IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

TOGAIL TECHNOLOGIES LTD. **Plaintiff,** **v.** **APPLE INC.** **Defendant.**	**Civil Action No. 6:22-cv-00326-ADA** **JURY TRIAL DEMANDED**

DEFENDANT APPLE INC.'S
OPENING CLAIM CONSTRUCTION BRIEF

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I. INTRODUCTION

Defendant Apple Inc. ("Apple") moves to construe seven disputed terms across three of the four Asserted Patents.[1]

Apple moves to construe the preamble of claims in two of the patents (the '238 and '502 Patents) as limiting because they provide an antecedent basis and recite structure or steps underscored as important in the specification—hallmarks of preambles that courts find limiting. In the '238 Patent, the specification, including the summary of the invention, makes clear that "a user equipment (UE) of a connected state" is at the heart of the claimed invention. The same is true for the "on-demand system information (SI) request procedure performed by a user equipment (UE)" in the '502 Patent. Togail improperly proposes to ignore these facts and not construe the preambles as limiting. *Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002) ("[A] preamble limits the invention if it recites essential structure or steps, or if it is 'necessary to give life, meaning, and vitality' to the claim." (quoting *Pitney Bowes, Inc. v. Hewlett–Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999))).

In the '972 Patent, Apple moves to hold Togail to the definition of "leading time value/duration" that the patentees recited in the specification. Togail should not be permitted to assert that its patent has a scope greater than what the patentees clearly chose to define and disclose to the Patent Office in order to obtain this patent—but that is precisely what Togail seeks to do by proposing no construction for this term. *See, e.g.*, *Rexnord Corp. v. Laitram Corp.*, 274 F.3d 1336,

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[1] The Asserted Patents are U.S. Patent No. 10,743,238 (the "'238 Patent") (claims 1-5, and 11-15); U.S. Patent No. 10,791,502 (the "'502 Patent") (claims 1, 2, 4-9, 11, 12, and 14-19); U.S. Patent No. 10,972,972 (the "'972 Patent") (claims 1, 8, 11-15, 22, and 25-28); and U.S. Patent No. 11,115,165 (the "'165 Patent") (claims 1-3, 5-9, and 11-12). Neither party proposed any terms for construction for the '165 Patent. Apple therefore does not discuss the '165 Patent in this brief.

1342 (Fed. Cir. 2001) ("***First, patent law permits the patentee to choose to be his or her own lexicographer*** by clearly setting forth an explicit definition for a claim term that could ***differ in scope*** from that which would be afforded by its ordinary meaning.").[2]

Apple also moves to construe four terms as indefinite. Two of the terms of the '502 Patent are invalid as nonsensical. *See, e.g.*, *Horizon Pharma, Inc. v. Dr. Reddy's Lab'ys Inc.*, 839 F. App'x. 500, 505 (Fed. Cir. 2021) ("One circumstance in which claims are indefinite is where the claims, as properly construed, are nonsensical."). In the first term, the phrase "first SI request message including at least one requested system information block (SIB)" requires that an SI request message itself includes the SI block that it is requesting. That makes no sense because the ***request*** message would not contain the very ***thing being requested***. In the second term, the phrase "transmitting a fourth SI request message to the BS after determining that the UE is ***not in the connected state***" appears in claims that depend from independent claims requiring the UE to be ***in a connected state***—thus contradicting the state of the UE required there. This too renders the claim nonsensical. *Multilayer Stretch Cling Film Holdings, Inc. v. Berry Plastics Corp.*, 831 F.3d 1350, 1362 (Fed. Cir. 2016) ("A dependent claim that contradicts, rather than narrows, the claim from which it depends is invalid." (citing 35 U.S.C. § 112(d))). These claims are thus invalid.

Certain claims of the '238 and '502 Patents are also invalid as indefinite because they are improper mixed method/apparatus claims. These claims are nominally apparatus claims directed to user equipment (UE) (*i.e.*, a device), but improperly include a method step requiring action by other devices on the network. In such instances, a person of ordinary skill in the art cannot determine with reasonable certainty whether the claim is met simply by an instance of the UE as

[2] All emphasis added throughout unless otherwise noted.

described in the claim, or only when other structures take specific actions, and this uncertainty renders the claims that include those terms indefinite. *IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377, 1384 (Fed. Cir. 2005) (holding claims invalid as indefinite where "it is unclear whether infringement [] occurs when one creates a system [or] when the user actually uses the [] means").

II. BACKGROUND

The Asserted Patents all relate to wireless communications, including fifth generation (e.g., 3GPP 5G NR) wireless communication devices, methods, and systems. *See, e.g.*, Ex. A[3], '238 Patent 1:25-45, 3:44-54; Ex. B, '502 Patent 1:23-36; Ex. C, '972 Patent 1:22-38.

A. Background of the '238 Patent

The '238 Patent is titled "System information updates in band width part (BWP) switch operation" and relates to coordinating which bandwidth part a wireless device should use to receive system information. A bandwidth part is a partition of the total bandwidth accessible to a device. *See, e.g.*, Ex. D, U.S. Patent No. 11,109,212 ("Agiwal '212") at 4:3-5. System information ("SI") in mobile communications refers to information provided by the network to a device about the network. *See, e.g.*, *id.* at 3:9-27. The independent claims (claims 1 and 11) describe a user equipment ("UE") in a connected state that receives an "SI change indication" and switches from a currently active bandwidth part to an initial active bandwidth part. Ex. A, '238 Patent claims 1 and 11. The term "user equipment" or "UE" refers to an end user's mobile device, such as a mobile phone. *Id.* 3:34-36 ("a UE may include, but is not limited to, a mobile station, a mobile terminal or device, a user communication radio terminal."). The UE determines which system information

[3] All Exhibit citations are to those attached to the Declaration of Jennifer M. Przybylski filed concurrently with this brief.

blocks to update based on the remaining minimum SI it receives from the initial active bandwidth part. *Id.* at 4:42-44. The dependent claims (Claims 2-5 and 12-15) describe various timings upon which the UE switches the bandwidth part and the SI update is completed. *Id.* claims 2-5, 12-15.

