim Construction Order.

I. Description of the Technology

CommScope's '747 patent and Dali's '473 patent both relate to distributed antenna systems ("DAS"). A DAS "allows for increased signal coverage." (Bims Decl. ¶ 33, ECF No. 72). For example, a cellphone located inside a building may have difficulty receiving radio signals from cell tower antennas. (*Id.*) A DAS allows a cellphone to send and receive signals through a system of much smaller "antennas" distributed throughout the building. (*Id.*)

DAS typically consists of three components: a remote unit, host unit, and base station. (Bims Decl. ¶ 33). The base station receives the signal from a service provider and communicates this signal to a host unit. (*Id.*) The host unit processes the signal, such as by amplifying it or converting it to a format better suited for transmission along the building's cables. (Acampora Decl. ¶ 43, ECF No. 68). The host unit then sends the processed signal to remote units distributed throughout the building. (*Id.* ¶ 46). A cellphone receives the signal through the remote units. The following figure depicts the components of a DAS as applied inside a building:



(*Id.* ¶ 37).

CommScope’s ‘747 patent generally discloses a DAS with a host unit that improves the rate and efficiency of signal transmission to the remote units. ‘747 patent at 1:66 to 2:6; (*see also* Acampora Decl. ¶ 54). Dali’s ‘473 patent addresses a common problem with DAS. Some remote units may become overloaded when people move from one part of the building to another, and “particularly when wireless subscribers congregate at one location.” ‘473 patent at 1:33-37. The patent discloses a DAS that is reconfigurable to meet changing demands. *Id.* at 3:59-4:8.

Dali’s ‘521 patent relates to techniques for reducing the distortion caused by amplifiers. *See* ‘521 patent at 1:41-2:8. Amplifiers increase the strength of signals transmitted by antennas. However, amplified signals are often distorted and can interfere with other signals that are close in frequency. *Id.* at 1:61-67. A typical solution is to implement analog predistortion techniques that help reduce the distortion. *Id.* at 2:19-31. The patent describes digital predistortion techniques that provide advantages over analog ones, such as the ability to work in a wide range of temperatures. *Id.* at 2:24-38. At its core, digital predistortion works by essentially adding a negative image of the distortion before the signal is amplified, thus cancelling out the positive distortion caused by the amplifier.

II. Legal Standard

a. General Principles of Claim Construction

The construction of disputed claims is a question of law for the court. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 971–72 (Fed. Cir. 1995), *aff’d*, 517 U.S. 370 (1996). “Ultimately, the interpretation to be given a term can only be determined and confirmed with a full understanding of what the inventors actually invented and intended to envelop with the claim.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) (en banc) (citation

omitted). Accordingly, a proper construction “stays true to the claim language and most naturally aligns with the patent's description of the invention.” *Id.* (citation omitted).

“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 Systems, Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). Courts first “look to the words of the claims themselves . . . to define the scope of the patented invention.” *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996) (citation omitted). The claim terms are “generally given their ordinary and customary meaning;” however, “a patentee may choose to be his own lexicographer and use terms in a manner other than their ordinary meaning, as long as the special definition of the term is clearly stated in the patent specification or file history.” *Id.* (citation omitted). The “ordinary and customary meaning” of the terms in a claim is “the meaning that the term[s] would have to a person of ordinary skill in the art in question at the time of the invention.” *Phillips*, 415 F.3d at 1313.

When the meaning of a term to a person of ordinary skill in the art is not apparent, a court is required to consult other sources, 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 1313 (citation omitted). A court must consider the context in which the term is used in an asserted claim or related claims in the patent, being mindful that “the 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.* The specification is “always highly relevant to the claim construction analysis” and is “the single best guide to the meaning of a disputed term.” *Id.* at 1315 (quoting *Vitronics*, 90 F.3d at 1582).

For example, should the specification reveal that a claim term has been given a special definition by the patentee that is different from the ordinary meaning of the term, the inventor's lexicography is controlling. *Id.* at 1316 (citation omitted). Furthermore, if the specification reveals an intentional disclaimer or disavowal of claim scope by the patentee, the claim scope dictated by the specification is controlling. *Id.* (citation omitted).

Finally, in construing claims, a court may consult extrinsic evidence, including “expert and inventor testimony, dictionaries, and learned treatises.” *Phillips*, 415 F.3d at 1317 (citing *Markman*, 52 F.3d at 980). Technical dictionaries may assist a court in “‘better understand[ing] the underlying technology’ and the way in which one of skill in the art might use the claim terms.” *Id.* at 1318 (quoting *Vitronics*, 90 F.3d at 1584 n.6). Expert testimony may also be helpful to “provide background on the technology at issue, to explain how an invention works, to ensure that the court's understanding of the technical aspects of the patent is consistent with that of a person of skill in the art, or to establish that a particular term in the patent or the prior art has a particular meaning in the pertinent field.” *Id.* (citation omitted).

Although extrinsic evidence may “shed useful light on the relevant art,” it is considered “less significant than the intrinsic record.” *Phillips*, 415 F.3d at 1317 (quoting *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 862 (Fed. Cir. 2004)). More simply, “extrinsic evidence may be useful to the court, but it is unlikely to result in a reliable interpretation of patent claim scope unless considered in the context of the intrinsic evidence.” *Id.* at 1319. Accordingly, “a court should discount any expert testimony ‘that is clearly at odds with the claim construction mandated by the claims themselves, the written description, and the prosecution history, in other words, with the written record of the patent.’” *Id.* at 1318 (quoting *Key Pharms. v. Hercon Labs. Corp.*, 161 F.3d 709, 716 (Fed. Cir. 1998)).

b. Means-Plus-Function Claims

Means-plus-function claiming occurs when a claim term is drafted in a manner that invokes 35 U.S.C. § 112(f), which 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 enacting this provision, Congress struck a balance in allowing patentees to express a claim limitation by reciting a function to be performed rather than by reciting structure for performing that function, while placing specific constraints on how such a limitation is to be construed, namely, by restricting the scope of coverage to only the structure, materials, or acts described in the specification as corresponding to the claimed function and equivalents thereof.”

