

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Nokia of America Corp., Ericsson Inc., AT&T Services, Inc., Cellco Partnership
d/b/a Verizon Wireless, and T-Mobile USA, Inc.,

Petitioners

v.

KT Corporation (Patent Owner) and Pegasus Wireless Innovation LLC (Exclusive
Licensee)

Patent Owner

Case: IPR2025-00036

U.S. Patent No. 11,627,631

PETITION FOR *INTER PARTES* REVIEW
UNDER 35 U.S.C. §312 AND 37 C.F.R. §42.104

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Exhibit	Short Name	Description
Ex. 1001	The '631 Patent	U.S. Patent No. 11,627,631 B2
Ex. 1002		Prosecution History of U.S. Patent No. 11,627,631 B2
Ex. 1003		Declaration of Dr. Michael Kotzin
Ex. 1004		<i>Curriculum Vitae</i> of Dr. Michael Kotzin
Ex. 1005		KR Provisional Application No. 10-2016-0146054
Ex. 1006	The 2016 KR Document	Certified English Translation of KR Provisional Application No. 10-2016-0146054
Ex. 1007		KR Provisional Application No. 10-2017-0142205
Ex. 1008	The 2017 KR Document	Certified English Translation of KR Provisional Application No. 10-2017-0142205
Ex. 1009	The '777 Patent	U.S. Patent No. 11,044,777 B2
Ex. 1010		Prosecution History of U.S. Patent No. 11,044,777 B2
Ex. 1011	R3-173152	Xn Based Mobility Across RA
Ex. 1012		Declaration of Craig Bishop regarding Certification of Publication of R3-173152, TS 36.300, TR 38.801, TR 21.905, TS 38.300, and TR 23.799
Ex. 1013	TR 38.801	3GPP TR 38.801 V0.4.0 (2016-08) 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Study on New Radio Access Technology; Radio Access Architecture and Interfaces (Release 14)
Ex. 1014		WIPO Publication No. 2018/059592 A1 (of PCT Application No. PCT/CN2017/105046)

Exhibit	Short Name	Description
Ex. 1015	Han	Certified English Translation of WIPO Publication No 2018/059592 A1 (of PCT Application No. PCT/CN2017/105046)
Ex. 1016		CN Application 20160875317.9
Ex. 1017	Han-CN	Certified English Translation of CN Application 20160875317.9
Ex. 1018	TR 21.905	3GPP TR 21.905 V13.1.0 (2016-06) 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Vocabulary for 3GPP Specifications (Release 13)
Ex. 1019	TS 38.300	3GPP TS 38.300 V0.6.0 (2017-08) 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; NR; NR and NG-RAN Overall Description; Stage 2 (Release 15)
Ex. 1020	TR 23.799	3GPP TR 23.799 V1.1.0 (10-2016) 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Study on Architecture for Next Generation System (Release 14)
Ex. 1021	LTE-Advanced	Sassan Ahmadi, LTE-Advanced A Practical Systems Approach to Understanding the 3GPP LTE Releases 10 and 11 Radio Access Technologies (2014)
Ex. 1022	Huang-Fu	United States Patent Publication No. 2016/0080992, “Method of Inter-RAT Bearer Change for 3GPP System,” Published March 27, 2016
Ex. 1023	Fujishiro	United States Patent Publication No. 2015/0043422, “Communication Control Method,” Published February 12, 2015

Exhibit	Short Name	Description
Ex. 1024	TS 36.300	3GPP TS 36.300 V.13.4.0 (2016-06) 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2 (Release 13)
Ex. 1025		<i>Pegasus Wireless Innovation LLC v. Verizon Communications Inc. et al</i> , Nos. 2:23-cv-00640, 2:23-cv-00638, 2:23-cv-00639 (E.D. Tex) First Amended Docket Control Order
Ex. 1026		<i>Pegasus Wireless Innovation LLC v. Verizon Communications Inc. et al</i> , Nos. 2:23-cv-00640, 2:23-cv-00638, 2:23-cv-00639 (E.D. Tex.) Consolidation Order
Ex. 1027		<i>Pegasus Wireless Innovation LLC v. Verizon Communications Inc. et al</i> , Nos. 2:23-cv-00640, 2:23-cv-00638, 2:23-cv-00639 (E.D. Tex.) Protective Order from Non-Jurisdictional Discovery

Nokia of America Corporation (“Nokia”), Ericsson Inc. (“Ericsson”), AT&T Services, Inc. (“AT&T”), Cellco Partnership d/b/a Verizon Wireless (“Verizon”), and T-Mobile USA, Inc. (“T-Mobile”), (collectively “Petitioners”) petition for IPR under 35 U.S.C. §§311–319 and 37 C.F.R. §42 of Claims 1-18 (“the Challenged Claims”) of U.S. Patent No. 11,627,631 (“the ’631 Patent”).