B. Background of the '502 Patent

The '502 Patent is titled "On-demand system information request procedure and error handling" and relates to transmitting sequential requests for "on-demand" system information (SI) when a first request fails and a timer expires. *See, e.g.*, Ex. B, '502 Patent at Abstract; *id.* claims 1 and 11. An *on-demand SI request* is a process by which the UE (e.g., a mobile phone) itself initiates a request for certain information from the cellular network. *See, e.g.*, *id.* at 1:26-33 ("When a UE finds that a required SI message(s) is not broadcasted . . . the UE may perform an on-demand SI request procedure to ask the network (also referred to as NW) to broadcast the required SIB(s) and/or SI message(s)."). The SI is received in the form of an SI message or system information blocks ("SIBs"). *See*, *e.g.*, *id.* at 5:10-14. The independent claims (claims 1 and 11) describe a user equipment (UE) in a connected state that transmits an SI request message including one requested SIB, activates a timer, and transmits a second SI request message if the timer expires and the requested SIB is not received. *Id.* claims 1 and 11. The dependent claims (claims 2, 4-9, 12, and 14-19) describe methods of the UE transmitting the SI request message and receiving SIBs. *Id.* claims 2, 4-9, 12, 14-19.

C. Background of the '972 Patent

The '972 Patent is titled "Method and apparatus for operating multiple antenna panels" and relates to power saving techniques for wireless communication devices with multiple antenna panels. *See, e.g.*, Ex. C, '972 Patent at claims 1–28. The '972 Patent on its face claims priority to U.S. Provisional Patent Application No. 62/699,465, entitled "Method and Apparatus for leading

time of beam switching for multi-panel transmission."[4] The '972 Patent relates to techniques for a wireless device to switch antenna beams. *See, e.g.*, Ex. C, '972 Patent at 6:22-67. The independent claims of the '972 Patent (claims 1 and 15) describe a device that stores a plurality of "leading time values" and "leading time durations" for beam-switching. The leading time values and durations are (or reflect) the minimum time required for the device to set up one or more antenna panels to transmit or receive data on an indicated beam. (*Id.* at claims 1, 15; *id.* at Abstract; *id. at* 6:23-27). The dependent claims (claims 8, 11-14, 22, and 25-28) feature various power-saving modes, in which the device turns one or more antenna panels on or off under certain conditions (*e.g.*, if the device is operating in a particular mode, or based on the value of a particular bit).

III. PERSON OF ORDINARY SKILL IN THE ART

In the context of the '238 and '502 Patents, a person of ordinary skill in the art (hereinafter, "POSITA") would be someone with at least: (1) a Masters of Science in Electrical Engineering or related field and three years of industry experience in mobile communications or wireless networks; or (2) a Doctorate (Ph.D., Eng.D., etc.) in Electrical Engineering or related field and one year of industry experience in mobile communications or wireless networks; or (3) equivalent industry experience in mobile communications or wireless networks. *See* Declaration of Matthew C. Valenti, P.E., Ph.D. ("Valenti Decl.") ¶ 30. [5]

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[4] Apple does not concede that any claims of the '972 Patent are entitled to receive the benefit of the provisional filing date.

[5] Matthew C. Valenti, P.E., Ph.D., a Professor of Computer Science and Electrical Engineering at West Virginia University, has submitted a declaration in support of Apple's Opening Claim Construction Brief, filed concurrently herewith. Dr. Valenti's CV is attached as the Appendix to his declaration.

IV. DISPUTED TERMS

A. Disputed Terms of the '238 Patent

1. "A method for a user equipment (UE) of a connected state, the method comprising:" ('238 Patent Claim 1)

Togail's Proposed Construction	Apple's Proposed Construction
No construction necessary.	The preamble is limiting.

The preamble of Claim 1 of the '238 Patent is limiting because it serves as antecedent basis for the claim term "the UE" and because the preamble recites essential structure underscored as important by the specification. Togail's proposal improperly ignores this canon of claim construction.

"[A] preamble limits the invention if it recites essential structure or steps, or if it is 'necessary to give life, meaning, and vitality' to the claim." *Catalina*, 289 F.3d at 808. "Further, when reciting additional structure or steps underscored as important by the specification, the preamble may operate as a claim limitation." *Id.* By contrast, courts generally find preamble language non-limiting if it "merely states the purpose or intended use of an invention." *Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 952 (Fed. Cir. 2006). This Court has used the following Federal Circuit "guideposts" to determine "whether the preamble is limiting: (1) preamble provides antecedent basis, (2) preamble is essential to understand limitations or terms in the claim body, (3) preamble recites 'additional structure or steps underscored as important by the specification,' and (4) 'clear reliance on the preamble during prosecution to distinguish the claimed invention from the prior art.'" *Digital Retail Apps, Inc. v. H-E-B, LP*, No. 6-19-CV-00167-ADA, 2020 WL 376664, at *7 (W.D. Tex. Jan. 23, 2020) (quoting *Catalina*, 289 F.3d at 808-09). Not all guideposts must be met to find a preamble limiting. *See Catalina*, 289 F.3d at 808 ("No litmus test defines when a preamble limits claim scope."); *see also PM Holdings, LLC v. Heart of Texas Surgery Ctr.,*

PLLC, No. 6:21-cv-00644-ADA, 2022 WL 1230272, at *4 (W.D. Tex. Apr. 26, 2022) (finding preamble limiting where only one guidepost was met).

The preamble meets at least two of the *Catalina* guideposts that warrant finding the preamble limiting. ***First***, the preamble serves as an antecedent basis for a claim term. The preamble recites "a user equipment (UE) of a connected state," Ex. A, '238 Patent claim 1 (preamble), and the remainder of the claim recites "determining which of the changed SIBs is required to be updated for **the UE** according to the received RMSI" (*id*. at 12:57-58). The preamble serves as antecedent basis for a claim term—the required "UE"—and it is therefore limiting. *See, e.g.*, *Shoes by Firebug LLC v. Stride Rite Children's Grp., LLC*, 962 F.3d 1362, 1367 (Fed. Cir. 2020) ("'No litmus test defines when a preamble limits claim scope,' but 'dependence on a particular disputed preamble phrase for antecedent basis may limit claim scope because it indicates a reliance on both the preamble and claim body to define the claimed invention.'" (citations omitted)) (finding preamble limiting in part because it provided an antecedent basis for a claim term); *Bio-Rad Labs., Inc. v. 10X Genomics Inc.*, 967 F.3d 1353, 1371-72 (Fed. Cir. 2020) ("Based on the antecedent relationship, it is clear the claim drafters intended to limit the claimed method**s** to on-chip reactions, using both the preamble and the body of the claim to define the claimed invention."); *Eli Lilly & Co. v. Teva Pharms. Int'l GmbH*, 8 F.4th 1331, 1343 (Fed. Cir. 2021) ("In addition to giving life and meaning to the method step of each claim, the preambles also provide antecedent basis for at least one later claim term in the independent claims."); *Collaborative Agreements, LLC v. Adobe Sys. Inc.*, No. A-14-CV-356-LY, 2015 WL 2250391, at *11 (W.D. Tex. May 12, 2015) (finding preambles limiting based on the antecedent basis of the term "a transaction"); *see also Digital Retail Apps*, 2020 WL 376664, at *8