Williamson v. Citrix Online, LLC, 792 F.3d 1339, 1347 (Fed. Cir. 2015).

“In making the assessment of whether the limitation in question is a means-plus-function term subject to the strictures of [Section 112(f)], [the Federal Circuit’s] cases have emphasized that the essential inquiry is not merely the presence or absence of the word ‘means’ but whether the words of the claim are understood by persons of ordinary skill in the art to have a sufficiently definite meaning as the name for structure.” *Id.* at 1348 (citing *Greenberg v. Ethicon Endo-Surgery, Inc.*, 91 F.3d 1580, 1583 (Fed. Cir. 1996)). The standard concerning the applicability of Section 112(f) was recently described as follows:

The standard is whether the words of the claim are understood by persons of ordinary skill in the art to have a sufficiently definite meaning as the name for structure. When a claim term lacks the word “means,” the presumption can be overcome and [Section 112(f)] 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.” The converse presumption remains unaffected: “use of the word ‘means’ creates a presumption that [Section 112(f)] applies.”

Williamson, 792 F.3d at 1349 (citations omitted).

The following is a list of non-structural generic placeholders that may invoke Section 112(f): “mechanism for,” “module for,” “device for,” “unit for,” “component for,” “element for,” “member for,” “apparatus for,” “machine for,” or “system for.”¹ These words are often referred to as “nonce” words that can operate as a substitute for “means” in the context of Section 112(f)—i.e., “simply . . . generic description[s] for software or hardware that performs a specified function.” *See Williamson*, 792 F.3d at 1350.

If the claim at issue is subject to Section 112(f), the Court must determine whether the specification discloses sufficient structure that corresponds to the claimed function:

Construing a means-plus-function claim term is a two-step process. The court must first identify the claimed function. Then, the court must determine what structure, if any, disclosed in the specification corresponds to the claimed function. Where there are multiple claimed functions, as we have here, the patentee must disclose adequate corresponding structure to perform all of the claimed functions. If the patentee fails to disclose adequate corresponding structure, the claim is indefinite.

...

Structure disclosed in the specification qualifies as “corresponding structure” if the intrinsic evidence clearly links or associates that structure to the function recited in the claim. Even if the specification discloses corresponding structure, the disclosure must be of “adequate” corresponding structure to achieve the claimed function. Under 35 U.S.C. § 112, paras. 2 and 6, therefore, if a person of ordinary skill in the art would be unable to recognize the structure in the specification and associate it with the corresponding function in the claim, a means-plus-function clause is indefinite.

Id. at 1351–52 (citations omitted).

¹ *Welker Bearing Co., v. PHD, Inc.*, 550 F.3d 1090, 1096 (Fed. Cir. 2008); *Massachusetts Inst. of Tech. v. Abacus Software*, 462 F.3d 1344, 1354 (Fed. Cir. 2006); *Personalized Media Commc'ns v. ITC*, 161 F.3d 696, 704 (Fed. Cir. 1998); *Mas-Hamilton Group v. LaGard, Inc.*, 156 F.3d 1206, 1214–15 (Fed. Cir. 1998).

III. Construction of Agreed Term

Claim Term	Agreed Construction
“the power amplifier” (Claim 1 of the ‘521 patent)	“the power amplifier” always refers to the same power amplifier that is introduced in the preamble

Claim 1 of the ‘521 patent provides:

A method of operating **a power amplifier**, the method comprising:

initializing **the power amplifier**;

performing a training phase comprising:

establishing pre-computed distortion contributions based on pre-compensation training feedback signals representative of output of **the power amplifier**; and

...

performing an operating phase comprising:

switching a controller off to disconnect signal representative of the output of **the power amplifier**;

The parties agree that “the power amplifier” mentioned throughout the body of the claim refers to “a power amplifier” mentioned in the preamble. *See Warner–Lambert Co. v. Apotex Corp.*, 316 F.3d 1348, 1356 (Fed. Cir. 2003) (“[I]t is a rule of law well established that the definite article ‘the’ particularizes the subject which it precedes.”). In other words, the invention must have at least one “power amplifier” that covers all three method steps—of initializing, performing a training phase, and performing an operating phase—mentioned in Claim 1.

The agreed term is taken from the Amended Joint Claim Construction Statement. (ECF No. 90). In view of the parties’ agreement on the proper construction, with which the Court agrees, the Court hereby adopts and approves the parties’ agreed construction.

IV. Construction of Disputed Terms

a. '747 Patent

i. “analog to digital converter circuit(s)”

Claim Term	CommScope’s Proposed Construction	Dali’s Proposed Construction	Court’s Construction
“analog to digital converter circuit(s)” (Claim 7)	Plain and ordinary meaning. The circuit may include multiple components.	Single-function circuit that converts an analog input signal to a digital output signal.	Circuit that accomplishes at least the conversion of an analog input signal to a digital output signal.

The parties dispute whether an “analog to digital converter circuit” should be limited to a “single-function circuit.” Although Dali does not dispute that circuits generally can perform multiple functions, it argues that the sole function of the “analog to digital converter circuit” in Claim 7 is to convert an analog input to a digital output. (Def. Resp. at 3, ECF No. 79). The Court rejects Dali’s proposed construction because such a limitation is not warranted by the intrinsic evidence. The claims indicate that while the circuit performs analog-to-digital conversion, it is not its only function. *See, e.g.*, ‘747 patent at 8:5-7 (“[T]he analog to digital converter circuit converts the analog signal to a digital signal and down-converts the digital signal”). Claim 8, which is dependent on Claim 7, is particularly instructive:

The host unit of claim 7, wherein each of the plurality of analog to digital converter circuits **comprises** one of (1) a single analog to digital converter operating at IF, (2) a dual analog to digital converter circuit operating at baseband, and (3) an analog to digital converter operating at a high sample rate followed by a digital down converter.

