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

HUAWEI TECHNOLOGIES CO. LTD,	§ § §	
Plaintiff,	§ §	
v.	§ §	Case No. 2:16-CV-00057-JRG-RSP
T-MOBILE US, INC., ET AL.,	§ §	
Defendants,	§ § §	
NOKIA SOLUTIONS AND NETWORKS US LLC, NOKIA SOLUTIONS AND NETWORKS OY, TELEFONAKTIEBOLAGET LM ERICSSON, and ERICSSON INC.	§ § § § § §	
Intervenors.	§ §	

MEMORANDUM OPINION AND ORDER

On March 17, 2017, the Court held a hearing to determine the proper construction of the disputed claim terms in United States Patent Nos. 8,625,527 ("the '527 Patent"), 9,060,268 ("the '268 Patent"), and 9,241,261 ("the '261 Patent") (collectively "the Asserted Patents"). The Court has considered the arguments made by the parties at the hearing and in their claim construction briefs. Dkt. Nos. 119, 125, & 135.[1] The Court has also considered the intrinsic evidence and made subsidiary factual findings about the extrinsic evidence. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005); *Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 841 (2015). The Court issues this Claim Construction Memorandum and Order in light of these considerations.

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

TABLE OF CONTENTS

I.   BACKGROUND

A.   The '527 Patent

The '527 Patent was filed on January 3, 2007, issued on January 7, 2014, and is titled "Method and System for Maintaining Session Continuity When Changes Occur at the Terminal During a Session." The '527 Patent relates "to a method and a system for maintaining session continuity when a user changes access address or access technology of a terminal, or even changes the terminal in a session." *Id.* at 1:20–24. The specification states "the present invention may logically replace an original session connection established before a handover with a new session connection established after the handover to guarantee the session continuity." *Id.* at 4:37–45. Figures 2A illustrates an embodiment of performing a session handover in a terminal-controlled mode.
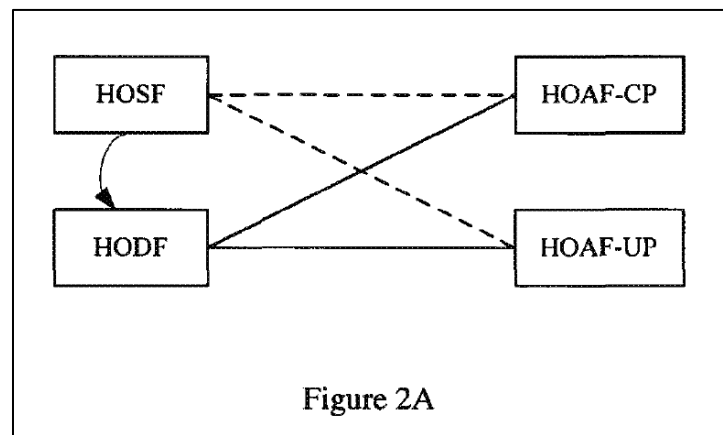
Figure 2A

Id. at Figure 2A. The specification states that "the system, which is applicable to a network supporting multiple access technologies, includes at least: an HOSF [Handover Source Function], an HODF [Handover Destination Function], an HOAF [Handover Anchor Function] and a Handover Detection Function." *Id.* at 8:2–6. The specification further states that "[t]he HOAF includes a control plane and a user plane, i.e., an HOAF-CP and an HOAF-UP," and that "[t]he HOSF and the HODF are directly connected with the HOAF-CP and the HOAF-UP respectively."

Id. at 8:6–10. The specification adds:

> The connection between the HOSF and the HOAF-CP and the connection between the HOSF and the HOAF-UP respectively correspond to the control plane connection and the user plane connection established before the handover. The two connections are illustrated with dotted lines. The connection between the HODF and the HOAF-CP and the connection between the HODF and the HOAF-UP respectively correspond to the control plane connection and the user plane connection established after the handover, and they are illustrated with solid lines."

Id. at 8:10–20. The specification also states that "[t]he HOSF is used for establishing a control plane first connection with the HOAF-CP and a user plane first connection with the HOAF-UP when the first user initiates or accepts a session," and that "[t]he HODF is used for establishing a control plane second connection with the HOAF-CP and a user plane second connection with the HOAF-UP when the handover condition is satisfied." *Id.* at 8:32–39. The specification adds that "[t]he HOAF-CP is used for establishing a control plane first connection with the HOSF when the first user initiates or accepts a session; establishing a control plane second connection with the HODF when the handover condition is satisfied; replacing the control plane first connection with the HOSF with the control plane second connection with the HODF, and indicating the HOAF-UP to replace the user plane first connection between the HOAF-UP and the HOSF with the user plane second connection between the HOAF-UP and the HODF." *Id.* at 8:40–49. The specification concludes the method by stating that "[a]fter establishing the second connection with the HODF, the HOAF-CP and the HOSF release the first connection between them, and the two users can continue the session through the second connection." *Id.* at 9:21–24.

Claim 1 of the '527 Patent is an exemplary claim and recites the following elements:

> 1. A method for maintaining session continuity, comprising:
> triggering a *Handover Anchor Function-Control Plane (HOAF-CP)* on a home network side of a first user, and establishing a first connection, wherein the first connection comprises a control plane first connection between a *Handover Source Function (HOSF)* of the first user and the HOAF-CP and a *user plane first connection*

between the HOSF and a Handover Anchor Function-User Plane (HOAF-UP) of a second user; establishing a control plane connection between the HOAF-CP and a terminal side of the second user, and establishing a session between the first user and the second user through the user plane first connection, the control plane first connection and the control plane connection between the HOAF-CP and a terminal side of the second user;

determining that a handover condition is satisfied, and establishing a second connection, wherein the second connection comprises a control plane second connection between a *Handover Destination Function (HODF)* of the first user and the HOAF-CP and a user plane second connection between the HODF and the HOAF-UP; and

continuing the session between the first user and the second user through the user plane second connection between the HODF and the HOAF-UP, the control plane second connection between the HODF and the HOAF-CP, and the control plane connection, which is already established between the HOAF-CP and the terminal side of the second user before the handover condition is satisfied.

B.   The '261 Patent

The '261 Patent was filed on June 12, 2014, issued on January 19, 2016, and is titled "Method, System, and Device for Negotiating Security Capability When Terminal Moves." The '261 Patent is generally "directed to a method for negotiating a security capability when a terminal moves, so that when moving from a 2G/3G network to an LTE network, a UE in an idle state can negotiate a security capability." '261 Patent at 2:13–16. Figure 1 is a flow chart of a method for negotiating a security capability when a terminal moves.

FIG. 1
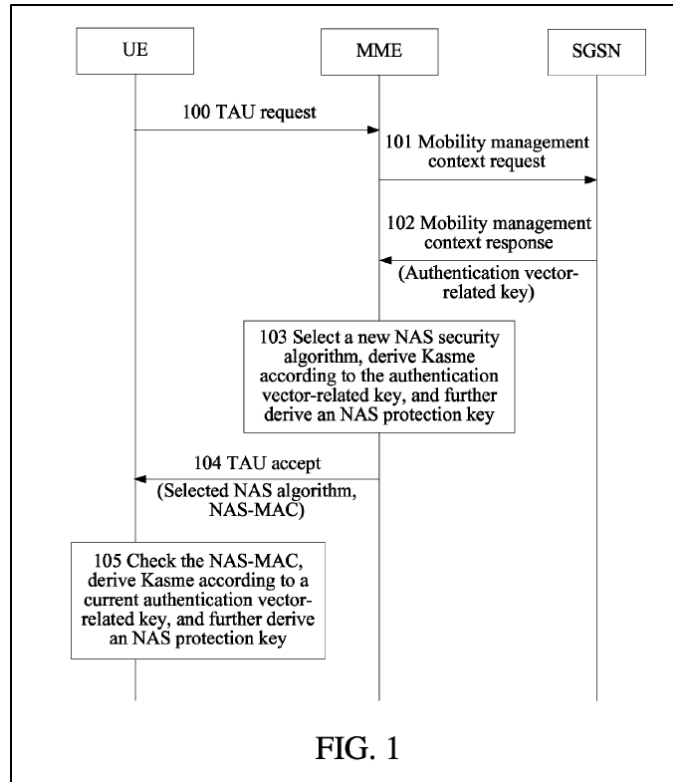
Id. at Figure 1. The specification states that "[i]n step 100, a UE [user equipment] sends a TAU [tracking area update] request to an MME [mobility management entity]." *Id.* at 4:47. The specification further discloses that "[t]he TAU request sent from the UE to the MME in this step not only carries some parameters such as a temporary mobile subscriber identity (TMSI) known to persons skilled in the art, but may also carry security capability information supported by the UE." *Id.* at 4:54–58. The specification adds that the "[t]he security capability information includes an NAS security algorithm (an NAS integrity protection algorithm and/or an NAS confidentiality protection algorithm), and may also include an RRC security algorithm (an RRC integrity protection algorithm and/or an RRC confidentiality protection algorithm) or a UP security algorithm (a UP confidentiality protection algorithm)." *Id.* at 4:58–64.

The specification further states that "[i]n steps 101-102, the MME acquires an NAS security algorithm supported by the UE, and sends a mobility management context request message to an SGSN." *Id.* at 4:65–67. "After receiving the message, the SGSN sends a mobility

management context response message carrying an authentication vector-related key to the MME." *Id.* at 4:67–5:3. The specification adds that "[i]n step 103, the MME selects a new NAS security algorithm, according to the NAS security algorithm supported by the UE and an NAS security algorithm supported by the MME as well as an NAS security algorithm allowed by the system, derives a root key Kasme according to the authentication vector-related key, and then derives an NAS protection key according to the Kasme." *Id.* at 5:32–38. The specification further states that "[t]he NAS protection key includes an NAS integrity protection key Knas-int and/or an NAS confidentiality protection key Knas-enc." *Id.* at 5:38–40.

The specification next states that "[i]n step 104, the MME generates a TAU accept message carrying the selected NAS security algorithm." *Id.* at 5:41–42. The specification discloses that "[t]he TAU accept message in this step may further carry security capability information supported by the UE." *Id.* at 5:52–53. The specification concludes that "[i]n step 105, the UE receives the TAU accept message carrying the NAS security algorithm selected by the MME, and acquires the negotiated NAS security algorithm; and then derives a root key Kasme according to a current authentication vector-related key thereof (for example, the IK and the CK, or the IK' and the CK' derived according to the IK and the CK when the originating network is the 3G, or the Kc or the Kc' derived according to the Kc when the originating network is the 2G), and derives an NAS protection key according to the root key." *Id.* at 5:54–63.

Claim 1 of the '261 Patent is an exemplary claim and recites the following elements (disputed term in italics):

> 1. *A method of security negotiation for idle state mobility from a first network to a long term evolution (LTE) network using a mobility management entity (MME), the method comprising*:

transmitting an authentication vector-related key from a service
general packet radio service (GPRS) support node (SGSN)
in the first network to the MME;

receiving security capabilities of a user equipment (UE)
including non-access stratum (NAS) security capabilities
of the UE from the UE;

selecting a NAS security algorithm supported by the NAS
security capabilities of the UE;

sending a message that indicates the selected NAS security
algorithm to the UE; and

*deriving a NAS protection key with the selected NAS security
algorithm from the authentication vector-related key.*

C.   The '268 Patent

The '268 Patent was filed on March 4, 2010, issued on June 16, 2015, and is titled "Negotiating Security Capabilities During Movement of UE." The '268 Patent is generally directed to "a method for negotiating security capabilities during movement of a UE, so that the security capabilities can be negotiated when the UE in the idle state moves from an LTE network to a 2G/3G network." '268 Patent at 1:66–2:3. Figure 1 is a flow chart of a method for negotiating security capabilities during movement of a UE.

FIG. 1
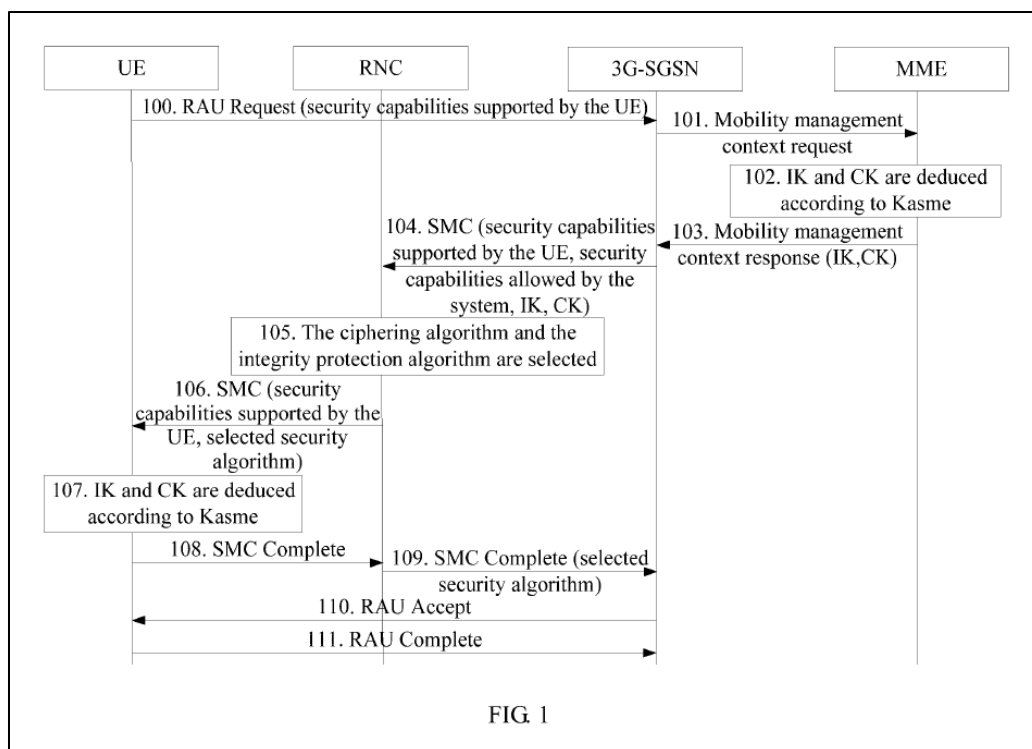
Id. at Figure 1. The specification states that at "Step 100: The UE [User equipment] sends an RAU [Routing Area Update] Request to the 3G SGSN [Serving GPRS Support Node] through an RNC [Radio Network Controller]." *Id.* at 4:16–17. The specification discloses that "[t]he RAU Request sent by the UE to the 3G SGSN in this step not only carries the parameters well known to those skilled in the art, for example, Temporary Mobile Subscriber Identifier (TMSI), but also may carries the security capabilities supported by the UE, for example, a ciphering algorithm and/or an integrity protection algorithm." *Id.* at 4:18–23.

The specification further states that at "Steps 101-103: The 3G SGSN obtains the AV-related keys from the MME through a mobility management context message, where the AV-related keys are deduced according to the root key." *Id.* at 4:24–27. The specification adds that "[t]he MME deduces the AV-related keys through a unidirectional transformation function according to its own root key Kasme, where the AV-related keys include an integrity protection key IK and a ciphering key CK, or an IK' and a CK' further derived from the IK and the CK

through unidirectional transformation by the MME; then the MME returns a mobility management context response that carries the AV-related keys to the 3G SGSN; and the 3G SGSN uses the AV-related keys as the current ciphering key and integrity protection key." *Id.* at 4:29–38.

The specification further states that at "Steps 104-106: The 3G SGSN sends a Security Mode Command (SMC) message to the RNC." *Id.* at 4:51–52. The specification discloses that "[t]he message carries the security capabilities supported by the UE, security capabilities allowed by the system, and a security key." *Id.* at 4:52–54. The specification further states that "the RNC selects security algorithms, including a ciphering algorithm and an integrity protection algorithm, and then sends an SMC message that carries the security capabilities supported by the UE and the selected security algorithm to the UE." *Id.* at 4:57–61.