("Thus, the Court finds the preamble limiting because the preamble provides the antecedent basis for limitations in the body.").

Second, the preamble recites "additional structure . . . underscored as important by the specification." *Catalina,* 289 F.3d at 808. The preamble explains that the UE is "of a connected state." Ex. A, '238 Patent at claim 1. That the claimed method applies only to UEs of a connected state is reinforced throughout the specification. The summary of the invention section of the patent recites two "aspects" of the invention, and each one describes the UE as being in a connected state—*i.e.* the summary of the invention describes the invention exclusively in terms of a UE in a connected state. *See id.* at 1:52-54 ("In one aspect of the present disclosure, a method for bandwidth part (BWP) operations performed by ***a user equipment (UE) of a connected state*** is provided."); *id.* at 2:1-2 ("In one aspect of the present disclosure, ***a user equipment (UE) of a connected state*** is configured to . . ."). The Federal Circuit has explained that statements in the summary of the invention are highly relevant to determining the invention's scope. *VirnetX, Inc. v. Cisco Sys., Inc.*, 767 F.3d 1308, 1318 (Fed. Cir. 2014) ("The fact that the Summary of the Invention gives primacy to these attributes strongly indicates that the invention requires more than just data security."); *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 864 (Fed. Cir. 2004) (giving particular weight to statements in the Summary of the Invention because "[s]tatements that describe the invention as a whole, rather than statements that describe only preferred embodiments, are more likely to support a limiting definition of a claim term").

In *Deere & Co. v. Bush Hog, LLC*, the Federal Circuit concluded that the preamble phrase "rotary cutter deck" was limiting and necessary to understand the scope of the claim. 703 F.3d 1349, 1357-58 (Fed. Cir. 2012) ("Relevant here, when reciting additional structure underscored as important by the specification, the preamble may operate as a claim limitation.") (internal

quotation marks and ellipses omitted). The court noted that "[u]nlike non-limiting preamble terms, 'rotary cutter deck' does not merely state a name or a use for the claimed box section. ***Rather, the term describes a 'fundamental characteristic of the claimed invention'*** that informs one of skill in the art as to the structure required by the claim." *Id.* (quoting *Poly-Am., L.P. v. GSE Lining Tech., Inc.*, 383 F.3d 1303, 1310 (Fed. Cir. 2004)). The court further observed:

> The specification further demonstrates that the preamble phrase "rotary cutter deck" is a limitation. The specification ***repeatedly*** refers to the ***"present invention"*** as ***"an improved deck for a rotary cutter,"*** or a ***"rotary cutter deck."*** . . . The ***title of the patent, the summary of the invention, and every drawing*** describe the invention as a deck for a rotary cutter. . . . The specification explains that ***the invention addresses a concern specific to rotary cutters***: the need for a cutter deck that is smooth and easy to clean, but does not reduce cutting efficiency. . . . ***In sum, the specification underscores the importance of "rotary cutter deck" as a limitation of the claimed invention.***

Id. (internal citations omitted).

The same facts are present here. The '238 Patent's specification repeatedly discusses the actions of a "connected" UE—***over 15 times***—and ***never describes the UE as not connected***. Figures 1-9 describe "BWP switching operation for a ***Connected_UE***." Ex. A, '238 Patent at 2:23-58. And the "Background" section explains that the invention purportedly addresses concerns specific to connected UEs:

> For a UE, an initial active DL BWP is defined as the frequency location and bandwidth dedicated for broadcasting remaining minimum SI (RMSI). When the NW sends ***to a Connected_UE*** a system information (SI) change indication that notifies of system information change, ***the Connected_UE may have to switch*** from the currently active BWP to the initial active BWP for accessing the RMSI and updating to the changed SI if there is no SI broadcasting on the currently active BWP. Furthermore***, the Connected_UE may not successfully complete SI update*** if there is no clear UE behavior defined for BWP switching. ***As a result of BWP switching inability problem, the UE*** may not be able to update system information.

Ex. A, '238 Patent 1:33-45. The preamble recites additional structure underscored ***repeatedly*** in the specification—including in the Summary of the Invention—as important. *Deere & Co.*, 703 F.3d at 1358; *Novatek, Inc. v. Sollami Co.*, 559 F. App'x 1011, 1016 (Fed. Cir. 2014) ("In addition, the purported improvement over prior art is stated as a 'more efficient means for allowing the removal of a bit from a bit holder or a bit block.' These statements in the specification underscore structural elements recited in the preamble, e.g., 'bit,' as pertinent to the invention claimed." (citations omitted)) (holding that "the district court did not err in concluding that the recited structural elements in the preambles serve as limitations that give 'life, meaning, and vitality to the claims' as a whole"); *see also Eli Lilly*, 8 F.4th at 1343; *Bio-Rad*, 967 F.3d at 1371. Therefore, the preamble of claim 1 is limiting.

2. "receiving a system information (SI) change indication broadcasted by a paging" (238 Patent Claim 11)

Togail's Proposed Construction	Apple's Proposed Construction
No construction necessary.	Indefinite

Claim 11 of the '238 Patent is indefinite because it improperly claims a mixed method and apparatus of the type prohibited by *IPXL*. 430 F.3d at 1384. Claim 11 is directed to an apparatus (a "user equipment (UE)") but includes a method step that is not performed by that apparatus. Specifically, other network equipment, not the UE, performs the "broadcasted by a paging" step that is required for the claimed UE to "receiv[e] a system information (SI) change indication broadcasted by a paging." The claim scope exceeds the apparatus and its capabilities, rendering the scope of potential infringement indefinite. *See H-W Tech., L.C. v. Overstock.com, Inc.*, 758 F.3d 1329, 133536 (Fed. Cir. 2014) ("The rationale behind invalidating [a mixed method/apparatus claim] as indefinite is that it is unclear when infringement occurs.").