Id. at 7:28-34 (emphasis added). This claim states that the circuit includes an “analog to digital converter,” which converts analog signals to digital signals. It can include another component, a “digital down converter,” which down converts a digital signal to a lower frequency. The use of

the open-ended, transitional term “comprises” further indicates that the circuit can have additional unnamed components that perform unnamed functions. *See Vivid Technologies, Inc. v. American Science & Engineering, Inc.*, 200 F.3d 795, 811 (Fed. Cir. 1999) (“[Disputed claim terms] use the signal ‘comprising,’ which is generally understood to signify that the claims do not exclude the presence in the accused apparatus or method of factors in addition to those explicitly recited.”). This suggests that the “analog to digital converter circuit” in the independent claim, Claim 7, should cover these multiple components and functions. *See Dow Chem. Co. v. United States*, 226 F.3d 1334, 1341–42 (Fed. Cir. 2000) (concluding that an independent claim should be given broader scope than a dependent claim to avoid rendering the dependent claim inconsistent); *Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1376 (Fed. Cir. 2014) (“Under the principles of claim differentiation, the independent claims are presumed to be broader [than the dependent claims.]”). The embodiments described in the specification also reinforce that the “analog to digital converter circuit” can perform digital down conversion in addition to analog to digital conversion. *See* ‘747 patent at 3:45-62. In light of the specification and Claim 8, the Court rejects reading a “single-function” limitation into the construction.

Dali’s expert, Dr. Bims, testified that analog-to-digital conversion and down conversion are “inextricably linked,” and hence should be considered together as a single function. (Bims Decl. ¶ 77). Contrary to his testimony, the claims discussed above indicate that analog-to-digital conversion and down conversion do not always exist together. The “analog to digital converter circuit” can only comprise of “a single analog to digital converter,” or it can comprise of “analog to digital converter . . . followed by a digital down converter.” *See* ‘747 patent at 7:28-34. The Court finds Dr. Bims’s testimony in this regard unpersuasive.

Because the “analog to digital converter circuit” can have multiple functions, CommScope proposes several alternative constructions: “circuit may include multiple components,” “circuit may include multiple components that perform multiple functions,” or “the analog to digital converter circuit is not limited to a single-function.” (Pl. Resp. at 1 n.1, ECF No. 81). The Court finds these proposed constructions too broad. While an “analog to digital converter circuit,” can have multiple functions, one of those functions must be analog-to-digital conversion. The specification in the patent describes the “analog to digital converter circuit” as always able to perform analog-to-digital conversion. *See, e.g.*, ‘747 patent at Fig. 1; *see also id.* at 8:5-7. In Claim 8, the transitional term “comprises” still means that the “analog to digital converter circuit” has to be at least an analog to digital converter. *See Vivid Technologies*, 200 F.3d at 811. The Court therefore construes “analog to digital converter circuit” as “circuit that accomplishes at least the conversion of an analog input signal to a digital output signal.”

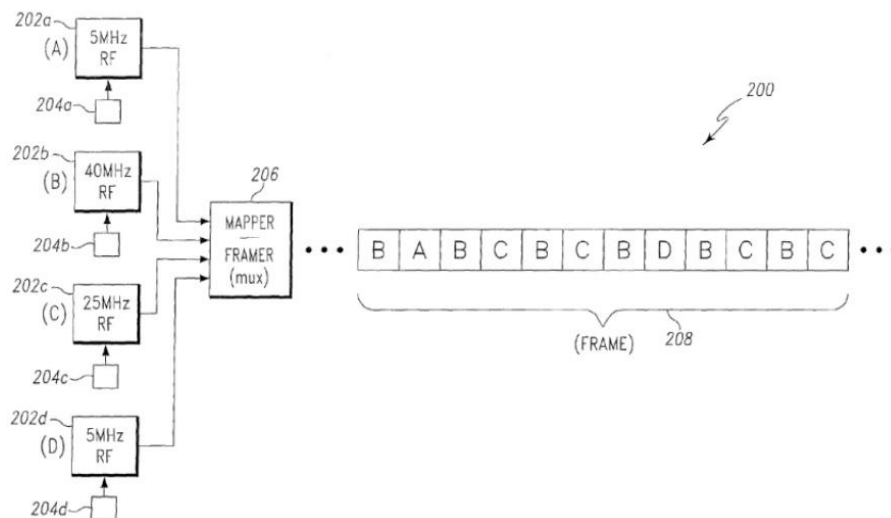
i. “multiplexer circuit”

Disputed Term	CommScope’s Proposed Construction	Dali’s Proposed Construction	Court’s Construction
“multiplexer circuit” (Claims 7, 10)	Plain and ordinary meaning. Otherwise: a circuit for accomplishing transmission of two or more signals over a common transmission medium.	Single-function circuit that combines two or more input signals to be transmitted as a single output signal.	Circuit that accomplishes at least the simultaneous transmission of two or more signals over a common transmission medium.

The dictionary definitions provided by the parties all convey the same message: a multiplexer is a device that combines two or more signals and conveys those signals

simultaneously over a single medium. (See Pl. App. at A210,² ECF No. 70 (“a device for accomplishing simultaneous transmission of two or more signals over a common transmission medium”); *id.* at A210³ (“a hardware device that allows the transmission of a number of different signals simultaneously over a single channel”); *id.* at A178⁴ (“a circuit or device which simultaneously transmits two or more signals which have been combined into a single channel”); Def. App. at APPX198,⁵ ECF No. 72 (“[a] device that allows the transmission of a number of different signals simultaneously over a single channel or transmission facility”).