The specification next states that at "Steps 107-109: The UE deduces the AV-related keys according to its own root key, where the AV-related keys include IK and CK, or an IK' and a CK' further derived from the IK and the CK through unidirectional transformation, and uses them as the current ciphering key and integrity protection key respectively." *Id.* at 4:64–5:2. "[T]he UE, . . . then sends an SMC Complete message to the RNC," and "[t]he RNC sends an SMC Complete message that carries the selected security algorithm to the 3G SGSN." *Id.* at 5:2–7. The specification concludes that at "Steps 110-111: The 3G SGSN sends an RAU Accept message to the UE," and "[a]fter receiving the message, the UE returns an RAU Complete message to the 3G SGSN." *Id.* at 5:8–11.

Claim 2 of the '268 Patent is an exemplary claim and recites the following elements (disputed term in italics):

> 2. A *mobility management entity (MME)* of a long term evolution (LTE) network for negotiating security keys, comprising:

> *a receiver configured to receive a context request for requesting a mobility management context sent by a serving GPRS support node (SGSN) in a second or third generation (2G/3G) network according to a routing area update (RAU) request from a user equipment (UE) in an idle mode*;
>
> *a processor configured to deduce authentication vector (AV)-related keys according to a root key of the MME*, wherein the AV-related keys comprise an Integrity Protection Key (IK) and a Ciphering Key (CK), or comprise values derived from the IK and the CK through an unidirectional transformation; and
>
> *a transmitter configured to send the mobility management context to the SGSN, wherein the mobility management context comprises information for determining security capacities supported by the UE and the AV-related keys.*

II.   APPLICABLE LAW

A.   Claim Construction

"It is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.'" *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (quoting *Innova/Pure Water Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). To determine the meaning of the claims, courts start by considering the intrinsic evidence. *Id.* at 1313; *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 861 (Fed. Cir. 2004); *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Group, Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001). The intrinsic evidence includes the claims themselves, the specification, and the prosecution history. *Phillips*, 415 F.3d at 1314; *C.R. Bard, Inc.*, 388 F.3d at 861. The general rule—subject to certain specific exceptions discussed *infra*—is that each claim term is construed according to its ordinary and accustomed meaning as understood by one of ordinary skill in the art at the time of the invention in the context of the patent. *Phillips*, 415 F.3d at 1312–13; *Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1368 (Fed. Cir. 2003); *Azure Networks, LLC v. CSR PLC*, 771 F.3d 1336, 1347 (Fed. Cir. 2014) ("There is a heavy

presumption that claim terms carry their accustomed meaning in the relevant community at the relevant time.") (vacated on other grounds).

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

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

specification—even if it is the only embodiment—into the claims absent a clear indication in the intrinsic record that the patentee intended the claims to be so limited." *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 913 (Fed. Cir. 2004).

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

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

In some cases, however, the district court will need to look beyond the patent's intrinsic evidence and to consult extrinsic evidence in order to understand, for example, the background science or the meaning of a term in the relevant art during the relevant time period. *See, e.g., Seymour v. Osborne*, 11 Wall. 516, 546 (1871) (a patent may be "so interspersed with technical terms and terms of art that the testimony of scientific witnesses is indispensable to a correct understanding of its meaning"). In cases where those subsidiary facts are in dispute, courts will need to make subsidiary factual findings about that extrinsic evidence. These are the "evidentiary underpinnings" of claim construction that we discussed in *Markman*, and this subsidiary factfinding must be reviewed for clear error on appeal.

Teva Pharm. USA, Inc. v. Sandoz, Inc., 135 S. Ct. 831, 841 (2015).

B.   Functional Claiming and 35 U.S.C. § 112, ¶ 6 (pre-AIA) / § 112(f) (AIA)[2]

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

But § 112, ¶ 6 does not apply to all functional claim language. There is a rebuttable presumption that § 112, ¶ 6 applies when the claim language includes "means" or "step for" terms, and that it does not apply in the absence of those terms. *Masco Corp.*, 303 F.3d at 1326; *Williamson*, 792 F.3d at 1348. The presumption stands or falls according to whether one of ordinary skill in the art would understand the claim with the functional language, in the context of the entire specification, to denote sufficiently definite structure or acts for performing the function. *See Media Rights Techs., Inc. v. Capital One Fin. Corp.*, 800 F.3d 1366, 1372 (Fed. Cir. 2015) (§ 112, ¶ 6 does not apply when "the claim language, read in light of the specification,

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[2] Because the applications resulting in the '527 Patent and the '268 Patent were filed before September 16, 2012, the effective date of the America Invents Act ("AIA"), the Court refers to the pre-AIA version of § 112.

recites sufficiently definite structure" (quotation marks omitted) (citing *Williamson*, 792 F.3d at 1349; *Robert Bosch, LLC v. Snap-On Inc.*, 769 F.3d 1094, 1099 (Fed. Cir. 2014))); *Williamson*, 792 F.3d at 1349 (§ 112, ¶ 6 does not apply when "the words of the claim are understood by persons of ordinary skill in the art to have sufficiently definite meaning as the name for structure"); *Masco Corp.*, 303 F.3d at 1326 (§ 112, ¶ 6 does not apply when the claim includes an "act" corresponding to "how the function is performed"); *Personalized Media Communications, L.L.C. v. International Trade Commission*, 161 F.3d 696, 704 (Fed. Cir. 1998) (§ 112, ¶ 6 does not apply when the claim includes "sufficient structure, material, or acts within the claim itself to perform entirely the recited function . . . even if the claim uses the term 'means.'" (quotation marks and citation omitted)).

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

1298 (Fed. Cir. 2005). However, § 112 does not permit "incorporation of structure from the written description beyond that necessary to perform the claimed function." *Micro Chem., Inc. v. Great Plains Chem. Co.*, 194 F.3d 1250, 1258 (Fed. Cir. 1999).

For § 112, ¶ 6 limitations implemented by a programmed general purpose computer or microprocessor, the corresponding structure described in the patent specification must include an algorithm for performing the function. *WMS Gaming Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1349 (Fed. Cir. 1999). The corresponding structure is not a general purpose computer but rather the special purpose computer programmed to perform the disclosed algorithm. *Aristocrat Techs. Austl. Pty Ltd. v. Int'l Game Tech.*, 521 F.3d 1328, 1333 (Fed. Cir. 2008).

III. CONSTRUCTION OF AGREED TERMS

The parties agreed to the construction of the following phrase:

Claim Term/Phrase	Agreed Construction
Preamble ('268 Patent, claims 1, 2)	The preamble is limiting.

Docket No. 141-1 at 10. In view of the parties' agreement on the proper construction of the identified terms, the Court hereby **ADOPTS** the parties' agreed construction.

During the claim construction hearing, the parties agreed to the construction of the following phrase:

Claim Term/Phrase	Agreed Construction
"[a/the] handover condition is satisfied" ('527 Patent, claims 1, 12, 13, 29, 36, 37, 41)	Plain and ordinary meaning

The parties originally disputed whether the phrase "[a/the] handover condition is satisfied" means a "handover is needed," as Plaintiff proposed, or whether it means that

"requirement for performing a handover is met," as Defendants proposed. The parties agreed during the hearing that the phrase should be given its plain and ordinary meaning. The Court agrees and finds that the phrase is unambiguous and easily understandable by a jury. The Court further finds that the parties did not provide persuasive reasoning for their proposed constructions. Accordingly, the Court agrees with the parties that the phrase **"[a/the] handover condition is satisfied"** should be given its **plain and ordinary meaning**.

After the claim construction hearing, the parties agreed to the construction of the following phrase:

Claim Term/Phrase	Agreed Construction
"terminal side of a second user" / "terminal side of the second user" ('527 Patent, claims 1, 12, 13, 29, 36, 37, 41)	"[a/the] second user's User Equipment (UE) when the second user is on an IP-based network, otherwise, [a/the] second user's UE, an interworking gateway, and the connection between them if the second user is in the CS domain/PSTN."

Docket No. 174 at 1. In view of the parties' agreement on the proper construction of the identified phrase, the Court hereby **ADOPTS** the parties' agreed construction.

IV. CONSTRUCTION OF DISPUTED TERMS

The parties' dispute focuses on the meaning and scope of twenty-two terms/phrases in the Asserted Patents.

1. "Handover Anchor Function" / "HOAF," "Handover Anchor Function-Control Plane (HOAF-CP)," "Handover Anchor Function User Plane" / "HOAF-UP"

Disputed Term	Plaintiff's Proposal	Defendants' Proposal
"Handover Anchor Function" / "HOAF	Not a claim term. See "HOAF-CP" and "HOAP-UP."	"module for handover that separates two connections and supports segmented exchange between the first user and the second user"
"Handover Anchor Function-Control Plane (HOAF-CP)"	Plain meaning.	"HOAF for the control plane"

"Handover Anchor Function-User Plane (HOAF-UP)"	Plain meaning.	"HOAF for the user plane"

a) The Parties' Positions

The parties dispute whether the term "Handover Anchor Function"/"HOAF" should be construed. Plaintiff contends that the term does not appear in the claims, and therefore should not be construed. Defendants argue that "HOAF" is "a claim term for the simple reason that it appears in the claims," and that the specification refers to the HOAF-CP and HOAF-UP as parts of the HOAF. (Dkt. No. 125 at 13). The parties also dispute whether the terms "Handover Anchor Function-Control Plane (HOAF-CP)" and "Handover Anchor Function User Plane (HOAF-UP)" require construction. Plaintiff contends that no construction is required because the claims themselves adequately define these terms. Defendants contend that there is no plain meaning for "Handover Anchor Function" / "HOAF," and that the actual dispute is whether the term "Handover Anchor Function" should be construed.

Plaintiff argues that specification is clear that HOAF-CP and HOAF-UP are two subcomponents of HOAF. (Dkt. No. 119 at 12). Plaintiff contends that Defendants ask the Court to construe a term (*i.e.*, HOAF) not recited in the claims. *Id.* Plaintiff further argues that no construction is required for "HOAF-CP" and "HOAF-UP" because the claims themselves adequately define these terms. *Id.* Plaintiff argues that "handover," "user plane," and "control plane" are well-known terms of art in telecommunications. *Id.* Plaintiff further contends that the remainder of the claims recites additional details that inform the reader about the nature of the HOAF-CP and HOAF-UP terms. *Id.*

Regarding Defendants' constructions, Plaintiff argues that Defendants replace the word "function" with "module." (*Id.* at 13). Plaintiff also argues that Defendants' proposal of "support[] segmented exchange between the first user and second user" is not used in the

specification. *Id.* According to Plaintiff, Defendants' constructions unnecessarily raise questions without resolution. *Id.*

Defendants respond that there is no plain meaning for "Handover Anchor Function" / "HOAF." (Dkt. No. 125 at 9) (citing Dkt. No. 125-1 at ¶ 36.). Defendants argue that the specification indicates that the "HOAF" is used for handover and is responsible for passing data from a connection on one of its sides to a connection on its other side. (Dkt. No. 125 at 10) (citing '527 Patent at 25:33–38; Dkt. No. 125-1 at ¶ 38). Defendants also argue that a "HOAF" acts as an exchange point. (Dkt. No. 125 at 10) (citing Dkt. No. 125-1 at ¶¶ 37-38; '527 Patent at 25:15–27:39, Fig. 5D). Defendants also contend that the prosecution history confirms that a "HOAF" supports segmented exchange from a connection on one of its sides to a connection on its other side. (Dkt. No. 125 at 11) (citing Dkt. No. 125-6 at 26; Dkt. No. 125-1 at ¶¶ 29, 39).

Defendants further argue that the meaning of the word "anchor" in the art is consistent with the specification's description of the "Handover Anchor Function" / "HOAF." (Dkt. No. 125 at 11) (citing Dkt. No. 125-3 at 21; Dkt. No. 125-1 at ¶ 37.) Defendants contend that the anchor is a fixed location that holds onto connections to both end-points in a call, so that when an end-point changes (*e.g.*, the mobile phone moves to a new cell), the new end-point can continue the call by reconnecting to the anchor that holds the connection to the party on the other end-point. (Dkt. No. 125 at 12) (citing Dkt. No. 125-3 at 22-24; Dkt. No. 125-1 at ¶ 37). According to Defendants, a "HOAF" is a module for handover that separates two connections and supports segmented exchange between the first user and the second user. (Dkt. No. 125 at 12) (citing Dkt. No. 125-1 at ¶¶ 35-41).

Regarding Plaintiff's constructions, Defendants argue that "HOAF" is not a term with a known meaning to a person of ordinary skill in the art, and the concept of a handover "anchor"

requires explanation. (Dkt. No. 125 at 13). According to Defendants, a jury would have no way to understand the term "anchor" in the context of a HOAF, or the role of a HOAF in the context of the claimed invention. *Id.* Defendants also argue that Plaintiff is incorrect in arguing that HOAF is not a claim term. *Id.* Finally, Defendants argue that Plaintiff offers no substantive explanation for why a "module" is not a "function" in the context of the '527 Patent. (*Id.* at 14). Defendants also contend that the term "segmented media exchange" is used in the specification and the term "segment" is used repeatedly to describe the function of the HOAF. (*Id.* at 14) (citing '527 Patent at 9:34–39; 11:39–12:20; 25:33–54).

Plaintiff replies that Defendants only seek to construe the sub-term "HOAF" because it is used in an alleged prior art reference. (Dkt. No. 135 at 4) (citing Dkt. No. 135-3 at 7). Plaintiff also argues that the role of the language "Handover Anchor Function" in the terms "HOAF-CP" and "HOAF-UP" is apparent on its face. (*Id.* at 5). Plaintiff further contends that Defendants do not make any serious suggestion that the jury will not understand what a "function" is, but instead use it as an excuse to try to import the word "module" from the specification. *Id.* Plaintiff argues that the jury will readily understand the concept of "anchor" as something that holds the end of a line in place. *Id.* (citing Dkt. No. 125-1 at ¶ 37; Dkt. No. 135-1 at ¶ 26). According to Plaintiff, Defendants' construction obscures this simple concept, and seeks to import two limitations, which are not required by the claims. (Dkt. No. 135 at 5). Plaintiff contends that the claims themselves explain the locations of and connections to the HOAF-CP and HOAF-UP. *Id.*

For the following reasons, the Court finds that the term **"Handover Anchor Function"** / **"HOAF"** should be construed to mean **"a constant point in a connection that anchors the connection in place."** The Court further finds that the term **"Handover Anchor Function-Control Plane (HOAF-CP)"** should be construed to mean **"HOAF for the control plane,"** and

that the term **"Handover Anchor Function User Plane (HOAF-UP)"** should be construed to

mean **"HOAF for the user plane."**

b) Analysis

The term "Handover Anchor Function" or "HOAF" appears in the claims as a subpart of

the terms "HOAF-CP" and "HOAF-UP." The term "Handover Anchor Function-Control Plane

(HOAF-CP)" appears in claims 1, 7, 9, 10, 12, 14, 17, 19, 27, 29, 31, 36, 37, and 41 of the '527

Patent. The Court finds that the term is used consistently in the claims and is intended to have

the same general meaning in each claim. The term "Handover Anchor Function-User Plane

(HOAF-UP)" appears in claims 1, 14, 29, and 41 of the '527 Patent. The Court finds that the

term is used consistently in the claims and is intended to have the same general meaning in each

claim.

Regarding the term "Handover Anchor Function" or "HOAF," the Court finds that a

construction would be helpful to the jury, and would also resolve the parties' claim construction

dispute. Neither party argues that the jury will have difficulty understanding "handover." The

Court agrees. Thus, the parties dispute the meaning of "anchor," and whether "function" should

be replaced with "module." Regarding the term "anchor," Defendants' expert opines that the

recited anchor is "a constant point in a connection—it holds (anchors) the connection in place, so

that the end-points are free to change locations without losing end-to-end connectivity" (Dkt.

No. 125-1 at ¶ 37). The Court agrees that this is consistent with the intrinsic evidence. For

example, the claims recite the locations of and connections to the HOAF-CP and HOAF-UP, and

identify the "constant point in the connection." Accordingly, the Court construes "Handover

Anchor Function" or "HOAF" to mean "a constant point in a connection that anchors the

connection in place."