"A single patent may include claims directed to one or more of the classes of patentable subject matter, but no single claim may cover more than one subject matter class." *Barkan Wireless IP Holdings, L.P. v. Samsung Elecs. Co.*, No. 2:18-CV-28-JRG, 2019 WL 497902, *33 (E.D. Tex. Feb. 7, 2019) (quoting *Microprocessor Enhancement Corp. v. Texas Instruments Inc.*, 520 F.3d 1367, 1374 (Fed. Cir. 2008) (internal quotation marks omitted)). A claim is indefinite for claiming an apparatus and a method for using the apparatus when "it is unclear whether infringement [] occurs when one creates a system [or] when the user actually uses the [] means." *IPXL*, 430 F.3d at 1384. Although "system claims with 'permissible functional language used to describe the capabilities [of the system],' rather than the activities of the user, are not invalid for indefiniteness," claims that "impermissibly claim" ***method steps performed by another*** "alongside system claims . . . blur the scope of the claimed invention." *Visible Connections, LLC v. Zoho Corp.*, 418 F. Supp. 3d 155, 165-66 (W.D. Tex. 2019) (alteration in original) (quoting *MasterMine Software, Inc. v. Microsoft Corp.*, 874 F.3d 1307, 1313 (Fed. Cir. 2017)) (finding claim indefinite).

In *Power Integrations, Inc. v. ON Semiconductor Corp.*, the district court analyzed a claim that listed apparatus elements before reciting a "control signal being provided when no feedback signal is provided at said feedback input and said duty cycle signal is in said high state." No. 16-cv-06371-BLF, 2018 WL 5603631, at *15 (N.D. Cal. Oct. 26, 2018). The district court found that the control signal was only provided "under certain conditions," and that "no recited structure in the claim [] arguably provide[d]" the control signal. *Id.* at *17. The court held that the claim was indefinite because the functional language it included was "not tied to the capability of any 'associated structures.'" *Id.*

Similarly, in *UltimatePointer, L.L.C. v. Nintendo Co.*, the claims at issue recited an apparatus that "consists of a handheld enclosure, a sensing device for generating data indicative of

the spatial state of the handheld enclosure, and a communication element providing control data to the computer for controlling the feature on the image." No. 6:11-cv-496, 2013 WL 2325118, *23 (E.D. Tex. 2013). However, the court ruled that an element reciting "control of a feature on an image 'based on the relation between the first spatial state and the second spatial state of the enclosure'" was indefinite. *Id.* That element, particularly the apparatus's reliance on "the relation" between spatial states, ***depended on "data generated" by a user performing a method step***. *Id*. The court held such a claim is "not definite as to whether the claim is infringed when the pointing-device apparatus is made or sold, or when a user actually uses it to direct a pointing line." *Id*.

Claim 11 is an improper mixed method/apparatus claim of the type invalidated in *IPXL*, *Power Integrations*, and *UltimatePointer*. Specifically, claim 11 is nominally an ***apparatus claim*** directed to a UE, but also requires a ***method step performed by the network:*** "receiving a system information (SI) change indication ***broadcasted by a paging***." Claim 11 claims a "user equipment (UE)" with particular structural elements, including "a non-transitory machine-readable medium" coupled to "a processor." A POSITA would understand the described "user equipment (UE)" to be the "apparatus" of independent claim 11 and its dependents. *See* Valenti Decl. ¶ 32. After reciting the structural scope of the claimed apparatus—a user equipment—claim 11 recites that the UE "perform[s] operations comprising" a number of method steps, characterized by functional language terms and presented using the same language as the method steps of method claim 1. For example, claim 11 requires that the UE "switch[es] from currently active BWP to an initial active BWP for an SI update," and "determine[es] which of the changed SIBs is required to be updated for the UE according to the received RMSI." But the step of "receiving a system information (SI) change indication broadcasted by a paging" describes ***action taken by an unclaimed structure***—

other network equipment. *See* Ex. A,'238 Patent at 13:43-44, 14:3-5, 13:39-40; *see also* Valenti Decl. ¶¶ 32-34.

Though the UE does the "receiving," the claimed action of broadcasting a system information (SI) change indication by a paging would not be performed by the UE. Instead, the specification describes this step as being performed by the network:

> In one embodiment of the present disclosure, a Connected_UE may implicitly switch to an initial active BWP upon receiving a system information (SI) change indication **broadcasted by paging from cellular network (NW)**. The SI change indication indicates a SI change/modification and **notifies the UE** to update to the changed SI if required by the UE.

Ex. A,'238 Patent 3:55-61. A POSITA would understand a description of an action taken by the "cellular network" to be performed by a base station. Valenti Decl. ¶¶ 33-34. This claim is therefore similar to the claim at issue in *UltimatePointer*, where the apparatus's claim limitation depended on a step performed by an unidentified user. *See* 2013 WL 2325118 at *23 ("The relation between the spatial states depends on data generated [by a user.]"). Here, the UE's capabilities likewise depend on a step performed by an unidentified base station.

The claim here also resembles the claim held invalid in *Power Integrations* because the SI change indication is sent by an unclaimed structure, the base station, under "certain conditions." 2018 WL 5603631, at *15 ("As written, the claim requires that the control signal 'be[] provided' under certain conditions." (alteration in original)). The method used for sending the SI change is performed by the network, providing the signal under the conditions of "broadcasted by a paging . . . during a modification period." The UE—the claimed apparatus—does not perform the methods used by the network to send the SI change indication. Valenti Decl ¶¶ 32-34; *see Power Integrations*, 2018 WL 5603631 at *17 ("[T]he disputed term is indefinite because it recites functional language divorced from any recited structure.").