The use of “multiplexer circuit” in the patent does not diverge from this meaning. See ‘747 patent at 7:26-28 (“a multiplexer circuit for multiplexing together the plurality of sample streams into one serial bit stream at a fixed bit rate”); *id.* 4:54-58 (discussing a device “multiplex[ing] together digitized bands” and converting them to a single “suitable frame structure format”). Figure 2, which shows four signals being multiplexed together, is illustrative:



² *Modern Dictionary of Electronics* (7th ed. 1999).

³ *Modern Dictionary of Electronics* (7th ed. 1999).

⁴ *Prentice Hall’s Illustrated Dictionary of Computing* (3d ed. 1998).

⁵ *IEEE Standard Dictionary of Electrical and Electronics Terms* (6th ed. 1997).

Id. at Fig. 2. The multiplexer circuit, labeled 206 in Figure 2, receives signals A, B, C, and D and combines them, outputting a single signal. *Id.* at 6:9-36.

Dali argues that without a “single-function” limitation in the construction, “multiplexer circuit” in Claim 7 would lose its meaning, because the circuit would do more than multiplexing. (Def. Resp. at 4). However, such a limitation is contrary to Claim 10, which is dependent on Claim 7 and which provides that “multiplexer circuit” includes multiple components, each with a different function:

The host unit of claim 7, wherein the multiplexer circuit comprises: a mapper that multiplexes together the plurality of sample streams; a framer, coupled to the mapper, the framer converts the multiplexed sample streams into slots of a frame; and a serializer which converts the frame into the serial bit stream at the fixed bit rate.

‘747 patent at 7:39-47. The mapper component multiplexes, but the serializer and framer components perform other functions like conversion. Again, the use of the term “comprises” indicates that the circuit can have additional unnamed components that perform unnamed functions. This suggests that the “multiplexer circuit” in the independent claim, Claim 7, should cover these multiple components and functions. *See Dow Chem.*, 226 F.3d at 1341–42; *Stryker Corp.*, 755 F.3d at 1376. The embodiment described in the specification further reinforces that the “multiplexer circuit” has multiple components, or “devices,” that multiplex but also “construct[] a suitable frame for transport.” *See* ‘747 patent at 6:18-22. In light of the specification and Claim 10, the Court rejects reading a “single-function” limitation into the construction. The “multiplexer circuit” multiplexes, but can perform additional functions.

The Court, however, finds CommScope’s proposed construction overly broad. CommScope’s construction omits the fact that multiplexing is transmission of a number of different signals *simultaneously* over a single channel. CommScope’s proposed construction

could sweep in, for example, transmitting a signal over the line and, later, a second signal over the same line. This is contrary to the plain and ordinary meaning of multiplexing, as supported by the extrinsic evidence. Accordingly, the Court construes “multiplexer circuit” as “circuit that accomplishes at least the simultaneous transmission of two or more signals over a common transmission medium.”

ii. “broadband RF signal”

Disputed Term	CommScope’s Proposed Construction	Dali’s Proposed Construction	Court’s Construction
“broadband RF signal” (Claim 7)	Plain and ordinary meaning.	Wideband RF signal.	Wideband RF signal.

Dali argues that the Court should construe “broadband” as “wideband,” because the patent consistently uses the term “wideband” to describe radio frequency signals, never “broadband.” (Def. Br. at 4, ECF No. 71). Indeed, outside of the claims, the patent does not mention “broadband” at all, instead opting for “wideband” in the patent’s title, specification, and preferred embodiments. *See* ‘747 patent at Title (“SYSTEM AND METHOD FOR ENHANCING THE PERFORMANCE OF WIDEBAND DIGITAL RF TRANSPORT SYSTEMS”); *id.* at 1:36-38 (“[A] significant problem exists in the transport of large amounts of digital RF bandwidth (e.g. wideband).”); *id.* at 1:38-40 (“For example, the existing wideband digital RF transport systems combine”); *id.* at 2:56-58 (“FIG. 1 depicts a schematic block diagram of an example system 100 for enhancing the performance of wideband digital RF transport systems.”). Although CommScope agrees that “wideband” and “broadband” are synonymous in the context of the patent, it argues that any construction would be unnecessary as it would provide “no meaningful assistance regarding claim scope.” (Pl. Br. at 8, ECF No. 66).

The Court agrees with Dali’s proposed construction. Claim 7 uses both “wideband” and “broadband:”

A host unit for **wideband** digital RF transport, the unit comprising: a plurality of inputs, each input coupled to receive a **broadband** RF signal; a plurality of analog to digital converter circuits, each coupled to a selected one of the plurality of inputs, each analog to digital converter circuit generating a sample stream, wherein each analog to digital converter circuit operating at a sample rate related to a signal bandwidth of its associated **broadband** RF signal

‘747 patent at 7:16-25 (emphasis added). “In the absence of any evidence to the contrary, [courts] must presume that the use of . . . different terms in the claims connotes different meanings.” *CAE Screenplates Inc. v. Heinrich Fiedler GmbH & Co. KG*, 224 F.3d 1308, 1317 (Fed. Cir. 2000). However, this presumption is overcome when evidence indicates that the patentee used the two terms interchangeably. *See Baran v. Med. Device Techs., Inc.*, 616 F.3d 1309, 1316 (Fed. Cir. 2010). The parties agree, and the intrinsic evidence supports, that “wideband” and “broadband” are used interchangeably in the patent.⁶ Moreover, “when a patent “repeatedly and consistently” characterizes a claim term in a particular way, it is proper to construe the claim term in accordance with that characterization.” *See GPNE Corp. v. Apple Inc.*, 830 F.3d 1365, 1370-71 (Fed. Cir. 2016). Because the asserted claim uses both words, construction is particularly helpful to mitigate any confusion for the jury. Accordingly, the Court construes “broadband” as “wideband.”