Turing to Defendants' construction, the Court finds that it would contradict the claim language when used to define the terms "Handover Anchor Function-Control Plane (HOAF-CP)" and "Handover Anchor Function User Plane (HOAF-UP)." Specifically, the specification disclose three different modes related to the HOAF-CP and HOAF UP as follows:

> When the HOAF-CP and the HOAF-UP are both located on the terminal side of the peer user, the session between the handover user and the peer user is born only by the control plane connection between the HOSF or the HODF in the handover UE and the HOAF-CP and the user plane connection between the HOSF or the HODF in the handover UE and the HOAF-UP respectively. *This mode is hereinafter referred to as an end-to-end mode.*
> If the HOAF-CP is located on the home network side of the handover user and the HOAF-UP is located on the terminal side of the peer user, on the control plane, the session between the handover user and the peer user needs to be born by two segments of connections, one is the connection between the HOSF or the HODF and the HOAF-CP, i.e., the control plane first connection or the control plane second connection, and the other is the control plane connection between the HOAF-CP and the terminal side of the peer user. As the HOAF-UP is on the terminal side of the peer user, on the user plane, the session between the handover user and the peer user is still born by the end-to-end user plane first or second connection. *This mode is hereinafter referred to as a CP-segmented mode.*
> If the HOAF-CP and the HOAF-UP are both located on the home network side of the handover user, besides the control plane and user plane first connection and the second connection with the HOSF and the HODF of the handover user respectively, the HOAF needs to establish another control plane connection and user plane connection with the terminal side of the peer user. The session between the handover user and the peer user in such a situation is born by two segments of connections on both control plane and user plane. To be specific, one segment is the control plane and user plane first connections or the control plane and user plane second connections, the other segment is the control plane and user plane connections between the HOAF and the terminal side of the peer user. *This mode is hereinafter referred to as a CPandUP-segmented mode.*

'527 Patent at 11:47–12:15 (emphasis added). As disclosed and illustrated, the "end-to-end mode" is when there are no HOAFs between the first user's terminal and the terminal side of the second user. *Id.* at 11:47–67, Figure 3A ("end-to-end/terminal controlled mode"). The "CP-segmented mode" is when the control plane is segmented, but the user plane is still end-to-end. *Id.* Figure 3C1 ("CP-segmented/ terminal-controlled mode or a CP-segmented/network-controlled mode"). Finally, the "CPandUP-segmented mode" is when both the control and user

planes are segmented. *Id.* at 12:1-15, Figure 3C2 ("CPandUP-segmented/ terminal-controlled mode or a CPandUP-segmented/ network-controlled mode"). Accordingly, Defendants' construction would contradict the "CP-segmented mode" embodiment, by requiring the "end-to-end" HOAF-UP to be a "segmented exchange between the first user and the second user."

Defendants agree that claim 1 and 29 are directed to CP-segmented embodiments, and that claim 41 is directed to the CPandUP-segmented embodiment. (Dkt. No. 125 at 16). As indicated above, in the CP-segmented embodiment "the HOAF-UP is on the terminal side of the peer user, on the user plane, the session between the handover user and the peer user is still born by the end-to-end user plane first or second connection." '527 Patent at 11:63–66. Defendants' construction would require the HOAF-UP to "separate two connections." This contradicts the claim language of claims 1 and 29, which is an end-to-end user plan connection. Regarding the term "function," Defendants have not provided a persuasive reason to redraft the claim as they propose.

Regarding the prosecution history, the Court agrees that the patentees distinguished the prior art by arguing that it only disclosed an end-to-end connection. Specifically, the patentee argued that the prior art is "borne by an end-to-end connection, i.e., the session is not borne by two segment connections as recited in Claim 65." Dkt. No. 125-6 at 27. However, the Court finds that the claim language captures the distinction by requiring more than one connection with the recited HOAF-CP. For example, claim 1 recites "triggering a Handover Anchor Function-Control Plane (HOAF-CP) on a home network side of a first user, and establishing a first connection, wherein the first connection comprises a control plane first connection between a Handover Source Function (HOSF) of the first user and the HOAF-CP . . . establishing a control plane connection between the HOAF-CP and a terminal side of the second user." Accordingly,

the Court does not adopt Defendants' construction.

Turning to the terms "Handover Anchor Function-Control Plane (HOAF-CP)" and "Handover Anchor Function-User Plane (HOAF-UP)," the Court finds that there is no longer a dispute given the Court's construction of the term "Handover Anchor Function." Plaintiff argued that "[a] 'user plane' is a connection that carries user traffic—i.e., content such as voice or data. A 'control plane' carries signaling traffic—i.e., messages that manage how and where user traffic gets sent." (Dkt. No. 119 at 12). Defendants responded that they "do not dispute the meaning given to the terms 'control plane' and 'user plane' in Huawei's brief." (Dkt. No. 125 at 13 n.3). Indeed, Defendants argued that the "HOAF-CP is a HOAF for control plane data, and the HOAF-UP is a HOAF for user plane data," and proposed the same constructions adopted by the Court. (Dkt. No. 125 at 12). Accordingly, the Court construes the term "Handover Anchor Function-Control Plane (HOAF-CP)" to mean "HOAF for the control plane," and the term "Handover Anchor Function User Plane (HOAF-UP)" to mean "HOAF for the user plane." Finally, in reaching its conclusion, the Court has considered the extrinsic evidence submitted by the parties, and given it its proper weight in light of the intrinsic evidence.

c) Court's Construction

The Court construes the term **"Handover Anchor Function" / "HOAF"** to mean **"a constant point in a connection that anchors the connection in place."** The Court further construes the term **"Handover Anchor Function-Control Plane (HOAF-CP)"** to mean **"HOAF for the control plane,"** and the term **"Handover Anchor Function User Plane (HOAF-UP)"** to mean **"HOAF for the user plane."**

2. "User plane first connection between the HOSF and HOAF-UP" Terms

Disputed Term	Plaintiff's Proposal	Defendants' Proposal
"user plane first connection between the HOSF and a Handover Anchor Function-User Plane (HOAF- UP) of a second user"	Plain meaning.	"end-to-end connection for the user plane from the HOSF to the second user's HOAF-UP"
"HOAF-UP is configured to establish the user plane first connection between the HOSF and the HOAF-UP"	Plain meaning.	"HOAF-UP is configured to establish an end-to-end connection for the user plane from the HOSF to the HOAF-UP"

a) The Parties' Positions

The parties dispute whether the recited "user plane first connection" should be clarified as an "end-to-end connection" in claims 1 and 29. Defendants argue that claims 1 and 29 require the use of a single HOAF-UP between the first and second users, and does not include an unlimited number of HOAF-UPs between the first and second user. Plaintiff argues that Defendants' construction attempts to import the limitation that the connection must be "end-to-end." (Dkt. No. 119 at 14). Plaintiff also argues that Defendants' construction would be confusing to the jury. *Id.* According to Plaintiff, UEs are not "directly" connected to each other, but instead connect to each other through a host of intermediary components. *Id.* Plaintiff suggests that Defendants may be seeking to develop a non-infringement argument whereby one UE must communicate directly to another UE with no intervening components connecting the two. *Id.*

Defendants respond that the specification describes three classes of embodiments: "end-to-end," "CP-segmented," and "CPandUP-segmented." (Dkt. No. 125 at 14) (citing '527 Patent at 11:39–12:20; Dkt. No. 125-1 at ¶¶ 43-45). Defendants argue that the "end-to-end" embodiment is what the specification calls the connection when there are no HOAFs between the first user's terminal and the terminal side of the second user. (Dkt. No. 125 at 14) (citing '527 Patent at 11:47–67). Defendants further contend that "CP-segmented" refers to the case in which

only the control plane is segmented, and "CPandUP-segmented" refers to the situation in which both the control and user planes are segmented. (Dkt. No. 125 at 15) (citing '527 Patent at 12:1–15).

Defendants argue that claims 1 and 29 claim CP-segmented embodiments as evidenced by the location of the HOAF-CP on the home network side of the first user, and the HOAF-UP on the terminal side of the second user. (Dkt. No. 125 at 15-16). Defendants contend that because "the HOAF-UP is on the terminal side of the peer user, on the user plane, the session between the handover user and the peer user is still born by the end-to-end user plane first or second connection." (*Id.* at 16) (citing '527 Patent at 11:63–67). Defendants further contend that claim 41 describes a contrasting embodiment where both the HOAF-CP and the HOAF-UP are between the users, meaning that both the control and user planes use segmented connections (*i.e.*, a CPandUP-segmented embodiment). (citing Dkt. No. 125 at 16) (citing '527 Patent at claim 41, 12:1–15).

Responding to Plaintiff's arguments, Defendants contend that their construction does not import "end-to-end" into the claim, but instead is a necessary characteristic of claims 1 and 29. (Dkt. No. 125 at 16) (citing '527 Patent at 11:63–66). Defendants further argue that "end-to-end" comes directly from the specification's description of how these connections must work in the context of the '527 Patent. (Dkt. No. 125 at 17) (citing '527 Patent at 11:49–67; 5:50–53). Finally, Defendants argue that the patent uses "end-to-end" to indicate that there are no intervening HOAFs, not to show that the connection has no intervening components. (Dkt. No. at 125 at 17) (citing Dkt. No. 125-1 at ¶ 47).

Plaintiff replies that Defendants' construction essentially rearranges the original claim language and adds the words "end-to-end." (Dkt. No. 135 at 6). Plaintiff argues that Defendants

admit that claims 1 and 29 already recite no anchor points between the first user and the terminal side of the second user. (Dkt. No. 135 at 6). Plaintiff contends that the alleged "necessary characteristic" is already explicitly recited in the claim. *Id.* Plaintiff further argues that to the extent "end-to-end" in their construction really means what Defendants now claim it means, it is redundant. *Id.*

For the following reasons, the Court finds that the phrase **"user plane first connection between the HOSF and a Handover Anchor Function-User Plane (HOAF- UP) of a second user"** should be given its **plain and ordinary meaning**. The Court also finds that the phrase **"HOAF-UP is configured to establish the user plane first connection between the HOSF and the HOAF-UP"** should be given its **plain and ordinary meaning**.

b) Analysis

The phrase "user plane first connection between the HOSF and a Handover Anchor Function-User Plane (HOAF- UP) of a second user" appears in claim 1 of the '527 Patent. The phrase "HOAF-UP is configured to establish the user plane first connection between the HOSF and the HOAF-UP" appears in claim 29 of the '527 Patent. The Court finds that adding "end-to-end connection" to the construction is unnecessary and redundant. As the parties agree, "claims 1 and 29 already recite no anchor points between the first user and the terminal side of the second user . . . thus, what [Defendants] allege to be a 'necessary characteristic' is already explicitly recited in the claim." (Dkt. No. 135 at 6).

Indeed, Plaintiff's expert, Dr. Michael Brogioli, opines that "when reciting a connection with an intermediate anchor point, the claims explicitly mention the two parts of that connection" (135-1 at ¶ 31). Dr. Brogioli further states that "[s]ince *the claims are clear which connections have intermediate anchor points and which do not*, the claim language already

include the concept that Dr. Seshan says is represented by the words 'end-to-end,' and thus adding 'end-to-end' to the claim would be unnecessary and confusing." (*Id.* at ¶ 31) (emphasis added). The Court agrees. To the extent that Plaintiff argues that the scope of the disputed phrases include "intermediate anchor points," the Court rejects that argument. Likewise, to the extent that Defendants contend that the scope of the disputed phrases excludes "intervening components," the Court rejects that argument because Defendants have conceded that point. *See, e.g.*, Dkt. No. at 125 at 17 ("Moreover, the patent uses 'end-to-end' to indicate that there are no intervening HOAFs, not to show that the connection has no intervening components, as Huawei asserts.") (citing Dkt. No. 125-1 at ¶ 47). Finally, in reaching its conclusion, the Court has considered the extrinsic evidence submitted by the parties, and given it its proper weight in light of the intrinsic evidence.

c) Court's Construction

The phrase **"user plane first connection between the HOSF and a Handover Anchor Function-User Plane (HOAF- UP) of a second user" plain and ordinary meaning**," and the phrase **"HOAF-UP is configured to establish the user plane first connection between the HOSF and the HOAF-UP"** will be given its **plain and ordinary meaning**.

3. "HOSF" and "HODF"

Disputed Term	Plaintiff's Proposal	Defendants' Proposal
"Handover Source Function" / "HOSF"	"Handover source function represented by a different access address or access means from the Handover Destination Function (HODF)"	"Module of first user terminal before handover"
"Handover Destination Function" / "HODF"	"Handover destination function represented by a different access address or access means from the Handover Source Function (HOSF)"	"Module of first user terminal after handover"

a) The Parties' Positions

Plaintiff argues that its construction is squarely supported by the specification. (Dkt. No. 119 at 15) (citing '527 Patent at 14:8–10). Plaintiff contends that when a UE connects to a particular base station, it is given a particular access address. (Dkt. No. 119 at 15). According to Plaintiff, that access address will change if that UE engages in a handover to a new base station. (*Id.* at 15) (citing '527 Patent at 3:19–33, 4:37–45). Plaintiff also argues that Defendants' construction attempts to improperly substitute the claim term "function" with the word "module." (Dkt. No. 119 at 15). Plaintiff further contends that Defendants' construction raises a timing-related ambiguity. (*Id.* at 15-16).

Defendants respond that the specification expressly and repeatedly confirms that the HOSF is a module in the device before "handover," and the HODF is a module in the device after "handover." (Dkt. No. 125 at 17) (citing '527 Patent at 14:18–23, 14:26–29). Defendants argue that the specification confirms that the HOSF and HODF are "modules" in a terminal. (Dkt. No. 125 at 18) (citing '527 Patent at 10:60–67; Dkt. No. 125-1 at ¶¶ 49, 55-56). Defendants also contend that Plaintiff's constructions are too broad because any two devices with different access addresses could be a HOSF and a HODF. (Dkt. No. 125 at 18). Defendants further argue that Plaintiff's construction are circular because the HOSF is defined in terms of the HODF, and the HODF in terms of the HOSF, without explaining what either actually is. *Id.* Finally, Defendants contend that Plaintiff's construction uses the term itself verbatim, and then adds additional words without support from the specification. *Id.*

Plaintiff replies that Defendants' criticism of its construction ignores the rest of the claim language, which requires both HOSF and HODF to be "of the first user" (claims 1, 41) or "located in a same terminal of a first user or different terminals of the first user" (claim 29). (Dkt. No. 135 at 6). Plaintiff further argues that Defendants' construction would improperly

exclude embodiments where the HODF initiates a handover because the "module of the first user terminal" would only become a HODF "after handover." *Id.*

For the following reasons, the Court finds that the term "**Handover Source Function**" / "**HOSF**" should be construed to mean "**source function corresponding to an access address or access technology before handover.**" The Court further finds that the term "**Handover Destination Function**" / "**HODF**" should be construed to mean "**destination function corresponding to an access address or access technology after handover.**"

b) Analysis

The term "Handover Source Function" or "HOSF" appears in claims 1, 9, 12, 13, 18, 27, 29, 31, and 41 of the '527 Patent. The Court finds that the term is used consistently in the claims and is intended to have the same general meaning in each claim. The term "Handover Destination Function" / "HODF" appears in claims 1, 9, 10, 12, 13, 14, 17, 18, 19, 27, 29, 31, 36, 37, and 41 of the '527 Patent. The Court finds that the term is used consistently in the claims and is intended to have the same general meaning in each claim. The Court further finds that neither parties' constructions accurately captures how the term should be construed in light of the intrinsic evidence.

The specification states that "the HOSF corresponds to an access module of the access point, or the access technology or the access means before the handover, and the HODF corresponds to another access module of the access point, or another access technology or another access means after the handover." '527 Patent at 14:18–23. Defendants cite to this portion of the specification to support their position, but only emphasis the "before and after handover" language. Accordingly, the Court finds that "HOSF" should be construed to mean "source function corresponding to an access address or access technology before handover,"

and "HODF" should be construed to mean "destination function corresponding to an access address or access technology after handover."