Because the UE does not itself perform the "broadcasted by a paging" step, infringement cannot be determined "when one creates" a UE. *IPXL*, 430 F.3d at 1384 (holding a mixed apparatus and method claim is indefinite because the scope of infringement is unclear between the creation of the apparatus and performance of the method); *see also UltimatePointer*, 2013 WL 2325118 at *23 ("The claim is not definite as to whether the claim is infringed when the pointing-device apparatus is made or sold, or when a user actually uses it to direct a pointing line."); *Visible Connections*, 418 F. Supp. 3d at 166 ("Because the presence of user steps makes it unclear whether infringement occurs when one creates an interface program . . . or when the user selects the documents to be shared, the claims do not 'apprise a person of ordinary skill in the art of its scope' and are invalid for indefiniteness." (citing *IPXL*, 430 F.3d at 1384)). This again resembles the claim held invalid in *Power Integrations* because the SI change indication is sent by an unclaimed structure, the base station. 2018 WL 5603631 at *17 ("A review of this relevant case law makes clear that the disputed term is indefinite because it recites functional language divorced from any recited structure.").

Therefore, "receiving a system information (SI) change indication broadcasted by a paging" is indefinite because it includes a method requiring specific functional conditions that cannot be performed by the claimed apparatus, only by unclaimed network equipment such as a base station.

B. Disputed Terms of the '502 Patent

1. "A method of an on-demand system information (SI) request procedure performed by a user equipment (UE), the method comprising" ('502 Patent Claim 1)

Togail's Proposed Construction	Apple's Proposed Construction
No construction necessary.	The preamble is limiting.

The preamble of Claim 1 of the '502 Patent is limiting because the preamble recites essential structure underscored as important by the specification and because it serves as an antecedent basis for the claim term "the UE." *Catalina*, 289 F.3d at 808 ("[A] preamble limits the invention if it recites essential structure or steps, or if it is 'necessary to give life, meaning, and vitality' to the claim."); *Digital Retail Apps*, 2020 WL 376664 at *7 (finding a preamble is limiting where it "recites 'additional structure or steps underscored as important by the specification'" (quoting *Catalina,* 289 F.3d at 808-09)). Togail's proposal improperly ignores that fact.

First, the preamble recites that the claimed system information request procedure is an "on-demand system information (SI) request procedure," and this characterization of the procedure provides essential structure. Ex. B, '502 Patent at claim 1. The importance of the "on-demand" aspect of the SI request is demonstrated throughout the '502 Patent. The title of the Patent is "***On-demand*** system information request procedure and error handling." Ex. B, '502 Patent. The background section of the specification explains that on-demand SI requests are a feature of 5G networks and that there were no existing techniques for error handling for on-demand requests at the time of the invention—it does not say the same of SI requests in general. *Id.* at 1:24-26 ("The concept of ***on-demand*** System Information (SI) request has been introduced in the next generation wireless network (e.g., a 5th generation (5G) new radio (NR) network)."); *id.* at 1:33-36 ("the next generation wireless network lacks an efficient mechanism for error handling associated with the ***on-demand*** SI request procedure"). The summary of the invention explains that "[t]he present disclosure is directed to ***on-demand*** system information request procedure and the corresponding error handling procedure for the next generation wireless communication networks." *Id.* at 1:40-43.

The above statements show that the preamble recites an essential element—an ***on-demand*** SI request—that is underscored as important in the specification. *See Deere & Co.*, 703 F.3d at 1358 ("The title of the patent, the summary of the invention, and every drawing describe the invention as a deck for a rotary cutter. . . . [T]he invention addresses a concern specific to rotary cutters . . . . In sum, the specification underscores the importance of 'rotary cutter deck' as a limitation of the claimed invention." (citations omitted)); *C.R. Bard*, 388 F.3d at 864 ("Statements that describe the invention as a whole, rather than statements that describe only preferred embodiments, are more likely to support a limiting definition of a claim term."). Like in *Deere & Co.*, "the term describes a 'fundamental characteristic of the claimed invention' that informs one of skill in the art as to the structure required by the claim." 703 F.3d at 1358.

Second, the preamble serves as an antecedent basis for a claim term. The preamble recites "a user equipment (UE)," and the remainder of the claim refers back to that UE. ('502 at 17:28 ("the UE").). This confirms that the preamble is limiting. *See, e.g.*, *Shoes by Firebug LLC*, 962 F.3d at 1367 ("No litmus test defines when a preamble limits claim scope, but dependence on a particular disputed preamble phrase for antecedent basis may limit claim scope because it indicates a reliance on both the preamble and claim body to define the claimed invention."); *Eli Lilly*, 8 F.4th at 1343 (preamble limiting when it provides antecedent basis for a claimed method step); *Bio-Rad*, 967 F.3d at 1371 ("The fact that the terms 'reaction' and 'microfluidic systems' provide antecedent basis for these terms in the body of the claim is a strong indication that the preamble acts as a necessary component of the claimed invention." (internal quotation marks omitted)); *Collaborative Agreements*, 2015 WL 2250391, at *11 (finding preambles limiting based on the antecedent basis of the term "a transaction"); *Digital Retail Apps*, 2020 WL 376664, at *8 ("Thus,

the Court finds the preamble limiting because the preamble provides the antecedent basis for limitations in the body."). Therefore, the preamble is limiting.

2. "first SI request message including at least one requested system information block (SIB)" ('502 Patent Claims 1 and 11)

Togail's Proposed Construction	Apple's Proposed Construction
No construction necessary.	Indefinite

Claims 1 and 11 of the '502 Patent are indefinite because the term "first SI request message including at least one requested system information block (SIB)" is nonsensical. It would not make sense for an SI request message to include a requested system information block, because the SI request message is how a UE informs the network that it needs a certain SIB. Valenti Decl. ¶ 39. If the UE already had the SIB, it would not need to request it.

"The test for indefiniteness is whether the claims, viewed in light of the specification and prosecution history, 'inform those skilled in the art about the scope of the invention with reasonable certainty.'" *Nevro Corp. v. Bos. Sci. Corp.*, 955 F.3d 35, 41 (Fed. Cir. 2020) (quoting *Nautilus, Inc. v. Biosig Instruments Inc.*, 572 U.S. 898, 910 (2014)). "One circumstance in which claims are indefinite is where the claims, as properly construed, are nonsensical." *Horizon Pharma*, 839 F. App'x. at 505; *see also Synchronoss Techs., Inc. v. Dropbox, Inc.*, 987 F.3d 1358, 1366–67 (Fed. Cir. 2021) ("Here, the asserted claims of the '446 patent are nonsensical and require an impossibility—that the digital media file contain a directory of digital media files.").