⁶ The definition of broadband in the Modern Dictionary of Electronics includes the statement, “[a]lso called wideband,” and the definition of wideband directs users to “[s]ee broadband.” (Def. App. at APPX183, 189). This further suggests that the patentee used the terms interchangeably.

b. ‘521 Patent

i. “initializing the power amplifier”

Disputed Term	CommScope’s Proposed Construction	Dali’s Proposed Construction	Court’s Construction
“initializing the power amplifier” (Claim 1)	Indefinite	Plain and ordinary meaning, which is: place the power amplifier in a condition for operation.	Placing the power amplifier in a condition for operation.

Claim 1 recites a method of operating a power amplifier, listing three steps: initializing, performing a training phase, and performing an operating phase. ‘521 patent at 10:47-11:4. CommScope argues only that “initializing” is indefinite because nothing in the specification or claims sheds light on what constitutes “initializing.” (Pl. Br. at 22). The Court declines to address invalidity arguments at the claim construction stage. “Although a determination of indefiniteness is intertwined to some degree with claim construction, a court must first attempt to determine what a claim means before it can determine whether the claim is invalid for indefiniteness.” *Mannatech, Inc. v. Techmedia Health, Inc.*, 2009 WL 3614359, at *15 (N.D. Tex. Oct. 29, 2009). “Whether the patents-in-suit are invalid because the definition of [a claim term] fails to provide one skilled in the art with any objective standards for determining [when a claim term is met] is a matter more appropriately addressed on summary judgment.” *Id.*

The Court therefore evaluates Dali’s proposed construction, which is the only one before it. Dali’s expert, Dr. Bims, notes that a POSITA would understand initialization to “generally include applying power to an electrical device and waiting on average a few seconds or less until the device reaches a steady operating state.” (Bims Decl. ¶ 125). He elaborates that initialization is required for power amplifiers in order to “achieve a constant steady state, or produce the same output upon receiving the same input.” (*Id.*) Because nothing in the intrinsic

evidence definitively states what constitutes “initializing,” Dali’s construction hinges on the testimony of Dr. Bims. Expert testimony may be consulted “to understand, for example, the background science or the meaning of a term in the relevant art during the relevant time period.” *Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 840 (2015) (citing *Seymour v. Osborne*, 11 Wall. 516, 546 (1871) (A patent may be “so interspersed with technical terms and terms of art that the testimony of scientific witnesses is indispensable to a correct understanding of its meaning.”)). “[E]xperts may be examined to explain terms of art, and the state of the art, at any given time,” but they cannot be used to prove “the proper or legal construction of any instrument of writing.”” *Id.* CommScope broadly argues that Dr. Bims is not a POSITA. (Pl. Resp. at 30-31). Although Dr. Bims has not worked extensively with power amplifiers per se,⁷ he has broad and extensive experience on the subject of wireless communications and distributed antenna systems, in which power amplifiers are used. (See Def. App. at APPX151-175). Accordingly, the Court accepts Dali’s proposed construction and construes “initializing the power amplifier” as “placing the power amplifier in a condition for operation.”

ii. “the lookup table”

Disputed Term	CommScope’s Proposed Construction	Dali’s Proposed Construction	Court’s Construction
“the lookup table” (Claims 1, 10)	“the lookup table” in the “retrieving . . .” step refers to the same lookup table introduced in the “storing . . .” step.	“the lookup table” in the “retrieving . . .” step refers to a lookup table introduced in the “storing . . .” step.	“the lookup table” in the “retrieving . . .” step refers to the same lookup table introduced in the “storing . . .” step.

Claim 1 provides, in relevant part:

A method of operating a power amplifier, the method comprising:

...

⁷ According to his deposition, the last time Dr. Bims designed a power amplifier was in an undergraduate class at Stanford. (Pl. App. at A579-81).

performing a training phase comprising:

...

storing the pre-computed distortion contributions in **a lookup table**; and performing an operating phase comprising:

...

retrieving from **the lookup table**, using the digital lookup table key, a corresponding pre-computed distortion contribution for the original value

Dali objects to CommScope's proposed construction on the grounds that "the same" limitation risks "implying to the jury that there can be only one lookup table." (Am. Joint Cl. Construction Statement at 4). Dali is generally seeking a construction that would allow for the following: "more than one lookup table could store pre-computed distortion contributions such that the contributions could be retrieved from a different lookup table than was originally used to store the information." (Def. Resp. at 13).

The parties' agreed construction of "the power amplifier" is helpful here. They agreed that the article "the" particularizes the subject which it precedes, i.e., refers to something recited previously in the claim. *See Creative Internet Adver. Corp. v. Yahoo!, Inc.*, 476 F. App'x 724, 729 (Fed. Cir. 2011). Accordingly, they agreed that "the power amplifier" refers to "a power amplifier" mentioned earlier in the same claim. The parties agree now that "the lookup table" refers to "a lookup table" mentioned earlier in the claim. Based on that premise, the invention must have information be stored on one "lookup table" and that the information be retrieved from *the same lookup table*. There can be multiple lookup tables, but the steps of storing and retrieving cannot be performed with different lookup tables. Dali's agreed construction for "the power amplifier" and its argument for "the lookup table" contradict each other. The Court therefore construes Claim 1 such that "the lookup table" in the "retrieving . . ." step refers to the same lookup table introduced in the "storing . . ." step.

iii. “a linearity and time delay table”

Disputed Term	CommScope’s Proposed Construction	Dali’s Proposed Construction	Court’s Construction
“a linearity and time delay table” (Claim 16)	A table that stores both time delay parameters of the PA/feedback loop and the output characteristics of the power amplifier when the power amplifier is set in the linear region.	A table that stores both the time delay parameters of the PA/feedback loop and the output characteristics of the power amplifier that correspond to operation of the power amplifier in its linear region.	A table that stores both time delay parameters of the PA/feedback loop and the output characteristics of the power amplifier when the power amplifier is set in the linear region.