I. STANDING UNDER 37 C.F.R. §42.104(a)

Petitioners certify the ’631 Patent is available for IPR, and Petitioners are not barred or estopped from requesting IPR.

II. PAYMENT OF FEES

Petitioners authorize Account No. 16-0605 to be charged.

III. OVERVIEW OF CHALLENGES AND RELIEF REQUESTED

Pursuant to 37 C.F.R. §42.22(a)(1) and 42.104(b)(1)–(2), Petitioners request cancellation of the Challenged Claims pursuant to the grounds below. Additional support is provided in the Declaration of Dr. Michael Kotzin (Ex. 1003).

Ground 1: Claims 1, 7, and 13 are unpatentable under 35 U.S.C. § 103 over R3-173152.

Ground 2: Claims 2-6, 8-12, and 14-18 are unpatentable under 35 U.S.C. § 103 over R3-173152 and TR 38.801.

Ground 3: Claims 1, 7, and 13 are unpatentable under 35 U.S.C. § 103 over Han and TS 36.300.

Ground 4: Claims 2-6, 8-12, and 14-18 are unpatentable under 35 U.S.C. § 103 over Han, TS 36.300, and TR 38.801.

IV. BACKGROUND

The '631 Patent fails to add anything to the then-existing state of the art, and instead describes basic implementation of slice-aware terminal handover. The Board should thus institute review and find each of the Challenged Claims unpatentable.

A. Technical Background

The '631 Patent relates to a “method of a base station for controlling transmission and reception of data through a network slice.” Ex. 1001, Abstract, 1:20-24; Ex. 1003, ¶¶82-84. The '631 Patent describes “a procedure of a user equipment and a base station for providing services based on network slicing.” Ex. 1001, 1:51-55, 1:62-66, 2:29-39; Ex. 1003, ¶¶85-87. As depicted in Figure 1, the '631 Patent discloses “a plurality of slices configured in a network infrastructure.” Ex. 1001, 7:58-59; FIG. 1; Ex. 1003, ¶¶88-91.

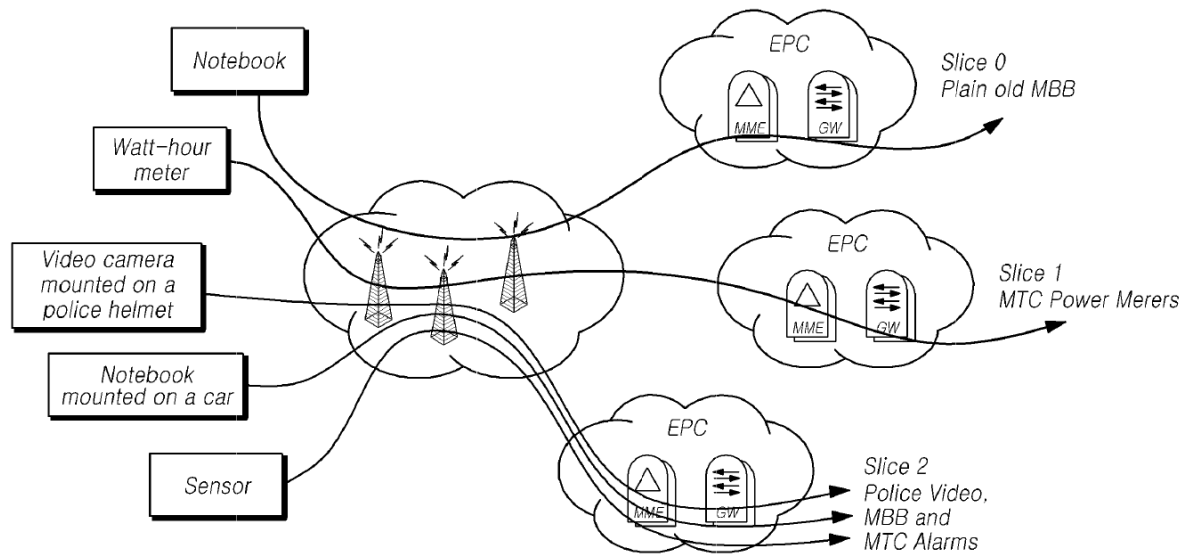
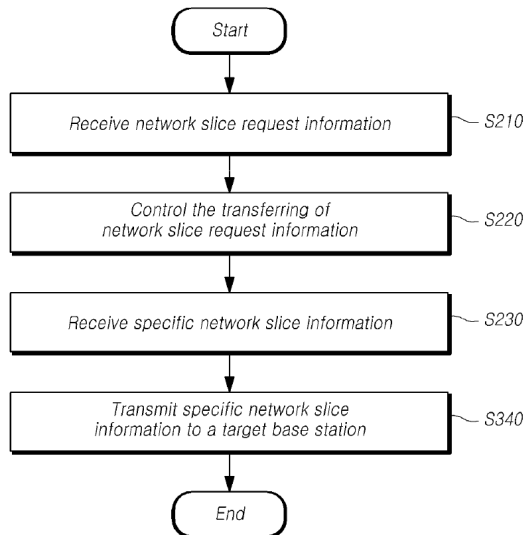
Ex. 1001, FIG. 1*FIG. 1*