The '502 Patent describes a procedure for on-demand system information requests. When a UE requires system information from the network, it can send an SI request to the base station. Valenti Decl. ¶ 38; Ex. B, '502 Patent at 5:8-21. A POSITA would understand that since this is a request for system information, including a request for one or more SIBs, the SI request would not itself contain any requested SIBs. Valenti Decl. ¶ 39. The patent specification supports that

understanding because it never discloses an SI request message that includes the SIB being requested by that message. *Id.* ¶ 39. A POSITA would view the limitation "first SI request message including at least one requested system information block (SIB)" as nonsensical because the SI request message could not itself include the SIB it is requesting. *Id.* ¶¶ 37-39. Claims 1 and 11 are therefore indefinite as nonsensical. *See*, *e.g.*, *Synchronoss*, 987 F.3d at 1366–67; *Horizon Pharma*, 839 F. App'x. at 505.

Even if the claims ***could*** be written in a definite manner, it is improper for a court to redraft claims to make sense. Courts should not "rewrite claims to preserve their validity." *See Synchronoss,* 987 F.3d at 1367 (quoting *Allen Eng'g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1349 (Fed. Cir. 2002)) (internal quotation marks omitted). In *Synchronoss*, the claim language plainly stated that a "digital media file" would contain "a directory of digital media files." *Id.* at 1366. The parties agreed this was impossible; accordingly, the Federal Circuit refused to construe the claims in a way contrary to their plain meaning and upheld the district court's indefiniteness finding. *Id.* at 1366-67. Likewise here, a plain reading of the exact chosen wording of claims 1 and 11 would indicate to a POSITA that the claimed SI request message ***must contain*** the requested SIB—***because that is what the claim says***. Valenti Decl. ¶ 37. This is nonsensical to a POSITA. *Id*. And, it would be improper for the Court to construe this term's verbatim plain wording to fix it, as doing so effectively redrafts the term of the patent. *See Horizon Pharma*, 839 F. App'x. at 505 ("That the proper construction of the claims is nonsensical does not warrant judicial redrafting of the claims."). Indeed, Togail has not proposed that the Court do so. Thus, claims 1 and 11 are invalid.

3. "transmitting a fourth SI request message to the BS after determining that the UE is not in the connected state" ('502 Patent Claims 6 and 16)

Togail's Proposed Construction	Apple's Proposed Construction
No construction necessary.	Indefinite

Dependent claims 6 and 16 of the '502 Patent are indefinite because they require a determination that the UE is both in a connected state and not in a connected state—a contradiction. While independent claims 1 and 11 require a UE in a connected state, their dependents, claims 6 and 16, require the "UE is not in the connected state."

"A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers." 35 U.S.C. § 112(d). "'[A] claim in dependent form shall contain a reference to a claim previously set forth and then *specify a further limitation of the subject matter claimed*.'" *Multilayer Stretch*, 831 F.3d at 1362 (quoting 35 U.S.C. § 112(d)) (emphasis in original). But "[a] dependent claim that contradicts, rather than narrows, the claim from which it depends is invalid." *Id.*

Claims 1 and 11 require the UE to "determine[e] that [it] is in the connected state." Dependent claims 6 and 16, however, require the UE to "determine[e] that [it] is ***not*** in the connected state." A POSITA could not determine when a device would infringe these claims because the claim requires the UE to be both in a connected state and not in a connected state; the UE as claimed cannot be both connected and not connected. Valenti Decl. ¶ 44. These claims are similar to the dependent claims held indefinite in *Huawei Tech. Co. v. T-Mobile US, Inc.*, No. 2:16-CV-00055-JRG-RSP, 2017 WL 2190103, *27-28 (E.D. Tex. May 17, 2017). There, the dependent claims required "wherein the address information is empty," similar to the dependent claim here requiring that "the UE is not in the connected state." *Id.* at *26. However, the corresponding

independent claim in *Huawei* required "providing . . . address information," much like the independent claim here requires a UE in the connected state. *Id.* The court in *Huawei* concluded "the dependent claims are ***nonsensical*** by ***requiring the provided address information to not be provided***." *Id.* at *27. Similarly, here, the UE cannot be both ***in a connected state*** and ***not in a connected state*** and cannot meet the elements of both the independent and dependent claims. *See Multilayer Stretch*, 831 F.3d at 1362 ("Independent claim 1 excludes LDPE from the inner layers, while dependent claim 10 includes it. As such, claim 10 is inconsistent with claim 1 and, indeed, contradicts claim 1. A dependent claim that contradicts, rather than narrows, the claim from which it depends is invalid."). Therefore, claims 6 and 16 are indefinite as nonsensical. *See, e.g.*, *Synchronoss,* 987 F.3d at 1366–67 ("Here, the asserted claims of the '446 patent are nonsensical and require an impossibility—that the digital media file contain a directory of digital media files.").

Even if the claims could be written in a definite manner, it is improper for a court to redraft claims to make sense. *Horizon Pharma*, 839 F. App'x. at 505 ("That the proper construction of the claims is nonsensical does not warrant judicial redrafting of the claims."). Furthermore, Togail has not proposed any construction. Therefore, claims 6 and 16 are invalid.

4. "receiving, from the BS, the at least one requested SIB via dedicated signaling that is transmitted in response to the first SI request message" ('502 Patent Claim 15)

Togail's Proposed Construction	Apple's Proposed Construction
No construction necessary.	Indefinite

Dependent claim 15 of the '502 Patent is indefinite because it improperly claims a mixed method and apparatus of the type prohibited by *IPXL*. 430 F.3d at 1384. Claim 15 includes both an apparatus (the "user equipment (UE)" of independent Claim 11) and steps that are not performed by the apparatus. By the explicit claim wording, a network base station (the "BS"), ***not***

the UE, performs the transmitted "via dedicated signaling . . . in response to the first SI request message" step that is required in order for the claimed UE to "receiv[e] . . . the at least one requested SIB." Ex. B, '502 Patent claim 15. The claim scope exceeds the apparatus and its capabilities, rendering the scope of potential infringement indefinite. *Power Integrations*, 2018 WL 5603631, at *17.