The specification describes “linearity and time delay table” as a table “used to store the linearity characteristics of [the power amplifier] and time-delay parameters of channels.” ‘521 patent at 6:8-11. The parties dispute how to construe “linearity characteristics.” CommScope argues that linearity characteristics are characteristics of the power amplifier when the amplifier is set in the linear region. (Pl. Br. at 12-15). This is a construction based on a preferred embodiment. *See* ‘521 patent at 10:4-11 (“[T]he linearity and time-delay table is trained by adaptive algorithm when [the power amplifier] of handset is set in the linear region so that the linear characteristics of [the power amplifier] could be pick[ed] up and stored into the entries of table.”).

First, Dali contests CommScope’s use of the word “when.” Dali argues that Claim 16 is a system claim and that using “when” to construct “linearity and time delay table” is “rewriting the term as though it were part of a method claim.” (Am. Joint Cl. Construction Statement at 9). Dali argues that this is because CommScope’s construction requires “the power amplifier to be actually used for the claim to be met—i.e., by originally attempting to limit the term to ‘**when** the power amplifier **is set** in the linear region.’” (*Id.* at 10 (emphasis in original)). Second, Dali

argues that a claim should not be limited to features disclosed in preferred embodiments, absent a clear expression of intent to limit the claim's scope. See *Enzo Biochem, Inc. v. Applera Corp.*, 599 F.3d 1325, 1342 (Fed. Cir. 2010); *Info-Hold, Inc. v. Applied Media Techs. Corp.*, 783 F.3d 1262, 1266 (Fed. Cir. 2015).

The Court agrees with CommScope's proposed construction. Typically, "it is improper to read limitations from a preferred embodiment described in the specification—even if it is the only embodiment—into the claims." *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 913 (Fed. Cir. 2004). It is entirely appropriate, however, "to limit the [claim term] to the sole portion of the specification that adequately discloses [the claim term] to the public." *Meds. Co. v. Mylan, Inc.*, 853 F.3d 1296, 1306 (Fed. Cir. 2017). The description in the preferred embodiment is the only disclosure of "linearity characteristics" in the patent, and the Court therefore finds it appropriate to import this limitation.

In fact, Dali itself is importing the same limitation into the claim term, albeit in different words. Compare Dali's proposed construction of "linearity characteristics" ("that correspond to operation of the power amplifier in its linear region") with CommScope's proposed construction ("when the power amplifier is set in the linear region"). The language of Dali's proposed construction, however, is not grounded in intrinsic or extrinsic evidence. The language of its proposed construction is not found anywhere in the specification. Its own expert, Dr. Bims, explains that "[a] person of ordinary skill in the art would understand linearity characteristics to mean the output characteristics of the power amplifier *when operated at different gain values, e.g., at different power amplification levels.*" (Bims Decl. ¶ 136 (emphasis added)). Moreover, contrary to Dali's assertion, CommScope's construction does not require the power amplifier to be used for the claim to be met; it simply refers to the *status* of the power amplifier when

“linearity characteristics” are stored in “a linearity and time delay table.” Accordingly, the Court construes “a linearity and time delay table” as “a table that stores both time delay parameters of the PA/feedback loop and the output characteristics of the power amplifier when the power amplifier is set in the linear region.”

iv. “address data former”

Claim Term	CommScope’s Proposed Construction	Dali’s Proposed Construction	Court’s Construction
“an address data former” (Claim 16)	Term invokes Section 112(f). Function is to generate a digital lookup table key. Structure is (a) DSP logic that transforms a received signal into either a 0 or a 1, and (b) a shift register. Otherwise: structure that transforms the received signal to either 0 or 1.	Logic for generating an address associated with an input signal.	Term invokes Section 112(f). Function is to generate a digital lookup table key. Structure is (a) DSP logic that transforms a received signal into either a 0 or a 1, and (b) a shift register.

Although the term does not use the word “means” or other recognized nonce words, CommScope argues that “address data former” does not communicate sufficiently definite structure to a POSITA, therefore invoking Section 112(f). (Pl. Br. at 16-19). Alternatively, CommScope argues for a construction based on language from a preferred embodiment:

[t]he address data formers 10I-10Q are designed to generate the required binary signal format. The data formers 10I-10Q receive signal from coders 00 first, and then transform the received signal to the sign symbol with form either 0 or 1.

‘521 patent at 6:1-4 (emphasis added). Dali argues that “address data former” communicates sufficiently definite structure—“logical structure”—to a POSITA. (Def. Br. at 12; *see also* Bims Decl. ¶ 159 (defining term as “one of a variety of data structures or algorithms for deriving an

address based on one or more characteristics of an input signal”)). Its proposed construction is derived from the testimony of Dr. Bims. (Bims. Decl. ¶¶ 158-62, 159).