Plaintiff argues that the "before and after" language raises a timing-related ambiguity. According to Plaintiff, it is unclear if the HOSF ceases to be a module after handover, and whether the HODF was a module before the handover or if it even existed. (Dkt. No. 119 at 16). As indicated in the Field of the Invention section, "[t]he present invention relates . . . to a method and a system for maintaining session continuity when a user changes access address or access technology of a terminal, or even changes the terminal in a session." '527 Patent at 1:20–24. Accordingly, the claims inherently include a timing issue, and the recited functions are identified by whether they are the source (*i.e.*, before handover) or the destination (*i.e.*, after handover). Contrary to Plaintiff's contention, the terms "before and after" relate to the method in which the session continuity is maintained. However, the Court agrees that the specification indicates that the HODF can detect that a handover is needed, as well as initiate the handover. *See, e.g.*, '527 Patent at 6:18–21 and 23:20–23 (discussing Fig. 5C), 36:30, 38:7–9. The Court's construction does not exclude this embodiment, because the HODF can still detect and initiate, so long as it remains the destination "after the handover."

Turing to the parties' constructions, the Court rejects Plaintiff's construction because it uses the disputed term to define itself. For example, Plaintiff's construction for the term "Handover Source Function" is a "Handover source function represented by . . . ." Likewise, Plaintiff's construction for the term "Handover Destination Function" is a "Handover destination function represented by . . . ." In addition, the Court agrees that Plaintiff's constructions are circular because the HOSF is defined in terms of the HODF, and the HODF in terms of the HOSF. The Court rejects Defendants' construction because it fails to identify the HOSF and

HOAF as "corresponding to an access address or access technology" as stated in the specification. *See, e.g.*, '527 Patent at 14:18–23.

During the claim construction hearing, Plaintiff requested clarifying the Court's preliminary construction to indicate that the HOSF and HODF are different to avoid any possibility that they are the same. Defendants stated that they do not disagree that the HOSF and HODF are different, as Plaintiff contends. Accordingly, to the extent that a party argues that the HOSF and HODF are the same, the Court rejects that argument. Finally, in reaching its conclusion, the Court has considered the extrinsic evidence submitted by the parties, and given it its proper weight in light of the intrinsic evidence.

c) Court's Construction

The Court construes the term "**Handover Source Function" / "HOSF"** to mean **"source function corresponding to an access address or access technology before handover."** The Court construes the term **"Handover Destination Function" / "HODF"** to mean **"destination function corresponding to an access address or access technology after handover."**

4. "Handover Control Function" / "HOCF"

Disputed Term	Plaintiff's Proposal	Defendants' Proposal
"Handover Control Function" / "HOCF"	Plain meaning.	"Module that controls handover"

a) The Parties' Positions

The parties agree that the term relates to controlling handover. (Dkt. No. 125 at 19). The parties dispute whether the recited "function" should be construed as "module," as Defendants contend. Plaintiff argues that Defendants' construction restates the claim term, except substituting "module" for "function." (Dkt. No. 119 at 16). Plaintiff contends that Defendants admit that no construction is required because a widget "that controls handover" is no different

from a "handover control" widget. *Id.*

Defendants respond that Plaintiff never states what the plain meaning of "function" is in the '527 Patent. (Dkt. No. 125 at 19). Defendants also argue that the specification explains that these "functions" are something inside a terminal, *i.e.*, a "module." (*Id.*) (citing '527 Patent at 10:60–65, 26:22–25; Dkt. No. 125-1 at ¶¶ 49, 55-56).

Plaintiff replies that Defendants agree that the only real dispute is whether their proposal to replace "function" with "module" is proper. (Dkt. No. 135 at 7). Plaintiff contends that it is improper because it is contradicted by Defendants' other arguments that "module" is a nonce word. *Id.*

For the following reasons, the Court finds that the term **"Handover Control Function"** / **"HOCF"** should be given its **plain and ordinary meaning**.

b) Analysis

The term "Handover Control Function" / "HOCF" appears in claims 2, 7, 9, 18, and 31 of the '527 Patent. The Court finds that the term is used consistently in the claims and is intended to have the same general meaning in each claim. The Court further finds that the term should be given its plain and ordinary meaning. Defendants have not provided a persuasive reason to redraft the claim as they propose. The specification never indicates that the Handover Control Function must be a module. The portions of the specification cited by Defendants relate to the HOSF and HODF, not the HOCF. *See, e.g.,* '527 Patent at 10:60–65 ("The HOSF and the HODF . . . can be different access modules in a same terminal of the handover user, or access modules in different terminals of the handover user."). Accordingly, the Court rejects Defendants' construction. Finally, in reaching its conclusion, the Court has considered the extrinsic evidence submitted by the parties, and given it its proper weight in light of the intrinsic evidence.

c) **Court's Construction**

The term **"Handover Control Function"** / **"HOCF"** will be given its **plain and ordinary meaning**.

5. **"idle state" and "idle mode"**

Disputed Term	Plaintiff's Proposal	Defendants' Proposal
"idle state"	"state in which the User Equipment does not have an active voice or data connection with the network"	"a state in which the UE is not currently sending or receiving user data"
"idle mode"	"mode in which the User Equipment does not have an active voice or data connection with the network"	"a mode in which the UE is not currently sending or receiving user data"

a) **The Parties' Positions**

The parties dispute whether "idle state"/ "idle mode" means that the UE does not have an active voice or data connection, as Plaintiff proposes, or if means that the UE is not currently sending or receiving user data, as Defendants propose. Plaintiff argues that "idle mode" has a well-known meaning in telecommunications, and that the '268 and '261 Patents use this term consistent with that meaning. (Dkt. No. 119 at 18) (citing Dkt. No. 119-4 at 16 n.1 ('268 Patent Prosecution History, Sept. 20, 2013 Response to Office Action)). Plaintiff also argues that a UE can be in one of two RRC states: "RRC_CONNECTED" or "RRC_IDLE." (Dkt. No. 119 at 18) (citing Dkt. No. 119-6 at 10-11 (TS 36.331 V0.1.4)). According to Plaintiff, the "RRC_IDLE" RRC state reflects the "idle mode" to which the patents refer. (Dkt. No. 119 at 18). Plaintiff further contends that in the idle state, only "broadcast/multicast" data is transferred, which the UE uses to detect incoming calls. *Id.* (citing Dkt. No. 119-6 at 10-11) (TS 36.331 V0.1.4)). Plaintiff argues that in idle mode, there is no RRC connection, and thus no voice or user data can be transmitted. (Dkt. No. 119 at 18).

Plaintiff further argues that the '268 Patent prosecution history confirms the patentee interpreted "idle state" in accord with its well-known meaning that no connection exists. (Dkt.

No. 119 at 19) (citing Dkt. No. 119-4 at 3, 28). According to Plaintiff, the patentee made clear that an "active mode or state," in which a UE already has a connection to a radio network, is different from the claimed "idle mode" or "idle state" in LTE, where the UE has no such connection. (Dkt. No. 119 at 19). Plaintiff further contends that the patentee explicitly relied upon 3GPP definitions related to idle mode when explaining the '268 Patent to the Examiner during prosecution. (119 at 20) (citing Dkt. No. 119-4 at 16 n.1 ('268 Patent Prosecution History, Sept. 20, 2013 Response to Office Action)). Plaintiff also contends that TR 21.905 V7.0.0 defines "idle mode" as the "state of UE switched on but which does not have any established RRC connection" and "RRC connection" as "[a] point-to-point bi-directional connection between RRC peer entities on the UE and the UTRAN sides, respectively." (Dkt. No. 119 at 20) (citing Dkt. No. 119-7 at 14, 23).

Regarding Defendants' construction, Plaintiff argues that it confuses the true nature of active and idle modes/states. (Dkt. No. 119 at 20). Plaintiff contends that the UEs of two individuals engaged in a voice call are both in active mode. *Id.* According to Plaintiff, Defendants' construction suggests that these active mode UEs momentarily revert to idle mode whenever there is a conversational lull or long pause *Id.* Plaintiff argues that the UEs remain in active mode and do not momentarily revert to idle mode whenever there is such a pause. *Id.* Plaintiff further argues that the UEs remain in active mode until a connection between the UE and the network ceases to exist. *Id.*

Defendants respond that their construction is consistent with the plain and ordinary meaning of this term, and the specification provides no indication that the patentee intended anything different. (Dkt No. 125 at 21). Defendants argue that they agree that background noise is user data because it is transmitted from one UE to another over a user plane. *Id.* Defendants

contend that Plaintiff attempts to define idle mode by reference to "active voice or data connection[s]," with no explanation of what it means for a connection to be "active." *Id.* Defendants argue that Plaintiff attempts to inject terminology from the 3GPP standards relating to "active mode" into its definition of "idle mode" by citing to the prosecution history of only one of the two patents. (*Id.* at 22). Defendants contend that the '268 prosecution history is irrelevant to the meaning of "idle state" in the '261 Patent, because the '261 Patent is not related to the '268 Patent. *Id.* Defendants further contend that Plaintiff proposes a different definition of the term "idle mode" than it did during prosecution. (Dkt. No. 125 at 22) (citing Dkt. No. 125-16 at 4 (TR 21.905 V7.0.0)).

Plaintiff replies that a mobile device in idle mode has no established connection (whether voice or data) to the network in the 3GPP body of standards. (Dkt. No. 135 at 8). Plaintiff argues that this is the plain and ordinary meaning of these terms in view of the asserted patents. *Id.* Plaintiff further argues that Defendants' expert agrees with Plaintoff. *Id.* (citing Dkt. No. 125-9 at ¶ 44). According to Plaintiff, the UE has no established connection, which is more than "not currently sending or receiving user data." (Dkt. No. 135 at 8).

For the following reasons, the Court finds that the terms **"idle state"** and **"idle mode"** should be construed to mean **"the state in which User Equipment (UE) is switched on but cannot send or receive user data."**

b) Analysis

The term "idle state" appears in claims 1, 9, and 17 of the '261 Patent. The Court finds that the term is used consistently in the claims and is intended to have the same general meaning in each claim. The term "idle mode" appears in claims 1, 2, and 3 of the '268 Patent. The Court finds that the term is used consistently in the claims and is intended to have the same general

meaning in each claim. During the claim construction hearing, the parties did not voice significant disagreement with the Court's construction. Instead, Plaintiff expressed concerns that the Court's construction appeared to describe "airplane mode" and not "idle mode." Specifically, Plaintiff argued that even when a UE is in the idle state or idle mode it still can receive something.·For example, Plaintiff argued that a UE in idle mode is capable of receiving a "broadcast/multicast" data (*e.g.*, Amber alert). Plaintiff contends that this type of broadcast could be confused as "user data" under the Court's construction, and therefore would be excluded from the scope of the claims. Thus, Plaintiff requested removing "or receive" from the Court's construction.

Defendants responded that removing "or receive" from the Court's construction may not be incorrect, but it may be incomplete. Defendants agreed that a UE may receive control signals in idle mode before it transitions to some other mode and begins to exchange user data. Defendants argued that the concern Plaintiff raised was not with "user data," but instead with "control data." Plaintiff responded that Defendants' clarifying comments regarding "user data" removed its concern of confusing it with "control data." Plaintiff then suggested that the parties agree that a UE has to wake-up out of idle mode before it can send or receive "user data."

Given the clarifications made during the claim construction hearing, the Court will not remove "or receive" from its construction. The Court's construction is based on the intrinsic evidence with a focus on avoiding unnecessary technical terms that could confuse the disputed issues, as well the jury. Specifically, the patentee relied on the definition of "idle mode" provided in the 3GPP Specification during prosecution. The patentee argued that "[a]pplicant respectfully notes that the definition for the 'idle mode' is well known in the art. For example, Applicant refers the Examiner to the definition for 'idle mode' and 'RCC connection' found in

the '3rd Generation Partnership Project: Technical Specification Group Services and System Aspect: Vocabulary for 3GPP Specifications (Release 7)' a.k.a. *3GPP TR 21.905 V7.0.0 (2005-09).*" (119-4 at 16 n.1) (emphasis in original). The referenced 3GPP specification defines "idle mode" as "[t]he state of UE switched on but which does not have any established RCC connection." (Dkt. No. 119-7 at 14)

Given the reliance on this definition in the prosecution history, the Court finds that this is how a person of ordinary skill in the art would interpret the term "idle mode." Indeed, Plaintiff argues that Defendants' expert agrees that "[i]n idle mode, there is no RRC connection, and thus no voice or user data can be transmitted." (Dkt. No. 135 at 8) (citing Dkt. No. 125-9 at ¶ 44 ("Therefore, a UE in 'idle state' or 'idle mode,' does not have an established RRC connection and thus cannot send or receive user data.")). Furthermore, the parties agree that the terms "idle mode" and "idle state" should have the same meaning. Accordingly, with the understanding that an RCC connection is required "to send or receive user data," the Court construes "idle mode" and "idle state" to mean "the state in which User Equipment (UE) is switched on but cannot send or receive user data." Finally, in reaching its conclusion, the Court has considered the extrinsic evidence submitted by the parties, and given it its proper weight in light of the intrinsic evidence.

c) Court's Construction

The Court construes the terms **"idle state"** and **"idle mode"** to mean **"the state in which User Equipment (UE) is switched on but cannot send or receive user data."**

6. "mobility management entity (MME)"

Disputed Term	Plaintiff's Proposal	Defendants' Proposal
"mobility management entity (MME)"	"element in a Long-Term Evolution (LTE) network that manages the mobility of User Equipment (UE)"	"server that manages mobility"

a) The Parties' Positions

The parties dispute whether the recited "mobility management entity (MME)" is limited to an element in an LTE network, as Plaintiff contends. Plaintiff argues that a "mobility management entity" or "MME" is a well-known network entity that belongs explicitly to an LTE network and manages mobility of a UE. (Dkt. No. 119 at 20) (citing '268 Patent at 1:23–47; '261 Patent at 1:26–32). Plaintiff contends that both the '268 and '261 Patents are expressly directed to LTE networks. (Dkt. No. 119 at 21) (citing '261 Patent at 2:1–9; '268 Patent at 1:57–62). According to Plaintiff, reference to an "MME" in the asserted patent is unambiguously intended to be interpreted as a particular component in an LTE system. (Dkt. No. 119 at 21).

Plaintiff further argues that if the patent used the term "MME" in the generic sense, as Defendants propose, the patent would have stated that a "SGSN" is a "MME" operating in a 3G network. *Id.* Plaintiff also contends that Defendants' interpretation is incompatible with the remainder of the '268 and '261 Patents, which describe these components as distinct entities. (Dkt. No. 119 at 21) (citing '268 Patent at 4:9–11, 5:16–17; '261 Patent at 7:18–31, 8:43–53). Finally, Plaintiff argues that Defendants' construction adds no clarity to the meaning of the term because it reorders the original term's words and replaces "entity" with "server." (Dkt. No. 119 at 22). Plaintiff contends that replacing "entity" with "server" simply introduces unnecessary ambiguity. *Id.*

Defendants respond that the claims and the specifications confirm their construction by describing that a "mobility management entity" "implements mobility management" or is "responsible for mobility management." (Dkt. No. 125 at 23) (citing '268 Patent at 1:25–26, 4:24–38; '261 Patent at 1:28–32, 3:65-4:3). Defendants argue that their construction also provides clarity by stating that an MME is a server. (Dkt. No. 125 at 23). Defendants contend that Plaintiff's construction offers no insight into what an MME is, and replaces one nonce word

(entity) with another (element). *Id.* Defendants also argue that Plaintiff seeks to define a MME by stating where it is (in an LTE network), without clarifying what it is (a server that manages UE mobility). *Id.*

Plaintiff replies that Defendants' expert neither opposed its construction nor supported Defendants' construction. (Dkt. No. 135 at 8). Plaintiff further argues that Defendants' injection of the word "server" is inappropriate. *Id.* Plaintiff contends that the sole use of "server" in either patent is a reference to another network element, the "Home Subscriber Server (HSS)." *Id.* (citing '261 Patent at 8:58; '268 Patent at 6:32–33). According to Plaintiff, the MME is explicitly named an "entity," not a "server," and Defendants provide no support for such a narrowing. (Dkt. No. 135 at 8).

For the following reasons, the Court finds that the term "**mobility management entity (MME)**" should be construed to mean **"entity in a Long Term Evolution (LTE) network responsible for mobility management."**

b) Analysis

The term "mobility management entity (MME)" appears in claims 1, 2, and 3 of the '268 Patent, and claims 1, 9, and 17 of the '261 Patent. The Court finds that the term is used consistently in the claims and is intended to have the same general meaning in each claim. The Court further finds that the recited "mobility management entity (MME)" should be construed to mean an "entity in a Long Term Evolution (LTE) network responsible for mobility management." The intrinsic evidence indicates that a "mobility management entity" or "MME" is a well-known network entity that belongs to an LTE network and manages mobility of a UE. *See, e.g.,* '268 Patent at 1:23–47 ("A Long Term Evolution (LTE) radio core network includes a Mobility Management Entity (MME)."); '261 Patent at 1:26–32 ("A core network of a [LTE]

wireless network includes an MME.").