Apparatus claim 11, on which claim 15 depends, recites a "user equipment (UE)" with particular structural elements including "a non-transitory machine-readable medium" coupled to "a processor. A person of ordinary skill in the art would therefore understand the described "user equipment (UE)" to be the "apparatus" of independent claim 11 and its dependents, including dependent claim 15. *See* Valenti Decl. ¶ 46. Dependent claim 15 does not describe any structural aspects of the claimed UE apparatus. Instead, claim 15 is directed to the method step of "receiving, ***from the BS***, the at least one requested SIB via dedicated signaling that is transmitted in response to the first SI request message." This claimed method step is not "permissible functional language used to describe the capabilities" of the UE apparatus, *Visible Connections*, 418 F. Supp. 3d at 165, because it specifies that a "BS" must send the SIB received by the UE. *See* Valenti Decl. ¶ 47. Additionally, the specification describes this step as being performed by the network. *See* Ex. B, '502 Patent 5:10-14 ("For example, in one implementation, for a UE that is in a connected state, ***the NW may deliver on-demand SI messages or SIB(s) via dedicated signaling to the UE*** after receiving an SI request from the UE."). A POSITA would understand that references to actions taken by the network would be performed by a base station, and therefore a base station would perform the delivery of SI messages or SIBs. *See* Valenti Decl. ¶ 48.

This is a similar scenario to the element found indefinite in *UltimatePointer*. *See* 2013 WL 2325118 at *23 ("The relation between the spatial states depends on data generated [by a user] . . .

effectively requiring the user to use the pointing device."). In *UltimatePointer*, the apparatus—a pointing device—was required to control a feature "based on the relation between" spatial states. *Id*. at *22. However, it was a ***user's actions*** that performed the method of "direct[ing] the handheld enclosure between two points" to determine the data for the relation. *Id*. at *23. The pointing-device apparatus therefore depended on actions of another entity (in that case, a user) in order to be able to accomplish its defined capabilities. *Id*. Here, the UE's capabilities likewise depend on a method performed by the ***base station***, which is not the apparatus claimed either by independent claim 11 or dependent claim 15. Claim 15 cannot be met without the actions of the base station because the UE cannot itself transmit the SIB in the method claimed, it can only receive it once the SIB is transmitted by the base station. *See* Valenti Decl. ¶¶ 46-48.

This is also similar to the claim at issue in *Power Integrations*. 2018 WL 5603631 at *15-16. In that claim, the control signal was only provided "under certain conditions," in particular, "when no feedback signal is provided at said feedback input and said duty cycle signal is in said high state." *Id*. The "conditions" of the signaling were not determined by the claimed apparatus, and the court found the claim indefinite. *Id.* Here, the SIB is only provided under certain conditions that are not determined by the claimed UE. The conditions—dedicated signaling and transmission in response to a SI request message—are determined by the base station. *See* Valenti Decl. ¶ 47. Because this step is performed by a base station, infringement cannot be determined "when one creates" a UE. *IPXL*, 430 F.3d at 1384; *see also Visible Connections*, 418 F. Supp. 3d at 166 ("Because the presence of user steps makes it unclear whether infringement occurs when one creates an interface program . . . or when the user selects the documents to be shared, the claims do not 'apprise a person of ordinary skill in the art of its scope' and are invalid for

indefiniteness." (citing *IPXL*, 430 F.3d at 1384)). Therefore, this claim is indefinite as an improper mixed method and apparatus claim.

C. Disputed Terms of the '972 Patent

1. "leading time [value[s] / duration[s]]" ('972 Patent Claims 1, 11, 15, 25)

Togail's Proposed Construction	Apple's Proposed Construction
No construction necessary.	"[value[s] / duration[s]] for beam switching which are, or may reflect, the minimum required time for a UE to set up its antenna panel(s) for providing an indicated RX/TX beam to receive or transmit data"

Apple's proposed construction of "leading time [value[s] / durations[s]]" is the correct construction because it is: (1) the express definition provided by the patentees, acting as lexicographers; and (2) the meaning used consistently throughout the intrinsic record.

First, the term "leading time" is explicitly defined by the patentees. The '972 Patent specification introduces the concept of "leading time" with a definitional statement: "Issues related to the leading time for beam switching may affect the power consumption. The **leading time for beam switching *is, or may reflect*, the minimum required time for a UE to set up its antenna panel(s) for providing an indicated RX/TX beam to receive or transmit data**." Ex. C, '972 Patent 6:23-27. This meaning of "leading time" is consistent throughout the specification, including both independent claims, the Abstract, the Summary, and the Detailed Description. The patentees' supplied definition should apply where—as here—the patentees have acted as lexicographers and clearly set forth a definition in the intrinsic record. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) (en banc) ("[O]ur cases recognize that the specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor's lexicography governs.").

The prosecution history is consistent and contains the same definition. The '972 Patent claims priority to U.S. Provisional Patent Application No. 62/699,465 (entitled "Method and Apparatus **for leading time of beam switching** for multi-panel transmission"). Ex. E, '972 Provisional at 3 (TOGAIL-APPLE_00002076). In that provisional application, the patentees stated in (nearly identical) definitional language: "**Leading time for beam switching *means* the minimum required time for UE to set up its antenna panels for the indicated RX/TX beam to receive or transmit the data**." *Id*. This language in the prosecution history and the specification communicates clear lexicographic intent, fitting squarely within the Federal Circuit's "exacting" standard for lexicography. *Hill-Rom Servs. Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir. 2014) ("The standards for finding lexicography and disavowal are exacting. To act as its own lexicographer, a patentee must clearly set forth a definition of the disputed claim term other than its plain and ordinary meaning and must clearly express an intent to redefine the term." (internal quotation marks omitted)).