The Court concludes that “address data former” invokes Section 112(f). In determining whether Section 112(f) applies, “the essential inquiry is not merely the presence or absence of the word ‘means’ but whether the words of the claim are understood by persons of ordinary skill in the art to have a sufficiently definite meaning as the name for structure.” *Williamson*, 792 F.3d at 1348. The Federal Circuit’s decision in *Advanced Ground Info. Sys., Inc. v. Life360, Inc.* is highly relevant. 830 F.3d 1341 (Fed. Cir. 2016). There, the Federal Circuit held that the term “symbol generator” invoked Section 112(f) because it “d[id] not describe anything structural.” *Id.* at 1348. The court highlighted that “symbol generator” was not a term of art used to designate structure, nor did its plain language suggest any structure. *Id.* at 1348. In particular, the Federal Circuit noted that even if “symbol” and “generator,” separately, are terms of art, “the combination of the terms as used in the context of the relevant claim language suggests that it is simply an abstraction that describes the function being performed (i.e., the generation of symbols).” *Id.* (emphasis in original).

Like “symbol generator,” the term “address data former” does not communicate sufficiently definite structure. “What is important [for Section 112(f)] is . . . that the term, as the name for structure, has a reasonably well understood meaning in the art.” *Greenberg v. Ethicon Endo-Surgery, Inc.*, 91 F.3d 1580, 1583 (Fed. Cir. 1996). “Address data former” is not a standard term used in the art; it was coined for use in the ‘521 patent. (See Wood Decl. ¶ 48, ECF No. 67). The plain language of “address data former” also does not communicate to a POSITA structure for hardware or software. (*Id.* at ¶ 50). Instead, the term is “simply an

abstraction that describes the function being performed,” i.e., forming address data. *See Advanced Ground*, 830 F.3d at 1348.

Dali argues that the term communicates “logical structure,” but logic by itself cannot constitute structure. *See Visual Networks Operations, Inc. v. Paradyne Corp.*, 2005 WL 1411578, at *30 (D. Md. June 15, 2005) (“Logic can be implemented in computer code, in hardware, or in some combination of both, but logic, itself, does not constitute a structure or device.”). Dali and its expert, Dr. Bims, consistently describe “address data former” only by the embodiment disclosed in the patent or in terms of what it does, not what it is. (*See, e.g.*, Bims Decl. ¶ 150 (“[A]ddress data former generates an address that is used for both the linearity and time delay tables and the predistortion tables.”); Def. Br. at 12 (“Generating addresses to store values in lookup tables or other memory structures is a common process.”)); *see also Media Rights Techs., Inc. v. Capital One Fin. Corp.*, 800 F.3d 1366, 1372 (Fed. Cir. 2015) (finding that the term “compliance mechanism” invokes Section 112(f), because the asserted claims “simply state that the ‘compliance mechanism’ can perform various functions”). Dali also analogizes to a case holding that the term “processor” communicates sufficiently definite structure, *Advanced Mktg. Sys., LLC v. CVS Pharmacy, Inc.*, 2016 WL 1741396, at *20 (E.D. Tex. May 3, 2016), but unlike “address data former,” courts have previously held that “processor” is not a generic nonstructural term, *Smartflash LLC v. Apple Inc.*, 77 F. Supp. 3d 535, 543 (E.D. Tex. 2014). Accordingly, the Court finds that the term “address data former” does not recite sufficient structure and is therefore subject to Section 112(f).

Construing a means-plus-function claim term is a two-step process. “The court must first identify the claimed function.” *Williamson*, 792 F.3d at 1351. “Then, the court must determine what structure, if any, disclosed in the specification corresponds to the claimed function.” *Id.*

Claim 16 of the ‘521 patent describes the function of “address data former” as “generat[ing] a digital lookup table key.” *See* ‘521 patent 12:35-36; *see also id.* at Abstract. Experts from both parties agree that the embodiment of “address data former” disclosed in the specification is a combination of shift register and digital signal process (“DSP”) logic that transforms a received signal into either a 0 or a 1. (*See* Wood Decl. ¶ 55; Bims Decl ¶¶ 153-54, 160-61); *see also* ‘521 patent 7:32-67 (“Address of lookup table in predistorter is formed by [series of equations]”); *id.* at 8:2-6 (“Address of lookup tables are formed in a shift register by taking binary symbol by means of [series of equations].”). In the embodiment, the DSP logic outputs a 0 or 1, and the shift register takes that output to create the address, which can be more than a 0 or 1. (*See* Wood Decl. ¶¶ 58-59; Bims Decl. ¶¶ 153-54; ‘521 patent at 8:2-9). Accordingly, the Court finds that “address data former” invokes Section 112(f). Its function is to generate a digital lookup table key, and its structure is (1) DSP logic that transforms a received signal into either a 0 or a 1 and (2) a shift register.

v. “switching a controller off to disconnect signal representative of the output of the power amplifier”

Disputed Term	CommScope’s Proposed Construction	Dali’s Proposed Construction	Court’s Construction
“switching a controller off to disconnect signal representative of the output of the power amplifier” (Claim 1)	Switching a controller to a nonoperating state to disconnect signal representative of the output of the power amplifier.	Switching a controller to an off status to disconnect signal representative of the output of the power amplifier.	Switching a controller to a nonoperating state to disconnect signal representative of the output of the power amplifier.

CommScope emphasizes various dictionary definitions indicating that “switching off” a controller puts that controller in a non-operative state. (*See* Pl. App. at A184⁸ (“not operating

⁸ *Cambridge Dictionary of American English* (2d ed. 2008).

because they are not switched on”); *id.* at 187⁹ (“[n]ot operating or operational”); *id.* at A190¹⁰ (“not functioning or so as to cease to function”). Dali argues that “switching off” a controller is to put it in an “off status.” Its construction incorporates language found in the specification:

The switch ON/OFF controllers 34I-34Q are set to ON status when predistortion lookup tables 31I-31Q are trained by adaptive algorithm. After the training procedure [is] completed, the switches are set to Off status and the predistortion lookup tables 34I-34Q are no longer updated adaptively.

See ‘521 patent at 6:37-41.