The parties agree, and the Court finds, that the '268 and '261 Patents are directed to LTE networks. *See, e.g.*, '261 Patent at 2:1-9 (noting the lack of security capability negotiation methods for UEs moving from a 2G or 3G network to an LTE network); '268 Patent at 1:57-62 (noting the lack of security capability negotiation methods for UEs moving from an LTE network to a 2G or 3G network). Furthermore, the specifications explicitly state that the MME is responsible for mobility management. '261 at 1:28–32 ("The MME . . . is mainly responsible for mobility management and user authentication."); '268 at 1:24–26 ("A Long Term Evolution (LTE) radio core network includes a Mobility Management Entity (MME), which implements mobility management and user authentication . . . .").

Defendants argue that the patentee used the term MME in a generic sense to mean a server in any network (*e.g.*, LTE, 2G, 3G). (Dkt. No. 125 at 23). There is no indication that the '261 and '268 Patents intended to use "mobility management entity (MME)" to refer to anything other than an MME in a LTE network. Defendants' generic interpretation is inconsistent with the specification, which describe the respective components as distinct entities. *See, e.g.*, '268 Patent at 4:9–11 (describing an embodiment where the "3G SGSN obtains the AV-related keys from the MME directly), 5:16–17 (describing an embodiment where the "3G SGSN obtains a root key from the MME"); '261 Patent at 7:18–31 ("[T]he MME . . . sends a context request message to an SGSN."), 8:43–53 ("[T]he MME acquires an NAS security algorithm supported by the UE from an SGSN through mobility management context request and response messages."). Accordingly, the Court does not adopt Defendants' construction. Finally, in reaching its conclusion, the Court has considered the extrinsic evidence submitted by the parties, and given it its proper weight in light of the intrinsic evidence.

c) Court's Construction

The Court construes the term **"mobility management entity (MME)"** to mean **"entity in a Long Term Evolution (LTE) network responsible for mobility management."**

7. "information for determining"

Disputed Term	Plaintiff's Proposal	Defendants' Proposal
"wherein the mobility management context comprises information for determining security capacities supported by the UE and authentication vector (AV)-related keys that are deduced according to a root key of the MME"	Plain meaning	Indefinite
"wherein the mobility management context comprises information for determining security capacities supported by the UE and the AV-related keys"	Plain meaning	Indefinite

a) The Parties' Positions

The parties dispute whether the phrases are indefinite for failing to inform, with reasonable certainty, those skilled in the art about the scope of the invention. Defendants argue that it is unclear whether "information for determining" modifies only "security capacities supported by the UE," or also modifies "AV-related keys." (Dkt. No. 125 at 24). Defendants contend that this is fatal because these possibilities each correspond to distinct embodiments disclosed in the specification, and neither the claim language nor the specification provide a way to resolve the ambiguity. *Id.* (Dkt. No. 125-9 at ¶ 43). Defendants argue that one reading requires that the mobility management context contains information for determining security capacities and the AV-related keys themselves. (Dkt. No. 125 at 24) (citing '268 Patent at 4:31–36, Figure 1 at 102, 103). Defendants also argue that the claim can be read as requiring that the mobility management context contains information for determining the security capacities and information for determining the AV-related keys. (Dkt. No. 125 at 24) (citing '268 Patent at 5:30–33, Figure 2 at 202, 203). According to Defendants, the claim cannot cover both options

because the phrase "information for determining" cannot both modify "AV-related keys" and not modify it. (Dkt. No. 125 at 24-25) (citing Dkt. No. 125-9 at ¶ 41, 43).

Plaintiff responds that the surrounding claim language leaves no doubt that there is only one reasonable reading of the claims, and Defendants' alleged second definition is contrived. (Dkt. No. 135 at 9). Plaintiff contends that the claim recites that the AV-related keys are "deduced according to a root key of the MME." *Id.* According to Plaintiff, this means the root key of the MME is information from which the AV-related keys are determined. *Id.* (Dkt. No. 135-1 at ¶¶ 41-44; Dkt. No. 125-9 at ¶ 40). Plaintiff further contends that Defendants' alleged second interpretation renders the existing claim language "deduced according to a root key of the MME" redundant, and is not a plausible reading of the claim. (Dkt. No. 135 at 9) (citing 135-1 at ¶¶ 41-44). Plaintiff argues that the only sensible reading of the claims is that "information for determining" only modifies "security capacities supported by the UE." (Dkt. No. 135 at 9).

For the following reasons, the Court finds that the **"information for determining"** phrases inform a person of ordinary skill in the art the scope of the claims with reasonable certainty, and should be given their plain and ordinary meaning.

b) Analysis

The phrase "wherein the mobility management context comprises information for determining security capacities supported by the UE and authentication vector (AV)-related keys that are deduced according to a root key of the MME" appears in claims 1 and 3 of the '268 Patent. The phrase "wherein the mobility management context comprises information for determining security capacities supported by the UE and the AV-related keys" appears in claim 2 of the '268 Patent. The Court finds that the phrases are used consistently in the claims and are intended to have the same general meaning in each claim. The Court further finds that the

phrases are not indefinite.

Defendants contend that it is unclear whether "information for determining" modifies only "security capacities supported by the UE," or also modifies "AV-related keys." (Dkt. No. 125 at 24). According to Defendants, "one reading requires that the mobility management context contains information for determining security capacities and the AV-related keys themselves (as opposed to information for determining them)." (Dkt. No. 125 at 24) (referred to as "Embodiment 1"). Defendants argue that the claim can also be read as requiring the mobility management context contains information for determining the security capacities and information for determining the AV-related keys. *Id.* (referred to as "Embodiment 2"). Defendants contend that the claim cannot cover both options because the phrase "information for determining" cannot both modify "AV-related keys" and not modify it, at the same time. (125 at 24). The Court finds that Defendants' alternative interpretation is not a plausible reading of the claim, and is inconsistent with the intrinsic evidence.

Contrary to Defendants' contentions, the claims are not drafted to cover both embodiments, but instead are drafted to cover the first embodiment or Embodiment 1. In describing the first embodiment, the specification states the following:

> Steps 101-103: The 3G SGSN obtains the AV-related keys from the MME through a mobility management context message, *where the AV-related keys are deduced according to the root key*.
> Specifically, the 3G SGSN sends a mobility management context request to the MME. *The MME deduces the AV-related keys through a unidirectional transformation function according to its own root key Kasme*, where the AV-related keys include an integrity protection key IK and a ciphering key CK, or an IK' and a CK' further derived from the IK and the CK through unidirectional transformation by the MME; then the MME returns a mobility management context response that carries the AV-related keys to the 3G SGSN; and the 3G SGSN uses the AV-related keys as the current ciphering key and integrity protection key.
> In step 100, if the RAU Request sent by the UE to the 3G SGSN carries no security capabilities supported by the UE, the mobility management context

response returned by the MME to the 3G SGSN in step 103 needs to further carry the security capabilities supported by the UE.

'268 Patent at 4:24–43 (emphasis added). The specification's statement that "*[t]he MME deduces the AV-related keys through a unidirectional transformation function according to its own root key Kasme,*" mirrors the claim language. Indeed, claim 2 recites that the processor in the MME is "configured to *deduce authentication vector (AV)-related keys* according to a root key of the MME," and that the transmitter in the MME is "configured to send the mobility management context to the SGSN, . . . *the AV-related keys.*"

In contrast, the specification describes the second embodiment or Embodiment 2 as follows:

> Steps 201-203: The 3G SGSN obtains the root key from the MME through a mobility management context message, and then deduces the AV-related keys according to the root key.
> Specifically, the 3G SGSN sends a mobility management context request to the MME. *The MME returns a mobility management context response that carries the root key to the 3G SGSN*. The 3G SGSN deduces the AV-related keys through a unidirectional transformation function according to the root key Kasme in the response, where the AV-related keys include an integrity protection key IK and a ciphering key CK, or an IK' and a CK' further derived from the IK and the CK through unidirectional transformation by the 3G SGSN, and uses them as the current ciphering key and integrity protection key respectively.
> In step 200, if the RAU request sent by the UE to the 3G SGSN carries no security capabilities supported by the UE, the mobility management context response returned by the MME to the 3G SGSN in step 203 needs to further carry the security capabilities supported by the UE.

'268 at 5:30–48 (emphasis added). In describing the second embodiment, the specification states that "*[t]he MME returns a mobility management context response that carries the root key to the 3G SGSN*." This does not mirror or even suggest the claim language. It simply states that the MME returns a root key. It takes an unreasonably strained reading of the claim to suggest that this disclosure equates to "*information for determining* . . . authentication vector (AV)-related keys that are deduced according to a root key of the MME," as recited in claim 1. The only

sensible reading of the claims is that "information for determining" only modifies "security capacities supported by the UE."

It is understood that a claim is definite so long as it informs, with "reasonable certainty" those skilled in the art about the scope of the invention. *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124, (2014). Contrary to Defendants' contention, the claim language informs those skilled in the art about the scope of the claims with reasonable certainty. Defendants have failed to carry their burden of proving indefiniteness. Accordingly, the Court finds that the disputed phrases inform a person of ordinary skill in the art the scope of the claims with reasonable certainty, and should be given their plain and ordinary meaning. Finally, in reaching its conclusion, the Court has considered the extrinsic evidence submitted by the parties, and given it its proper weight in light of the intrinsic evidence.

c) Court's Construction

The phrase **"wherein the mobility management context comprises information for determining security capacities supported by the UE and authentication vector (AV)-related keys that are deduced according to a root key of the MME,"** and the phrase **"wherein the mobility management context comprises information for determining security capacities supported by the UE and the AV-related keys"** are not indefinite and will be given their plain and ordinary meaning.

8. "receiver," "processor," and "transmitter"

Disputed Term	Plaintiff's Proposal	Defendants' Proposal
"a receiver configured to receive a context request for requesting a mobility management context sent by a serving GPRS support node (SGSN) in a second or third generation (2G/3G) network according to a routing area update (RAU) request from a user equipment (UE) in an idle mode"	Not subject to 112 ¶ 6 – plain meaning. If the Court determines this term is subject to 112 ¶ 6: **Function:** receiving a context request for requesting a mobility management context sent by a serving GPRS support node (SGSN) in a second or third generation (2G/3G) network according to a routing area update (RAU) request from a user equipment (UE) in an idle mode **Structure:** MME receiver and equivalents thereof	Indefinite for failure to disclose structure. **Function:** receive a context request for requesting a mobility management context sent by a serving GPRS support node (SGSN) in a second or third generation (2G/3G) network according to a routing area update (RAU) request from a user equipment (UE) in an idle mode **Structure:** No corresponding structure disclosed.
"a processor configured to deduce authentication vector (AV)- related keys according to a root key of the MME"	Not subject to 112 ¶ 6 – plain meaning. If the Court determines this term is subject to 112 ¶ 6: **Function:** deducing authentication vector (AV)- related keys according to a root key of the MME **Structure:** MME processor and equivalents thereof	Indefinite for failure to disclose structure. **Function:** to deduce authentication vector-related keys according to a root key of the MME **Structure:** No corresponding structure disclosed.
"a transmitter configured to send the mobility management context to the SGSN"	Not subject to 112 ¶ 6 – plain meaning. If the Court determines this term is subject to 112 ¶ 6: **Function:** sending the mobility management context to the SGSN **Structure:** MME transmitter and equivalents thereof	Indefinite for failure to disclose structure. **Function:** to send the mobility management context to the SGSN **Structure:** No corresponding structure disclosed.

a) The Parties' Positions

The parties dispute whether the phrases are subject to § 112 ¶ 6. Defendants contend that

the terms are governed by § 112 ¶ 6, because they recite insufficient structure for performing the

claimed functions in the context of an MME. Defendants further contend that the terms are indefinite, because the specification lacks adequate disclosure of corresponding structures, or any algorithm capable of implementing the claimed functions.

Specifically, Defendants argue that the '268 Patent discloses that an MME is a server, similar to an SGSN that "implements mobility management." (Dkt. No. 125 at 26) (citing '268 Patent at 1:25–28). Defendants contend that locating the claimed elements within an MME fails to identify them as any particular structure, and actually contradicts the ordinary use of these terms. (Dkt. No. 125 at 26). Defendants further argue that an MME typically takes the form of a server or series of servers, which would not be known to a person of ordinary skill in the art to contain a "receiver" or a "transmitter." (Dkt. No. 125 at 26) (citing Dkt. No. 125-9 at ¶¶ 24-26). Defendants also argue that while the actual physical housing of a server may have a number of ports through which data and messages are sent and received, one of ordinary skill in the art would not understand there to be a discrete "receiver" or "transmitter" anywhere in the device. (Dkt. No. 125 at 26) (citing Dkt. No. 125-9 at ¶¶ 24-26).

Defendants also contend that the words "receiver," "processor," or "transmitter," do not appear in the specification or figures of the '268 Patent. (Dkt. No. 125 at 26) (citing Dkt. No. 125-9 at ¶¶ 26-27). According to Defendants, "receiver" and "transmitter" have only been interpreted by persons of skill in the art and courts to connote sufficient structure when they are a component within a mobile device that receives and sends signals over the air via electromagnetic waves. (Dkt. No. 125 at 27) (citing Dkt. No. 125-9 at ¶¶ 24-25). Defendants contend that MMEs are computer servers that are connected to other network elements using wired, not wireless, connections. (Dkt. No. 125 at 27) (citing Dkt. No. ¶ 25).

Defendants also argue that each of the "receiver," "processor," and "transmitter" terms in

claim 2 recites functions, and the specification does not recite structures sufficient to perform the claimed functions. (Dkt. No. 125 at 27) (citing Dkt. No. 125-9 at ¶¶ 26-28). Defendants contend that the specification does not teach one of ordinary skill in the art how to configure a "receiver" to receive a context request, how to configure a "processor" to deduce an AV-related key, or how to configure a "transmitter" to send a context response. (Dkt. No. 125 at 27) (citing Dkt. No. 125-9 at ¶ 28). Defendants further argue that the specification fails to show specific algorithms or programming methods to convert general purpose receivers, processors, and transmitters into components capable of performing their specified function. (Dkt. No. 125 at 27-28) (citing Dkt. No. 125-9 at ¶¶ 27-28, 36).

Defendants also contend that the specification fails to disclose sufficient structure that corresponds to the claimed functions recited for the "receiver," "processor," and "transmitter" terms. (Dkt. No. 125 at 28) (Dkt. No. 125-9 at ¶¶ 27-28, 35-36). Defendants argue that specification does not use the terms "receiver," "processor," or "transmitter," or describe any structure corresponding to these terms. (Dkt. No. 125 at 28) (Dkt. No. 125-9 at ¶ 26-27). According to Defendants, the terms "receiver," "processor," and "transmitter" are indefinite because the specification lacks adequate disclosure of corresponding structures, or any algorithm capable of implementing the claimed functions. (Dkt. No. 125 at 28).