FIG. 3 depicts the “operations of a base station” with respect to network slices. Ex. 1001, 12:13-24; Ex. 1003, ¶¶92-99.

Ex. 1001, FIG. 3

FIG.3



B. Prosecution History

1. The '631 Patent

U.S. Patent Application No. 17/314,064 (the “’064 application”) was filed May 7, 2021 as a continuation of U.S. Patent Application No. 16/346,987 (“the ’987 application”) (issued as U.S. Patent 11,044,777 (“the ’777 patent”)), which is a national stage entry of Application No. PCT/KR/2017/012319 (“the ’319 PCT application”), which claims priority to KR Provisional Application No. 10-2017-0142205, filed October 30, 2017, and KR Provisional Application No. 10-2016-

0146054 (“the 2016 KR document”), filed November 3, 2016. Ex. 1001, Cover; Ex. 1003, ¶¶100-101.

The ’064 application faced a Non-Final Office Action which identified limitation [1.C2] of the issued independent claims as allowable. Ex. 1002, 96; Ex. 1003, ¶102. A Notice of Allowance was mailed December 5, 2022. Ex. 1002, 68, 79-99; Ex. 1003, ¶102.

2. The Parent ’777 Patent

The ’987 application faced a single Non-Final Office Action which rejected the claims over U.S. Publication Nos. 2018/0007552, 2018/0124854, and 2016/0353465, and identified allowable subject matter similar to limitation [1.C2] of the ’631 Patent. Ex. 1010, 394-424; Ex. 1003, ¶¶105-107. Applicant did not dispute that the art taught the majority of elements in the claims. Ex. 1010, 427-435; Ex. 1003, ¶108. A Notice of Allowance was mailed February 24, 2021. Ex. 1010, 459-468; Ex. 1003, ¶109.

C. Priority Date

The ’631 Patent issued from the ’064 application filed May 7, 2021, and claims priority to two Korean applications: 10-2017-0142205 (filed October 30, 2017) (Ex. 1007, Ex. 1008), and the 2016 KR document. Patent Owner is not entitled to at least its alleged earliest priority date because the subject matter of at least

independent claims 1, 7, and 13 was not disclosed in the manner required by 35 U.S.C. § 112(a), in the 2016 KR document. *See, generally*, Ex. 1003, ¶¶110-126.

Under 35 U.S.C. § 120, a claim in a U.S. application is entitled to the benefit of the filing date of an earlier filed international application if the subject matter is disclosed in the manner provided by 35 U.S.C. § 112(a). *See, e.g., In re NTP, Inc.*, 654 F.3d 1268, 1277 (Fed. Cir. 2011). 35 U.S.C. § 112(a) requires that “[t]he specification shall contain a written description of the invention,” and to comply with the written description requirement, the specification must “clearly allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed.” *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc) (alteration in original) (quoting *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563 (Fed. Cir. 1991)). The specification must “reasonably convey[] to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.” *Id.* “What is required to meet the written description requirement ‘varies with the nature and scope of the invention at issue, and with the scientific and technologic knowledge already in existence.’” *Juno Therapeutics, Inc. v. Kite Pharma, Inc.*, 10 F.4th 1330, 1335 (Fed. Cir. 2021) (quoting *Capon v. Eshhar*, 418 F.3d 1349, 1357 (Fed. Cir. 2005)).

Independent claims 1, 7, and 13 each recite the limitation – “wherein, if one or more protocol data unit (PDU) sessions are associated with one or more network

slices that are not supported by the target BS, the handover request confirmation message includes information for indicating a rejection of the one or more PDU sessions by the target BS.” The 2016 KR document does not reasonably convey to a POSITA that the inventor had possession of the claimed subject matter. Ex. 1003, ¶¶111-121.

The 2016 KR document, at best, describes slicing generally but does not describe network slicing in connection with PDU sessions, nor does it describe indicating a rejection of PDU sessions based on a network slice not being supported. Ex. 1006, ¶[0031]; Ex. 1003, ¶113.