The Court agrees with CommScope’s proposed construction. The underlying dispute over this term is what switching “off” does to the controller. The specification gives guidance on when the controller is turned off (“[a]fter the training procedure [is] completed”) and what the effect of turning off is (“predistortion lookup tables . . . are no longer updated adaptively”). *See* ‘521 patent at 6:37-41. The specification does not give any information on what happens to the controller that is set to “off.” Dali argues that the term “off” need not be defined. However, “[a] determination that a claim term ‘needs no construction’ or has the ‘plain and ordinary meaning’ may be inadequate . . . when reliance on a term’s ‘ordinary’ meaning does not ‘resolve the parties’ dispute.” *O2 Micro Int’l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1361 (Fed. Cir. 2008). Dali’s proposed construction fails to address what happens to a controller in the “off” state. CommScope’s proposed construction adopts the plain and ordinary meaning: switching off an object makes it non-operational. Accordingly, the Court construes “switching a controller off to disconnect signal representative of the output of the power amplifier” as “switching a controller to a nonoperating state to disconnect signal representative of the output of the power amplifier.”

⁹ *The American Heritage College Dictionary* (3d ed. 2000).

¹⁰ *New Oxford American Dictionary* (3d ed. 2010).

c. '473 Patent

- i. **“wherein the host unit is configurable to transmit a digital representation of a first subset of the plurality of downlink signals to the first remote unit and a digital representation of a second subset of the plurality of downlink signals to the second remote unit, the second subset being different than the first subset”**

Disputed Term	CommScope’s Proposed Construction	Dali’s Proposed Construction	Court’s Construction
“wherein the host unit is configurable to transmit . . . ” (Claims 6, 11)	Language states an intended use	Language does not state an intended use	Language does not state an intended use

CommScope’s argument regarding “intended use” is novel. “Intended use” analysis has been applied by federal courts to the *preamble of a method claim*.¹¹ A preamble “simply stating the intended use or purpose of the invention will usually not limit the scope of the claim.” *Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp.*, 320 F.3d 1339, 1345 (Fed. Cir. 2003). This is because “such statements usually do no more than define a context in which the invention operates.” *Id.* However, preamble language will limit the claim if it recites not merely a context in which the invention may be used, but the essence of the invention without which performance of the recited steps is nothing but an academic exercise.” *Id.* (citing *Griffin v. Bertina*, 285 F.3d 1029, 1033 (Fed. Cir. 2002)).

CommScope argues that the same analysis applies to terms in the body of non-method claims. It argues that on its face, the claim term does not describe what the mentioned “host

¹¹ One district court opinion summarily disposed of a party’s “intended use” argument at a Markman hearing because the disputed term was in the body. *See Secor View Techs. LLC v. Nissan N. Am., Inc.*, 2013 WL 6147788, at *5 n.11 (D.N.J. Nov. 21, 2013) (“The typical rule is that a preamble that simply states the intended use or purpose of an invention will usually not limit the claims. Here, the phrase Plaintiff argues is non-limiting is in the body of the claim, not in the preamble.”). *But see In re Stencel*, 828 F.2d 751, 754 (Fed. Cir. 1987) (“Such statements [of intended use] often, although not necessarily, appear in the claim’s preamble, as in Stencel’s claims.”).

unit” is or does. (Pl. Br. at 29-30). CommScope finds fault with the fact that the host unit is *configurable* to do something, not *configured* to do it. (*Id.*) In support, CommScope cites to administrative decisions from the PTO, ruling that “configurable to” language represents a statement of intended use. (*See* Pl. App. at A313, A302). Dali argues that the term relates to the essence of the invention, because configurability is the key feature that is novel over the prior art. (Def. Br. at 21-22).

Regardless of whether “intended use” analysis is applicable outside the context of the preamble and method claims, the Court finds that the disputed claim term does not state an intended use. First, the term does not describe an intended use or purpose of the invention. It describes a feature of the invention. *Compare* ‘473 patent at 14:12-18 *with Manning v. Paradis*, 296 F.3d 1098, 1103 (Fed. Cir. 2002) (method for “treating a subject in cardiac arrest”); *see also Griffin v. Bertina*, 285 F.3d 1029, 1031 (Fed. Cir. 2002) (method for “diagnosing an increased risk for thrombosis”); *Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp.*, 320 F.3d 1339, 1344 (Fed. Cir. 2003) (method of “growing and isolating swine infertility and respiratory syndrome virus”); *Advanced Med. Optics, Inc. v. Alcon Inc.*, 361 F. Supp. 2d 370, 395 (D. Del. 2005) (method for “reducing expandable gas”).

Second, the disputed claim term is related to the “essence of the invention.” The specification praises how configurability (or flexibility) is the feature of the invention that improves upon the prior art:

The advanced system architecture of the present invention provides a high degree of flexibility to manage, control, enhance and facilitate radio resource efficiency, usage and overall performance of the distributed wireless network.

‘473 patent at 3:60-64; *see also id.* at 5:64-6:1 (“[P]resent invention is a novel Reconfigurable Distributed Antenna System that provides a high degree of flexibility to manage, control, re-

configure, enhance and facilitate . . . the overall performance of the distributed wireless network”). This indicates that the patentee envisioned the configurability claim to be a limitation of the invention, not a statement of intended use. *See also Catalina Mktg. Int’l v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (“In general, a preamble limits the invention if it recites essential structure or steps.”). This is unlike the administrative decisions cited by CommScope, in which the patents at issue did not similarly emphasize configurability, or something akin to it, as a fundamental improvement over prior art. Accordingly, the Court finds that the phrase “wherein the host unit is configurable to transmit . . .” does not state an intended use.

V. Conclusion

The Court **ADOPTS** the claim constructions as set forth above. The parties 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 in the presence of the jury any portion of this opinion, other than the actual definitions adopted by the Court.

SO ORDERED.

December 19, 2017.