Plaintiff responds that the claimed "configured to" terms in the '268 Patent should be construed according to their plain meaning, and are not subject to construction under 35 U.S.C. § 112, ¶ 6. (Dkt. No. 119 at 24). Plaintiff argues that none of these phrases uses the "means for" language, and thus, are presumptively not subject to § 112, ¶ 6 construction. *Id.* Plaintiff contends that each of these terms use simple, well-understood terms in the networking and communications arts, such as a "receiver," "processor," and "transmitter," and additionally

include clauses that further define the structure of the device by identifying how it is configured. *Id.* Plaintiff further argues that each of these terms are used within a larger network component, such as an MME or SGSN, which must include those structures to achieve their purpose. *Id.* Plaintiff contends that "receiver," "processor," and "transmitter" each have a recognizable structure to persons of ordinary skill in the art. *Id.* at 25. Plaintiff further argues that where a would-be functional limitation recites relatively simple functions, such as transmitting or receiving, little disclosure is needed to apprise the public of the structure that corresponds to that function. *Id.*

In the alternative, Plaintiff argues that even if these terms are construed under § 112, ¶ 6, the terms have corresponding structure. *Id.* According to Plaintiff, the specification links the MME to each of the recited function. *Id.* (citing '268 Patent at 4:24–30, 4:35–36). In its reply, Plaintiff argues that Courts have repeatedly held these terms are not subject to 112(6). (Dkt. No. 135 at 10) (citing *Cellular Communications Equipment LLC, v. AT&T, Inc.*, Case No. 2:15-CV-576-RWS-RSP (E.D. Tex. Dec. 19, 2016) (finding "a processor configured to . . ." was not subject to § 112, ¶ 6). Plaintiff further contends that Defendants argument that "receiver" and "transmitter" can only connote sufficient structure in wireless systems is not credible. (Dkt. No. 135 at 10). According to Plaintiff, transmitters and receivers in wired networks were widely known long before their relatively recent prevalence in wireless systems. *Id.* (Dkt. No. 135-1 at ¶¶ 45-47).

For the following reasons, the Court finds that the term **"receiver"** is not subject to § 112, ¶ 6, and should be construed to mean **"receiver of a Mobility Management Entity (MME)."** The Court further finds that the term **"transmitter"** is not subject to § 112, ¶ 6, and should be construed to mean **"transmitter of a Mobility Management Entity (MME)."** The

Court also finds that the term **"processor"** is not subject to § 112, ¶ 6, and should be construed

to mean **"processor of a Mobility Management Entity (MME)"**

b) Analysis

The phrase "a receiver configured to receive a context request for requesting a mobility

management context sent by a serving GPRS support node (SGSN) in a second or third

generation (2G/3G) network according to a routing area update (RAU) request from a user

equipment (UE) in an idle mode" appears in claim 2 of the '268 Patent. The phrase "a transmitter

configured to send the mobility management context to the SGSN" appears in claim 2 of the

'268 Patent. The phrase "a processor configured to deduce authentication vector (AV)-related

keys according to a root key of the MME" appears in claim 2 of the '268 Patent.

"It is well settled that '[a] claim limitation that actually uses the word 'means' invokes a

rebuttable presumption that § 112, [¶] 6 applies.'" *Apex Inc. v. Raritan Comput., Inc.*, 325 F.3d

1364, 1371 (Fed. Cir. 2003) (quotation omitted). It is also equally understood that "a claim term

that does not use 'means' will trigger the rebuttable presumption that § 112, [¶] 6 does not

apply." *Id.* (quotation omitted). The presumption against the application of § 112, ¶ 6 may be

overcome if a party can "demonstrate[] that the claim term fails to 'recite sufficiently definite

structure' or else recites 'function without reciting sufficient structure for performing that

function.'" *Williamson*, 792 F.3d at 1339 (quoting *Watts v. XL Sys., Inc.*, 232 F.3d 877, 880

(Fed. Cir. 2000)). "In undertaking this analysis, we ask if the claim language, read in light of the

specification, recites sufficiently definite structure to avoid § 112, ¶ 6." *Robert Bosch, LLC v.*

Snap-On Inc., 769 F.3d 1094, 1099 (Fed. Cir. 2014) (citing *Inventio AG v. Thyssenkrupp*

Elevator Ams. Corp., 649 F.3d 1350, 1357 (Fed. Cir. 2011)).

Claim 2 of the '268 Patent does not recite the word "means." Therefore, there is a

rebuttable presumption that § 112, ¶ 6 does not apply. Defendants have failed to rebut the presumption because "the words of the claim are understood by persons of ordinary skill in the art to have sufficiently definite meaning as the name for structure." *Williamson*, 792 F.3d at 1348. Specifically, the intrinsic evidence demonstrates that a person of ordinary skill in the art would understand the necessary structure of the "receiver," "transmitter," and "processor" in claim 2 of the '268 Patent.

The specification states that "the 3G SGSN sends a mobility management context request to the MME." '268 Patent at 4:28–29. Using similar language, claim 2 recites that the "receiver" of the MME is "configured to receive a context request for requesting a mobility management context sent by a serving GPRS support node (SGSN)." Similarly, the specification states that "the MME returns a mobility management context response that carries the AV-related keys to the 3G SGSN." *Id.* at 4:35–36. Using similar language, claim 2 recites that the "transmitter" of the MME is "configured to receive a context request for requesting a mobility management context sent by a serving GPRS support node (SGSN)." Likewise, the specification states that "[t]he MME deduces the AV-related keys . . . according to its own root key." *Id.* at 4:29–31. Using similar language, claim 2 recites that the "processor" is "configured to deduce authentication vector (AV)-related keys according to a root key of the MME."

The specification further states that "[a] Long Term Evolution (LTE) radio core network includes a Mobility Management Entity (MME), which implements mobility management and user authentication like a Serving GPRS Support Node (SGSN) in a 2G/3G network." *Id.* at 1:24–28. The specification further states that "[a]n SGSN is provided, which is applicable when a UE moves from an LTE network to a 2G/3G network." *Id.* at 2:45-46. The specification also states that "[a]n MME is provided, which is applicable when a UE moves from an LTE network

to a 2G/3G network." 268 at 2:55-56. Thus, a person of ordinary skill would understand that the claimed "receiver" is a "receiver of a Mobility Management Entity (MME)," the claimed "transmitter" is a "transmitter of a Mobility Management Entity (MME)," and the claimed "processor" is a "processor" of a Mobility Management Entity (MME).

The claim language further describes the inputs and outputs of these components, and what it is that they "receive," "send," or "deduce." For example, the "receiver" is "configured to receive a context request for requesting a mobility management context sent *by a serving GPRS support node (SGSN)*," the "transmitter" is "configured to send the mobility management context *to the SGSN*," and the "processor" is "configured to deduce authentication vector (AV)-related keys according to *a root key of the MME*." *See* '268 Patent at Claim 2 (emphasis added). As explained in *E2E*, § 112, ¶ 6 does not apply when the written description provides context as to the "inputs and outputs" and how the claimed components "interact[] with other components . . . in a way that . . . inform[s] the structural character of the limitation-in-question or otherwise impart[s] structure." *E2E Processing, Inc. v. Cabela's Inc.*, 2015 U.S. Dist. LEXIS 86060, *20 (E.D. Tex. July 2, 2015) (quoting *Williamson*, 792 F. 3d at 1351). Each of the disputed terms is used within a larger network component, such as an MME or SGSN, which must include those structures to achieve their stated objective (*e.g.*, sending and receiving appropriate data).

Defendants argue that the terms "receiver," "transmitter," and "processor" are not understood by persons of ordinary skill in the art to have a sufficiently definite meaning for structures for performing the claimed functions in the context of an MME. (Dkt. No. 125 at 26). The Court disagrees. As discussed above, the intrinsic evidence indicates that the claimed "receiver" is a "receiver of a Mobility Management Entity (MME)," the claimed "transmitter" is a "transmitter of a Mobility Management Entity (MME)," and the claimed "processor" is a

"processor" of a Mobility Management Entity (MME). The intrinsic evidence also indicates that

the MME must include these structures to achieve the recited objective (*e.g.*, sending and

receiving appropriate data). S*ee, e.g., Linear Tech. Corp. v. Impala Linear Corp.*, 379 F.3d 1311,

1319-21 (Fed. Cir. 2004) ("circuit [for performing a function]" found to be sufficiently definite

structure because the claim recited the "objectives and operations" of the circuit).

Defendants also contend that the specification does not use the terms "receiver,"

"transmitter," or "processor," and does not disclose any structure for these terms. (Dkt. No. 125

at 28). Defendants argue that that the specification does not disclose any hardware, software,

algorithms, or other structure that comprise the MME. *Id.* According to Defendants, "the

specification lacks adequate disclosure of corresponding structures, or any algorithm capable of

implementing the claimed functions." *Id.*

The Court is not persuaded by Defendants' argument. As discussed above, the

specification contains descriptions of MMEs and SGSNs performing the claimed functionality.

See, e.g., '268 Patent at 4:28–29 ("[T]he 3G SGSN sends a mobility management context request

to the MME."), 4:29–31 ("The MME deduces the AV-related keys . . . according to its own root

key."), 4:35–36 ("[T]he MME returns a mobility management context response that carries the

AV-related keys to the 3G SGSN."). These disclosures demonstrate that the term "mobility

management entity" has an understood meaning in the art and is likewise not subject to § 112 ¶

6. In sum, the recited terms are not nonce words. *See SyncPoint Imaging, LLC v. Nintendo of

Am. Inc.*, 2016 U.S. Dist. LEXIS 677, *54-62 (E.D. Tex. Jan. 5, 2016) (holding claim limitations

reciting "a processor … for processing …" were not means-plus-function limitations because the

term 'processor' connoted structure and was not a 'nonce' term."). Finally, in reaching its

conclusion, the Court has considered the extrinsic evidence submitted by the parties, and given it

its proper weight in light of the intrinsic evidence.

c)   Court's Construction

The Court finds that the term **"receiver"** is not subject to § 112, ¶ 6, and should be

construed to mean **"receiver of a Mobility Management Entity (MME)."** The Court further

finds that the term **"transmitter"** is not subject to § 112, ¶ 6, and should be construed to mean

"transmitter of a Mobility Management Entity (MME)." The Court also finds that the term

"processor" is not subject to § 112, ¶ 6, and should be construed to mean **"processor of a**

Mobility Management Entity (MME)"

9.   Preamble of Claim 1

Disputed Term	Plaintiff's Proposal	Defendants' Proposal
Preamble of Claim 1[3]	Preamble is limiting. To the extent additional clarification is needed, the claim 1 preamble requires the "receiving," "selecting," "sending," and "deriving" steps to be performed by the MME.	Claim 1: Preamble is limiting but does not require all recited steps be performed by the MME

a)   The Parties' Positions

The parties agree that the preamble in claim 1 of the '261 Patent is limiting. The parties

dispute whether it requires the recited steps to be performed by the MME. Plaintiff contends that

the preamble of claim 1 recites both the actor and acts that lie at the heart of the '261 Patent.

(Dkt. No. 119 at 26). According to Plaintiff, it is the LTE network MME that negotiates security

during idle state mobility. *Id.* (citing '261 Patent at Abstract). Plaintiff further argues that

interpreting the preamble as limiting makes plain that the MME is used for security negotiation

for idle state mobility. (Dkt. No. 119 at 27). Plaintiff contends that construing the preamble as

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[3] Plaintiff's opening brief and Defendants' opposition brief included the preamble of claim 17 as a disputed phrase. In its reply brief, Plaintiff stated that claim 17 was dropped prior to the parties' P.R. 4-3 statement. (135 at 10).

limiting removes any potential ambiguity by requiring the "receiving," "selecting," "sending," and "deriving" steps to be performed by the MME, and the "transmitting" step to result in a transmission to the MME. *Id.*

Plaintiff further argues that the specification repeatedly confirms that it is directed an innovative procedure whereby an LTE network MME enables security negotiation. *Id.* (citing '261 Patent at Abstract, 2:21–23). Plaintiff also argues that the specification further confirms that various steps are performed by the MME. (Dkt. No. 119 at 27) (citing '261 Patent at 3:32–64). Finally, Plaintiff contends that the prosecution history removes any doubt about the import of the claim preambles. (Dkt. No. 119 at 27) (citing Dkt. No. 119-13 at 22, 39, 48-52).

Defendants respond that they agree that the preamble is limiting, but propose a construction that clarifies that not all steps need to be performed by the MME. (Dkt. No. 125 at 30). Defendants contend that the "transmitting" step is expressly performed by a separate entity sending "to the MME." *Id.* According to Defendants, if the preamble required the MME to perform every step, the claim would contradict itself. *Id.* Defendants argue that clarification is needed to ensure that the jury is not confused about which steps have to be performed by an MME, given that the preamble refers to "using an MME." *Id.*

For the following reasons, the Court finds that the preamble of claim 1 is limiting and requires the "receiving," "selecting," "sending," and "deriving" steps to be performed by the MME.

b) Analysis

The Court finds that the preamble of claim 1 requires the "receiving," "selecting," "sending," and "deriving" steps to be performed by the MME. The specification indicates that the claims are directed to a procedure whereby an LTE network MME enables security

negotiation. *See, e.g.*, '261 Patent at Abstract ("An MME negotiates security in case of idle state mobility for a UE from a first network to a LTE network."), 2:21–23 ("The present invention is further directed to an MME, so that when moving from a 2G/3G network to an LTE network, a UE in an idle state can negotiate a security capability."). Moreover, the specification explicitly states that the various steps are performed by the MME. Specifically, the specification states the following:

> A method for negotiating a security capability when a terminal moves, wherein when a user equipment (UE) moves from a second/third generation (2G/3G) network to a long term evolution (LTE) network, the method comprises:
> *receiving, by a mobility management entity (MME)*, a tracking area update (TAU) request message sent from the UE, and acquiring a non-access signaling (NAS) security algorithm supported by the UE, and an authentication vector-related key or a root key derived according to the authentication vector-related key;
> *selecting, by the MME*, an NAS security algorithm according to the NAS security algorithm supported by the UE, deriving an NAS protection key according to the authentication vector-related key or the root key, and sending a message carrying the selected NAS security algorithm to the UE.
> In the technical solutions of the present invention, *the MME receives* the TAU request message sent from the UE, and acquires the authentication vector-related key or the root key derived according to the authentication vector-related key and the NAS security algorithm supported by the UE; then selects the NAS security algorithm according to the NAS security algorithm supported by the UE, generates a message carrying the selected NAS security algorithm, and *sends the message to the UE*, thereby enabling the UE and the MME to share the NAS security algorithm. In addition, *the MME derives the NAS protection key according to the authentication vector-related key or the root key derived according to the authentication vector-related key*, and the UE derives the NAS protection key according to the authentication vector-related key, thereby enabling the MME and the UE to share the NAS protection key. In this way, when moving from the 2G/3G network to the LTE network, the UE can negotiate the NAS security algorithm and the NAS protection key with the MME, so that the security capability negotiation process in the TAU procedure between heterogeneous networks is achieved, thereby ensuring the security of subsequent interaction between the UE and the network.

'261 Patent at 3:28–64. As indicated by the intrinsic evidence, the Court finds that "the preamble is essential to understand[ing] limitations or terms in the claim body." *Catalina Mktg. Int'l Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002).

The patent prosecution history further confirms the importance of the preamble. As originally filed, the "receiving," "selecting," "sending," and "deriving" steps of claim 1 each were limited to being done "by the MME." (Dkt. No. 119-13 at 22). The patentee later amended the claims so that the "MME" limitation appeared in the claim preamble, rather than the body. (Dkt. No. 119-13 at 38). Importantly, the patentee did not indicate or suggest that this amendment changed the scope of the claim. *Id.* at 119-13 at 49-52.

Defendants argue that clarification is needed to ensure that the jury is not confused about which steps have to be performed by an MME, given that the preamble refers to "using an MME." (Dkt. No. 125 at 30). The Court agrees, and finds that interpreting the preamble as limiting makes clear that the MME is used for security negotiation for idle state mobility. Accordingly, requiring the "receiving," "selecting," "sending," and "deriving" steps to be performed by the MME, and the "transmitting" step to result in a transmission to the MME properly clarifies the scope of the claim for the jury.

c) Court's Construction

The preamble of claim 1 is limiting and requires the "receiving," "selecting," "sending," and "deriving" steps to be performed by the MME.

10. "[deriving/derives] a NAS protection key with the selected NAS security algorithm from the authentication vector-related key"

Disputed Term	Plaintiff's Proposal	Defendants' Proposal
"[deriving/derives] a NAS protection key with the selected NAS security algorithm from the authentication vector-related key"	"[deriving/derives] a NAS protection key using the authentication vector-related key and the selected NAS security algorithm"	"[deriving/derives] a NAS protection key by the UE using the authentication vector-related key CK and/or IK as an input to the selected NAS security algorithm"

a) The Parties' Positions

The parties dispute whether the "deriving" step must be performed by the UE, as

Defendants contend, or if it can be performed by the MME, as Plaintiff contends. The parties

also dispute whether the recited "authentication vector-related key" ("AV-key") must be used as

an input to the recited "selected NAS security algorithm," as Defendants contend. Plaintiff

argues that the specification describes (1) the AV-key, and (2) the selected security algorithm as

inputs to a "derivation method" to produce the NAS protection key. (Dkt. No. 119 at 28) (citing

'261 Patent at 5:10–12, 5:24–31, 5:36–38, 6:55–7:3). Plaintiff contends that the patent teaches

that the selected algorithm and AV-key are input to a function to derive the NAS protection key.