The Federal Circuit has explained that "the word 'is,' . . . may 'signify that a patentee is serving as its own lexicographer.'" *Sinorgchem Co., Shandong v. Int'l Trade Comm'n*, 511 F.3d 1132, 1136 (Fed. Cir. 2007) (quoting *Abbott Labs. v. Andrx Pharms., Inc.*, 473 F.3d 1196, 1210 (Fed. Cir. 2007)). Courts do not require that the patentees use quotation marks or magic words like "defined" or "herein" to find lexicography; all that is required is that the patent applicants set out the different meaning in the specification in a manner sufficient to give one of ordinary skill in the art notice of the change from ordinary meaning. *See Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1117 (Fed. Cir. 2004). Here, the patentees have done exactly that, stating unambiguously what the leading time for beam switching "is" or "may reflect" or "means": the minimum required time for a UE to set up its antenna panel(s) for providing an

indicated RX/TX beam to receive or transmit data. Ex. C, '972 Patent 6:23-27; Ex. E, '972 Provisional at 3 (TOGAIL-APPLE_00002076). This language is an "express definition" the patentees chose to include in this patent; Togail "must be bound by it." *Sinorgchem*, 511 F.3d at 1136.

Additionally, throughout the specification, the term "leading time" is used consistently with this single meaning. Each occurrence of "leading time" in the specification relates to, or appears in the context of, **beam switching**; and is, describes, or denotes **the minimum required time for the device (i.e., UE) to set up its antenna panel(s) for providing an indicated RX/TX beam to receive or transmit data**. This definition—the patentees' definition—controls. *See Bell Atl. Network Servs. Inc. v. Covad Commc'ns Grp., Inc.*, 262 F.3d 1258 (Fed. Cir. 2001) (finding lexicography "when a patentee uses a claim term throughout the entire patent specification, in a manner consistent with only a single meaning").

For example, after defining the term "leading time" (as discussed above), the specification explains in the next paragraph that "**beam switching delay**" may affect power consumption, and as such "**the UE may need to be given a sufficient leading time for beam switching**." Ex. C, '972 Patent 6:50-58. "For example, **the leading time for beam switching may be two milliseconds (ms)** from the time a beam switch command is received (e.g., for a control-channel-based way) or acknowledged (e.g., for a MAC-CE based way) **to the time the beam switch is completed**." *Id.* The '972 Patent does not mention "leading time" in any context other than beam switching, and the intrinsic record does not suggest any other meaning. Other uses of "leading time" in the specification, across various embodiments, are consistent:

> In many cases, **a BS [Base Station] (e.g., a gNB) may not know the current antenna panel status of the UE**, which causes some issues since the BS always have to consider the worst case for the UE to perform the beam switching. For example, **the BS may need**

> **to configure the UE with a leading time for beam switching which is much longer than a leading time the UE actually needs**. As the leading time becomes longer, the efficiency and flexibility of the UE's operations may get lower.

Id. at 7:34-44.

> However, for a scheduling offset value configured for a UE that includes only one antenna panel (or a single-antenna-panel UE), **such value may not fulfill the leading time for beam switching** required by another UE that includes multiple antenna panels (or a multiple-antenna-panel UE).

Id. at 8:14-19.

> For example, techniques are described for determining the scheduling offset value(s). **As described above, the leading time for beam switching may be the minimum required time for a UE to set up the antenna panels for providing an indicated RX/TX beam to receive/transmit the data.**

Id. at 8:65-9:18; *see also id.* at 16:28-47.

The patent thus teaches consistently that the "leading time" values and durations referred to in the claims are the leading time values and durations ***for beam switching***; and that they ***are, or may reflect*, the minimum required time for the UE to set up its antenna panel(s) for providing an indicated RX/TX beam to receive or transmit data**.

Togail wrongly contends that no construction is necessary. Although the words "leading" and "time" are terms with ordinary English meanings, the patentees have clearly, affirmatively defined "leading time" to have a different, narrower scope in the context of this patent. Thus, a resort to plain and ordinary meanings of these terms would invite a claim scope far beyond what the patentees disclosed or defined in securing this patent before the PTO. Nor can Togail rely on the presumption of plain and ordinary meaning—a presumption that does not apply in the face of clear lexicography. *See Irdeto Access, Inc. v. Echostar Satellite Corp.*, 383 F.3d 1295, 1303 (Fed. Cir. 2004) ("Patentee's clear intent to rely on the four corners of his patent to define fully the terms

at issue thus takes this case out of the 'heavy presumption' regime of our cases."); *Blue Spike LLC v. Grande Commc'ns Inc.*, No. 4:20-cv-671-ALM, 2021 WL 5094911, at *3 (E.D. Tex. Nov. 2, 2021) ("Although the Court generally presumes terms possess their ordinary meaning . . . this presumption does not arise when the patentee acts as his own lexicographer." (citing *Irdeto Access*, 383 F.3d at 1301)).

Apple's proposed construction is the only construction supported by the intrinsic record, and the Court should construe "leading time [value[s] / duration[s]]" to have the meaning supplied by the patentees: "[value[s] / duration[s]] for beam switching which are, or may reflect, the minimum required time for a UE to set up its antenna panel(s) for providing an indicated RX/TX beam to receive or transmit data."

V. CONCLUSION

For the foregoing reasons, Apple requests that the Court adopt the following constructions:

Term	**Patent (Claims)**	**Construction**
"A method for a user equipment (UE) of a connected state, the method comprising:"	'238 (1)	The preamble is limiting
"receiving a system information (SI) change indication broadcasted by a paging"	'238 (11)	Indefinite
"A method of an on-demand system information (SI) request procedure performed by a user equipment (UE), the method comprising"	'502 (1)	The preamble is limiting
"first SI request message including at least one requested system information block (SIB)"	'502 (1, 11)	Indefinite
"transmitting a fourth SI request message to the BS after determining that the UE is not in the connected state"	'502 (6)	Indefinite

Term	Patent (Claims)	Construction
"receiving, from the BS, the at least one requested SIB via dedicated signaling that is transmitted in response to the first SI request message"	'502 (15)	Indefinite
"leading time [value[s] / duration[s]]"	'972 (1, 11, 15, 25)	"[value[s] / duration[s]] for beam switching which are, or may reflect, the minimum required time for a UE to set up its antenna panel(s) for providing an indicated RX/TX beam to receive or transmit data"

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Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that all counsel of record are being served with a copy of the foregoing document via the Court's CM/ECF system on January 26, 2023.

Dated: January 26, 2023

/s/ J. Stephen Ravel

J. Stephen Ravel