(Dkt. No. 119 at 29). According to Plaintiff, after the recited security negotiation procedure

concludes, the UE and network later use the NAS protection keys as inputs to the security

algorithm to encrypt and/or provide integrity protection to messages passed between them. *Id.*

(citing at '261 Patent at 3:58–64, 15:17–28).

Regarding Defendants' construction, Plaintiff argues that the specification does not

describe the MME as deriving NAS protection keys using AV-keys as inputs to the selected

NAS security algorithm. (Dkt. No. 119 at 29). Plaintiff contends that the specification describes

deriving NAS protection keys using the selected NAS security algorithm as an input to the

derivation method. *Id.* (citing '261 Patent at 6:60–7:3). Plaintiff concludes that Defendants'

interpretation cannot be correct because it directly contradicts the specification. (Dkt. No. 119 at

29).

Defendants respond that the language of the claim and the disclosures of the specification

make clear that the UE performs the claimed "deriving" step. (Dkt. No. 125 at 31). Defendants

contend that the patentee specifically removed language during prosecution that required it to be

performed by the MME. *Id.* According to Defendants, the patentee signaled to the public that the

"deriving" step was not performed by the MME, but that other steps of the method may be

performed "using an MME" or some other entity. *Id.* Defendants also argue that based upon the sequence of steps in claim 1, the specification, and the figures, the deriving step should be construed to be performed by the UE. *Id.* (citing '261 Patent at 11:64–12:2, 4:65–5:65, Figure 1).

Defendants also argue that their construction specifies that the NAS protection key is derived using an AV-related key as an input to the NAS security algorithm. (Dkt. No. 125 at 31). According to Defendants, the specification makes it clear that there are two different ways to derive the NAS protection keys. (*Id.* at 32). Defendants argue that in the first method one can derive the NAS protection key from the AV-related keys by first deriving the MME root key and then deriving the NAS protection keys from the MME root key. *Id.* (citing '261 Patent at 6:55– 59). Defendants also argue that in the second method, one can "directly derive the NAS protection key according to the authentication vector-related key without deriving the root key." (Dkt. No. 125 at 32). Defendants contend that because claims 1, 9, and 17 do not recite a root key, K_{ASME}, the claims cover "directly deriv[ing]" the NAS Protection Keys from the AV-related keys, which can only be done if the AV-related keys are the inputs to the NAS security algorithm. *Id.* (citing '261 Patent at 6:56).

Defendants further contend that the patentee claimed the first method (in which the processor first derives the root key from the AV-related keys and then derives the NAS protection keys from the root keys) in the parent application to the 261 Patent, U.S. Patent No. 8,812,848 ("the '848 Patent"). (Dkt. No. 125 at 32). According to Defendants, this means that the patentee deliberately elected to claim the second method in which the NAS protection keys are "directly derive[d]" from the AV-related keys instead of the generated root key." *Id.*

Plaintiff replies that the "deriving" step in the claims is performed in the MME, not the UE. (Dkt. No. 135 at 11). Plaintiff notes that Defendants argued earlier that these claims were

indefinite because "it is unclear which components are responsible for the 'transmitting,' 'receiving,' 'selecting,' 'sending,' and 'deriving' steps recited in claim 1." *Id.* Plaintiff contends that Defendants now argue they know exactly what network element must perform the deriving step (UE). *Id.* Plaintiff argues that the patentee removed "by the MME" from the steps of claim 1, and inserted "using a MME" into the claim preamble during prosecution in response to a Section 112 rejection. *Id.* According to Plaintiff, there is no indication that the patentee made this amendment to change the claim scope, or explicitly require the UE to perform the deriving step instead of the MME. *Id.* Plaintiff argues that claim 1 should not be construed to exclude the MME from performing it because that would contradict the clear description in the specification. *Id.* ('261 Patent at 3:52–55).

For the following reasons, the Court finds that the phrase **"[deriving/derives] a NAS protection key with the selected NAS security algorithm from the authentication vector-related key"** should be construed to mean **"[deriving/derives] a NAS protection key using the authentication vector-related key and the selected NAS security algorithm."**

b) Analysis

The phrase "[deriving/derives] a NAS protection key with the selected NAS security algorithm from the authentication vector-related key" appears in claims 1, 9, and 17 of the '261 Patent. The Court finds that the phrase is used consistently in the claims and is intended to have the same general meaning in each claim. Regarding the issue of whether the deriving step must be performed by the UE, the Court rejects Defendants' construction. Contrary to Defendants' proposal, the intrinsic evidence indicates that the "deriving" step is performed by the MME. The claims are drafted from the perspective of the MME, and the preamble of claim 1 states that the method is performed "using a mobility management entity (MME)." Similarly, claim 9 recites "a

key derivation module that derives a NAS protection key with the selected NAS security algorithm from the authentication vector-related key," and further explicitly recites that the key derivation module is "included in a mobility management entity (MME)." The claims further indicate when a step is not performed by the MME. For example, claim 1 recites that the "transmitting step" is performed by a service general packet radio service (GPRS) support node (SGSN).

Defendants contend that the sequence of steps in claim 1 require construing the deriving step to be performed by the UE. (Dkt. No. 125 at 31). According to Defendants, "it is clear that the 'deriving' step was meant to take place after the 'sending' Step 104, which means it takes place in Step 105 where the UE 'further derive an NAS protection key.'" *Id.* (citing '261 Patent at 5:54–65, Figure 1). The Court disagrees. Excluding the MME from performing the deriving step would contradict the specification. *See, e.g.*, '261 Patent at 3:52-55 ("the MME derives the NAS protection key according to the authentication vector-related key or the root key derived according to the authentication vector-related key"). Moreover, the patent explicitly states that the deriving step does not have to be in the order that Defendants contend. The specification states that "[t]he procedure that the MME finally derives the NAS protection key according to the authentication vector-related key in step 103 is not limited to any time sequence with respect to step 104 and step 105, and the procedure may be performed before step 104, or between step 104 and step 105, or after step 105." '261 Patent at 6:49–54. Thus, Defendants' argument is inconsistent with the intrinsic evidence.

Defendants also contend that the patentee specifically removed language during prosecution that required the deriving step to be performed by the MME. According to Defendants, this "signaled to the public that the 'deriving' step was not performed by the MME,

but that other steps of the method may be performed 'using an MME' or some other entity."
(Dkt. No. 125 at 31). For the reasons stated above in the analysis of the previous term, the Court
rejects Defendants' argument. The prosecution history indicates that the patentee removed "by
the MME" from the "receiving," "selecting," "sending," and "deriving" steps of claim 1 and,
then inserted "using a MME" into the claim preamble to overcome a Section 112 rejection.
There is no indication that the patentee made this amendment to change the claim scope, much
less to explicitly require the UE to perform the deriving step instead of the MME. Indeed, under
Defendants' rationale the "receiving," "sending," and "selecting" steps could not be performed
by the MME, because "by the MME" was also removed from these steps. This would contradict
the plain claim language of "using a mobility management entity (MME)" recited in the
preamble.

Regarding the issue of whether "authentication vector-related key" must be used as an
input to the recited "selected NAS security algorithm," the Court rejects Defendants'
construction. Defendants' construction is not consistent with the intrinsic evidence and would
also improperly read a "directly derived" requirement into the claims. First, the specification
does not describe the MME as deriving NAS protection keys using AV-keys as inputs to the
selected NAS security algorithm. Instead, the specification describes deriving NAS protection
keys using the selected NAS security algorithm as an input to the derivation method.
Specifically, the specification describes the AV-key and the selected security algorithm as inputs
to a "derivation method" to produce the NAS protection key. The specification identifies the
selected security algorithm as the "NAS confidentiality protection algorithm" and "NAS
integrity protection algorithm"; the root key as "Kasme"; the AV-key as encryption key "CK"
and integrity key "IK"; and describes the NAS protection key as including "NAS integrity

protection key Knas-int and/or an NAS confidentiality protection key Knas-enc." '261 Patent at 5:10-12, 5:24-31, 5:36-38.

Using these abbreviations, the specification states that CK and IK can be used to derive Kasme. *Id.* at 5:36–38, 5:20–23, 6:66–67. The specification then teaches using a "derivation method" to derive the confidentiality protection key—Knas-enc = f(Kasme, NAS confidentiality protection algorithm, other parameters)—and a function for deriving the integrity protection key—Knas-int = f(Kasme, NAS integrity protection algorithm, other parameters). *Id.* at 6:60-7:3. Thus, the specification explicitly states that the selected algorithm and AV-key are input to a function to derive the NAS protection key. *See, e.g.*, '261 Patent at 5:38–40 ("The NAS protection key includes an NAS integrity protection key Knas-int and/or an NAS confidentiality protection key Knas-enc."). After the recited security negotiation procedure concludes, the UE and network later use the NAS protection keys as inputs to the security algorithm to encrypt and/or provide integrity protection to messages passed between them. *Id.* at 3:58–64, 15:17–28.

Defendants argue that their construction should be adopted because the patentee claimed the first method (in which the processor first derives the root key from the AV-related keys and then derives the NAS protection keys from the root keys) in the '848 Patent (*i.e.*, the parent application). Claim 1 in the '848 Patent recites "*a processor configured to generate a root key from an authentication vector-related key available at the UE and to derive, from the generated root key, according to the NAS security algorithm, a NAS protection key for communicating with the LTE network.*" '848 Patent at claim 1 (emphasis added). Contrary to Defendants' argument, this indicates that the claims in the '261 Patent are not limited to deriving a root key in the derivation method. Instead, the claims in the '261 Patent may cover more than one embodiment because they do not explicitly recite generating a root key. Accordingly, the Court

rejects Defendants' construction. Finally, in reaching its conclusion, the Court has considered the extrinsic evidence submitted by the parties, and given it its proper weight in light of the intrinsic evidence.

c) Court's Construction

The Court construes the phrase **"[deriving/derives] a NAS protection key with the selected NAS security algorithm from the authentication vector-related key"** to mean **"[deriving/derives] a NAS protection key using the authentication vector-related key and the selected NAS security algorithm."**

11. Claim 17 of the '261 Patent

Disputed Term	Plaintiff's Proposal	Defendants' Proposal
"communications system that provides security negotiation for idle state mobility from a first network to a long term evolution ("LTE") network . . wherein the MME is in the LTE network and selects a NAS security algorithm supported by the NAS security capabilities of the UE, sends a message that indicates the selected NAS security algorithm to the UE, and derives a NAS protection key with the selected NAS security algorithm from the authentication vector-related key."	Plain meaning	Indefinite / incapable of construction.

a) The Parties' Positions

The parties dispute whether claim 17 of the '261 Patent is indefinite under *IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377 (Fed. Cir. 2005), for reciting both an apparatus and a method of using the apparatus. Plaintiff contends that the claims specifically recites a communications system that includes an MME, which "selects a NAS security algorithm supported by the NAS security capabilities of the UE, sends a message that indicates the selected NAS security algorithm to the UE, and derives a NAS protection key with the

selected NAS security algorithm from the authentication vector-related key." (Dkt. No. 119 at 30). According to Plaintiff, the "wherein" clause at issue describes the structure of the claimed MME claimed system. (*Id.* at 30-31). Plaintiff contends infringement of these claims occurs as soon as an apparatus is made, used, or sold (or offered for sale) with the ability to create the claimed tunnel. *Id.*

Plaintiff further argues that the Federal Circuit cases make clear that even the use of an active verb does not turn the claim into an improper mixed method and apparatus claim. *Id.* (citing *UltimatePointer, L.L.C. v. Nintendo Co.*, 816 F.3d 816, 819 (Fed. Cir. 2016); *Microprocessor Enhancement Corp. v. Texas Instruments Inc.*, 520 F.3d 1367, 1375 (Fed. Cir. 2008); *HTC Corp. v. IPCom GmbH & Co., KG*, 667 F.3d 1270, 1273 (Fed. Cir. 2012)). Plaintiff contends that the disputed claim language is similar to the active verbs used in these cases, and describes the larger network environment in which the claimed apparatus resides. (Dkt. No. 119 at 31-32).

Defendants argue that claim 17 recites that "the MME is in the LTE network and selects…, sends…, and derives…" certain things. (Dkt. No. 125 at 33). According to Defendants, this language no longer describes the capabilities of the MME, but instead describes steps that the MME must perform. *Id.* Defendants contend that the patentee deliberately described the MME as an apparatus, described its capabilities, and then later described method steps performed by the MME. *Id.* Defendants argue that this is precisely the type of claim that is invalid under the Federal Circuit's *IPXL* line of case law. *Id.* Defendants further argue that claim 17 is unlike the claims of both *HTC* and *MEC* because it claims the MME as an apparatus with certain capability and later in the same claim, requires the MME to take action – it "selects," "sends," and "derives." (*Id.* at 34).

Plaintiff replies that it explained why its claims are four corners with those in *UltimatePointer*. (Dkt. No. 135 at 12). Plaintiff argues that claim 17 first cites the structure of "a mobility management entity (MME)," and then cites functionality explicitly linked to that cited structure, *e.g.*, "wherein the MME is in the LTE network and selects a NAS security algorithm . . ." *Id.* According to Plaintiff, this claim form does not implicate *IPXL. Id.*

For the following reasons, the Court finds that claim 17 of the '261 Patent is not indefinite under *IPXL*, and that the disputed clause should be given its plain and ordinary meaning.

b) Analysis

"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." *IPXL*, 430 F.3d at 1384 (holding indefinite a claim covering both an apparatus and a method of using that apparatus). Claim 17 of the 261 Patent recites "[a] communications system . . . comprising: a mobility management entity (MME) that receives security capabilities of a user equipment (UE) . . . ." Defendants agree that there are no *IPXL* issues for this portion of the claim.

Defendants argue that problems arise when claim 17 later recites that "the MME is in the LTE network and selects…, sends…, and derives…" certain things. Defendants contend that this language no longer describes the capabilities of the MME, but now describes steps that the MME must perform. The Court disagrees with Defendants' analysis. Importantly, Federal Circuit cases indicate that a claim does not fall within *IPXL* if the limitation only indicates the capabilities of the associated structure. For example, the claim at issue in *UltimatePointer* recited "a handheld device including: an image sensor, said image sensor *generating data* . . . ." *UltimatePointer,* 816 F.3d at 819 (emphasis added). The Court held that "the 'data generating' limitations only

indicate that the associated structures have this capability (for example, the image sensor and processor in claim 1) and do not require that any data be actually generated by the user." *Id.* at 827.

The Court finds that claim 17 is similar to the claim in *UltimatePointer*, and does not "reflect an attempt to claim both an apparatus and a method, but instead claim[s] an apparatus with particular capabilities." *Id.* at 827-828. Here, the claim recites a communications system that includes an MME, which "selects a NAS security algorithm supported by the NAS security capabilities of the UE, sends a message that indicates the selected NAS security algorithm to the UE, and derives a NAS protection key with the selected NAS security algorithm from the authentication vector-related key." The Court agree that the "wherein" clause describes the structure of the claimed MME in terms of the actions that the MME must be capable of performing when it is part of the claimed system. In other words, "[u]nlike *IPXL* and similar cases, the claim at issue here makes clear that [the "selecting," "sending," and "deriving"] limitation[s] reflect[] the capability of that structure rather than the activities of the user." *Id.* at 827.

c) Court's Construction

The Court finds that claim 17 of the '261 Patent is not indefinite under *IPXL*, and that the disputed clause should be given their plain and ordinary meaning.

12. "acquisition module," "selection module," and "key derivation module"

Disputed Term	Plaintiff's Proposal	Defendants' Proposal
"an acquisition module that receives from a user equipment (UE) security capabilities of the UE including non- access stratum (NAS) security capabilities of the UE"	Not subject to 112 ¶ 6 – plain meaning. If the Court determines this term is subject to 112 ¶ 6: **Function:** receiving from a user equipment (UE) security capabilities of the UE including non- access stratum (NAS) security capabilities of the UE **Structure:** Acquisition module (Fig. 4) in a MME and equivalents thereof	Indefinite for failure to disclose structure. **Function:** receive from a user equipment (UE) security capabilities of the UE including non-access stratum (NAS) security capabilities of the UE **Structure:** No corresponding structure disclosed.
"a selection module that selects a NAS security algorithm supported by the NAS security capabilities of the UE and sends a message that indicates the selected NAS security algorithm to the UE"	Not subject to 112 ¶ 6 – plain meaning. If the Court determines this term is subject to 112 ¶ 6: **Function:** selecting a NAS security algorithm supported by the NAS security capabilities of the UE and sends a message that indicates the selected NAS security algorithm to the UE **Structure:** Selection module (Fig. 4) in a MME and equivalents thereof	Indefinite for failure to disclose structure. **Function:** to select a NAS security algorithm supported by the NAS security capabilities of the UE and send a message that indicates the selected NAS security algorithm to the UE **Structure:** No corresponding structure disclosed.
"a key derivation module that derives a NAS protection key with the selected NAS security algorithm from the authentication vector-related key"	Not subject to 112 ¶ 6 – plain meaning. If the Court determines this term is subject to 112 ¶ 6: **Function:** deriving a NAS protection key using the authentication vector-related key and the selected NAS security algorithm **Structure:** Key derivation module (Fig. 4) in a MME and equivalents thereof	Indefinite for failure to disclose structure. **Function:** to derive a NAS protection key with the selected NAS security algorithm from the authentication vector-related key **Structure:** No corresponding structure disclosed

a) The Parties' Positions

The parties dispute whether the phrases are subject to § 112 ¶ 6. Defendants contend that

the terms are governed by § 112 ¶ 6, because they recite insufficient structure to perform their

recited functions. Defendants further contend that the terms are indefinite, because the

specification does not point to any hardware (or any other structures) that could perform the stated functions. Specifically, Defendants argue that each of the disputed terms contains the nonce word "module" coupled with a function. (Dkt. No. 125 at 34). Defendants contend that this combination would not have had an understood meaning in the art, and that the claimed "modules" do not belong to any known class of structures. (*Id.* at 35) (citing Dkt. No. 125-9 at ¶¶ 29-32, 35). According to Defendants, the term "module" in claim 9 of the '261 Patent "does not provide any indication of structure because it sets forth the same black box recitation of structure for providing the same specified function as if the term 'means' had been used." (Dkt. No. 125 at 35) (citing Dkt. No. 125-9 at ¶¶ 29-33). Defendants further argue that Figure 4 only discloses generic boxes for the "acquisition module," "selection module," and "key derivation module," and that there is no indication of what is inside, how it works, or how it is supposed to perform the claimed functions. (Dkt. No. 125 at 35) (citing Dkt. No. 125-9 at ¶¶ 30-33).

Defendants also argue that even if the "module" terms had a common understanding in the context of an MME, a person of ordinary skill would not understand the identity of these components in light of the functions they perform in the claims. (Dkt. No. 125 at 35) (citing Dkt. No. 125-9 at ¶¶ 34-36). Defendants further argue that a person of ordinary skill would not be able to understand whether the claimed modules refer to software or hardware such as a Network Interface Card (NIC), routers, switches, or something else entirely. (Dkt. No. 125 at 36) (Dkt. No. 125-9 at ¶ 34). According to Defendants, these claim elements would not have "an understood meaning in the art," and should be construed under § 112, ¶ 6. (Dkt. No. 125 at 36).

Defendants further contend that the "module" terms are indefinite because the specification provides no corresponding structure for the claimed functions. (Dkt. No. 125 at 36). Defendants argue that if the "module" terms are construed as hardware, the specification does

not point to any hardware that could perform the stated functions. *Id.* In the alternative, Defendants argue that if the "module" terms are construed as software, the specification does not discloses a processor that executes the corresponding function or an algorithm for the claimed functionality. *Id.* (citing Dkt. No. 125-9 at ¶ 36). Defendants also argue that the mere disclosure of an "acquisition module," "selection module," and "key derivation module" in Figure 4 is not sufficient structure for performing the claimed functions. (Dkt. No. 125 at 36) (citing Dkt. No. 125-9 at ¶ 36).

Plaintiff responds that each of the disputed claim terms contain phrases that modify the otherwise nonce word "module," and describe how the particularized modules "interact[] with other components" in the '261 Patent. (Dkt. No. 119 at 33). Plaintiff argues that the claim language describes the structural character of the claimed modules. (*Id.* at 34). Plaintiff further argues that these disputed claim terms are constrained to reside in a mobility management entity (MME). (Dkt. No. 119 at 34) (citing '261 Patent at 12:45–48).

In the alternative, Plaintiff argues that even if these terms are construed under § 112, ¶ 6, the specification sets forth sufficient structure corresponding to the claims. (Dkt. No. 119 at 34). Plaintiff contends that each of these proposed constructions finds corresponding structure in the specification. *Id.* According to Plaintiff, Figure 4 of the '261 Patent depicts the "acquisition module," "selection module," and "key derivation module" within the MME. *Id.* Plaintiff further contends that the specification describes the recited functions and clearly links them to elements depicted in Figure 4. *Id.* (citing '261 Patent at 2:59–3:8, 10:6–54).

In its reply, Plaintiff argues that these terms should not be subject to 112(6) because the '261 Patent (1) includes "prefix" words before "module" that impart structural meaning; and (2) impart further structure by explaining what the "modules" do and how they fit into the rest of the

system. (Dkt. No 135 at 12) (Dkt. No. 135-1 at ¶¶ 48-54).

For the following reasons, the Court finds that the term **"acquisition module"** is not subject to § 112, ¶ 6, and should be construed to mean **"receiver of a Mobility Management Entity (MME)."** The Court further finds that the term **"selection module"** is subject to § 112, ¶ 6, and is indefinite for failing to discloses sufficient structure that corresponds to the claimed function. The Court also finds that the term **"key derivation module"** is subject to § 112, ¶ 6, and is indefinite for failing to discloses sufficient structure that corresponds to the claimed function.

b) Analysis

The phrase "an acquisition module that receives from a user equipment (UE) security capabilities of the UE including non- access stratum (NAS) security capabilities of the UE" appears in claim 9 of the '261 Patent. The phrase "a selection module that selects a NAS security algorithm supported by the NAS security capabilities of the UE and sends a message that indicates the selected NAS security algorithm to the UE" also appears in claim 9 of the '261 Patent. The phrase "a key derivation module that derives a NAS protection key with the selected NAS security algorithm from the authentication vector-related key" appears in claim 9 of the '261 Patent.

"It is well settled that '[a] claim limitation that actually uses the word 'means' invokes a rebuttable presumption that § 112, [¶] 6 applies.'" *Apex Inc. v. Raritan Comput., Inc.*, 325 F.3d 1364, 1371 (Fed. Cir. 2003) (quotation omitted). It is also equally understood that "a claim term that does not use 'means' will trigger the rebuttable presumption that § 112, [¶] 6 does not apply." *Id.* (quotation omitted). The presumption against the application of § 112, ¶ 6 may be overcome if a party can "demonstrate[] that the claim term fails to 'recite sufficiently definite

structure' or else recites 'function without reciting sufficient structure for performing that function.'" *Williamson*, 792 F.3d at 1339 (quoting *Watts v. XL Sys., Inc.*, 232 F.3d 877, 880 (Fed. Cir. 2000)). "In undertaking this analysis, we ask if the claim language, read in light of the specification, recites sufficiently definite structure to avoid § 112, ¶ 6." *Robert Bosch, LLC v. Snap-On Inc.*, 769 F.3d 1094, 1099 (Fed. Cir. 2014) (citing *Inventio AG v. Thyssenkrupp Elevator Ams. Corp.*, 649 F.3d 1350, 1357 (Fed. Cir. 2011)).

Claim 9 of the '261 Patent does not recite the word "means." Therefore, there is a rebuttable presumption that § 112, ¶ 6 does not apply. For the term "acquisition module," Defendants have failed to rebut the presumption because "the words of the claim are understood by persons of ordinary skill in the art to have sufficiently definite meaning as the name for structure." *Williamson*, 792 F.3d at 1348. Specifically, the intrinsic evidence demonstrates that a person of ordinary skill in the art would understand the necessary structure of the "acquisition module" in claim 9 of the '261 Patent.

The specification states that "[t]he acquisition module is adapted to receive . . . an NAS security algorithm supported by the UE." '261 Patent at 2:61–65, *see also, id.* at 10:36–40. The specification further states that "[t]he acquisition module further acquires the security capability information supported by the UE, and the selection module further carries the security capability information supported by the UE and acquired by the acquisition module in the message carrying the selected NAS security algorithm." '261 Patent at 10:50–54. Using similar language, claim 9 recites that the acquisition module "receives from a user equipment (UE) security capabilities of the UE including non-access stratum (NAS) security capabilities of the UE." The claim further recites that the "acquisition module" is "included in a mobility management entity (MME)." Thus, a person of ordinary skill would understand that the claimed "acquisition module" is "a

receiver of a Mobility Management Entity (MME)." These examples show that this term has an "understood meaning in the art" and thus are not subject to § 112 ¶ 6 construction. *See Chrimar Sys. v. ADTRAN, Inc.*, 2016 U.S. Dist. LEXIS 79555, *38 (E.D. Tex. June 17, 2016) ("Where a claim term has an understood meaning in the art, it recites sufficient structure.").

Defendants argue that the acquisition module contains the nonce word "module" coupled with a function. (Dkt. No. 125 at 34). According to Defendants, the term "module" in claim 9 of the '261 Patent "does not provide any indication of structure because it sets forth the same black box recitation of structure for providing the same specified function as if the term 'means' had been used." (Dkt. No. 125 at 35). Defendants further argue that Figure 4 only discloses generic boxes for the "acquisition module." *Id.*

As discussed above, the intrinsic evidence indicates that the claimed "acquisition module" is a "receiver of a Mobility Management Entity (MME)." Furthermore, the intrinsic evidence indicates that MME must include this structure to achieve its stated objective (*e.g.*, receiving an attach request and requesting to initiate a procedure). S*ee, e.g., Linear Tech. Corp. v. Impala Linear Corp.*, 379 F.3d 1311, 1319-21 (Fed. Cir. 2004) ("circuit [for performing a function]" found to be sufficiently definite structure because the claim recited the "objectives and operations" of the circuit). Importantly, what is claimed here is a communication system that receives from a user equipment (UE) security capabilities of the UE including non-access stratum (NAS) security capabilities of the UE.

Regarding the terms "selection module" and "key derivation module," the Court finds that Defendants have rebutted the presumption that § 112, ¶ 6 does not apply, because a person of ordinary skill in the art would not understand the words of the claim "to have a sufficiently definite meaning as the name for structure." *Williamson v. Citrix Online, LLC*, 792 F.3d 1339,

1349 (Fed. Cir. 2015). Like the previous terms, the disputed term contains the word "module" coupled with a function. The term also includes adjectival modifier of "selection" and "key derivation." However, unlike the previous terms, this combination does not have an understood meaning in the art or belong to a class of structures. (Dkt. No. 125-9 at ¶¶ 29-32).

The Federal Circuit has stated that "[g]eneric terms such as 'mechanism,' 'element,' 'device,' and other nonce words that reflect nothing more than verbal constructs *may* be used in a claim in a manner that is tantamount to using the word 'means.'" *Williamson*, 792 F.3d at 1350 (emphasis added). Here, the recited "selection module" and "key derivation module" are generic recitations of software or hardware, and are purely functional claiming. Thus, the term "selection module" and the term "key derivation module" in claim 9 of the '261 Patent "does not provide any indication of structure, because it sets forth the same black box recitation of structure for providing the same specified function as if the term 'means' had been used." *Id.*

Furthermore, the specification does not provide any guidance for the "selection module" and "key derivation module." The specification includes Figure 4 that references a "selection module" and a "key derivation module." However, Figure 4 only disclose a generic box for the "selection module" and a "key derivation module." There is no indication of what is inside the "selection module" and "key derivation module," or how they are supposed to perform the claimed function. Instead, the only description of the boxes refer to the limitations in terms of the function performed. '261 at 10:40–49 ("The selection module is adapted to select the NAS security algorithm according to the NAS security algorithm supported by the UE and acquired by the acquisition module, generate and send the message carrying the selected NAS security algorithm to the UE. The key derivation module is adapted to derive the NAS protection key, according to the authentication vector-related key or the root key derived according to the

authentication vector-related key acquired by the acquisition module, and the selected NAS security algorithm."). The functional descriptions does not connote structure to a person of ordinary skill in the art. (Dkt. No. 125-9 at ¶¶ 30-33). Accordingly, the Court finds that the terms "selection module" and "key derivation module" are subject to § 112, ¶ 6.

Having determined that the terms "selection module" and "key derivation module" are means-plus-function term, the Court now must "attempt to construe the disputed claim term by identifying the 'corresponding structure, material, or acts described in the specification' to which the claim term will be limited." *Robert Bosch*, 769 F.3d at 1097 (quoting *Welker Bearing Co. v. PHD, Inc.*, 550 F.3d 1090, 1097 (Fed. Cir. 2008)). "If we are unable to identify any 'corresponding structure, material, or acts described in the specification,' the claim term is indefinite." *Id.* (quoting *Noah Sys.*, 675 F.3d at 1312); *see also EON Corp. IP Holdings, LLC v. AT&T Mobility LLC*, 785 F.3d 616, 621 (Fed. Cir. 2015) ("Means-plus-function claim limitations under § 112 ¶ 6 must satisfy the definiteness requirement of § 112 ¶ 2.").

The Court finds that the "selection module" and "key derivation module" terms are indefinite because the specification fails to provide corresponding structure for the claimed functions. The specification describes the "selection module" and "key derivation module" solely by their function. '261 at 10:40–49 ("The selection module is adapted to select the NAS security algorithm according to the NAS security algorithm supported by the UE and acquired by the acquisition module, generate and send the message carrying the selected NAS security algorithm to the UE. The key derivation module is adapted to derive the NAS protection key, according to the authentication vector-related key or the root key derived according to the authentication vector-related key acquired by the acquisition module, and the selected NAS security algorithm."). The functional descriptions does not connote structure to a person of

ordinary skill in the art. (Dkt. No. 125-9 at ¶¶ 30-33). This description does not point to any hardware that could perform the stated functions. The specification also fails to disclose a processor that executes the corresponding function or an algorithm for the claimed functionality.

During the claim construction hearing Plaintiff pointed to specific portions of the specification to support it contention that the terms are not indefinite. Plaintiff conceded that the arguments presented during the hearing were not identified in its briefing. The Court has reviewed the specification in light of Plaintiff's argument and is not persuaded that it alters the analysis. Accordingly, the Court finds that the "selection module" and "key derivation module" terms are indefinite because the specification fails to provide corresponding structure for the claimed function. Finally, in reaching its conclusion, the Court has considered the extrinsic evidence submitted by the parties, and given it its proper weight in light of the intrinsic evidence.

c) Court's Construction

The Court finds that the term **"acquisition module"** is not subject to § 112, ¶ 6, and should be construed to mean **"receiver of a Mobility Management Entity (MME)."** The Court further finds that the term **"selection module"** is subject to § 112, ¶ 6, and is indefinite for failing to discloses sufficient structure that corresponds to the claimed function. The Court also finds that the term **"key derivation module"** is subject to § 112, ¶ 6, and is indefinite for failing to discloses sufficient structure that corresponds to the claimed function.

V.   CONCLUSION

The Court adopts the constructions above for the disputed and agreed terms of the Asserted Patents. Furthermore, the parties should ensure that all testimony that relates to the terms addressed in this Order is constrained by the Court's reasoning. However, in the presence of the jury the parties should not expressly or implicitly refer to each other's claim construction

positions and should not expressly refer to any portion of this Order that is not an actual construction adopted by the Court. The references to the claim construction process should be limited to informing the jury of the constructions adopted by the Court.

It is SO ORDERED.

SIGNED this 21st day of June, 2017.

_____
ROY S. PAYNE
UNITED STATES MAGISTRATE JUDGE