The 2016 KR document describes scenarios in which a terminal moves from one cell to another, and, in each scenario, the neighboring cell merely provides information as to whether a cell itself (not PDU-session specific) supports slicing. *See* Ex. 1006, ¶¶[0044-0048]; Ex. 1003, ¶¶114-115.

When the 2016 KR document discusses “information for identifying the service/session/bearer linked to the slice information,” it describes, at best, that such information is included in interest information by a terminal, received by the terminal via system information, pre-configured in the terminal, or received by the terminal via a RRC connection reconfiguration message. Ex. 1006, ¶[0062]; Ex. 1003, ¶116. The 2016 KR document does not disclose support or lack thereof of

network slicing on a PDU session-by-PDU session basis, let alone the concept of rejecting a PDU session. Ex. 1003, ¶¶116-117.

The 2016 KR document describes that, “if the target cell/base station does not support network slicing, the target base station may include information to give an instruction in the handover response X2 message or the handover command inter-node RRC message.” Ex. 1006, ¶[0085]; Ex. 1003, ¶118. Disclosure of “the target cell/base station” not “support[ing] network slicing,” or of “the target cell/base station” not “provid[ing] the network slice via network slicing,” does not convey a “target cell/base station” not supporting a network slice specific to a PDU session to the POSITA. Ex. 1006, ¶[0086]; Ex. 1003, ¶¶118-119.

The 2016 KR document states that, “if the target cell/base station does not support network slicing, the target base station may include information to give an instruction in the handover response X2 message or the handover command inter-node RRC message.” Ex. 1006, ¶[0085]; Ex. 1003, ¶118. The 2016 KR document describes:

[0086] As one example, if the target cell/base station receives the information described above via the source cell/base station, and when the target cell/base station does not support network slicing, or does not provide the network slice via network slicing, the target base station may transmit the information to the source base station as included in the handover response X2 message. As another example, when the target cell/base station receives the information described above via the source cell/base station, and when the target cell/base station does not support network slicing, or does not provide the corresponding interest

group communication via network slicing, the information may be forwarded to the terminal to give an instruction in the handover command internode RRC message.

Ex. 1006, ¶[0086].

The 2016 KR document, like the '631 Patent itself, makes no mention of a rejection, let alone “information for indicating a *rejection of one or more PDU sessions*.” Ex. 1003, ¶¶119. At best, the 2016 KR document describes either supporting or not supporting network slicing and conveying such information *Id*. Because the 2016 KR document does not disclose “protocol data unit (PDU) sessions” specifically being associated with “network slices,” “one or more PDU sessions” cannot be rejected, nor can a handover request confirmation message include information for indicating a rejection of one or more PDU sessions, as is required by the claims. Ex. 1003, ¶¶119-120.

To the extent Patent Owner argues the disclosure of a target base station not supporting network slicing represents a genus and “one or more PDU sessions” is a species within that genus, such an argument fails. Evaluating whether the written description is satisfied involves “an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art.” *Ariad Pharms., Inc.*, 598 F.3d at 1351. For genus claims, the Federal Circuit has looked for blaze marks within the disclosure that guide attention to the claimed species or subgenus. *Fujikawa v. Wattanasin*, 93 F.3d 1559, 1570 (Fed. Cir. 1996) (quoting *In*

re Ruschig, 379 F.2d 1990, 994-95). Here, the 2016 KR document does not provide any blaze marks that convey “information for indicating a rejection for one or more PDU sessions,” namely because the 2016 KR document fails to disclose a rejection, and thus fails to disclose a rejection of one or more PDU sessions associated with network slices that are not supported by a target base station.

Claims 1, 7, and 13 also recite, *inter alia*, “deciding, by a source base station (BS), whether to perform a handover,” and “transmitting, from the source BS to a target BS, a handover request message when it is decided to perform the handover.” The 2016 KR document does not disclose or reasonably convey such a feature to a POSITA. Ex. 1003, ¶121.

Indeed, the term “decide” appears once in the 2016 KR document. Ex. 1003, ¶122. The 2016 KR document merely mentions a situation where the “source base station may not decide to handover to the target base station,” which arises *after* the “target cell/base station receives [] information” via a “handover request message” or “handover preparation message,” and responds to the source base station with a “handover response X2 message.” Ex. 1006, ¶¶[0081-0087]; *see also* Ex. 1001, 18:52-19:5; Ex. 1003, ¶122. The 2016 KR document therefore does not reasonably convey to a POSITA “deciding, by a source base station (BS), whether to perform a handover,” *and then* “transmitting, from the source BS to a target BS, a handover request message when it is decided to perform the handover.” Ex. 1003, ¶122.

Because the 2016 KR document does not provide written description support for at least one limitation recited in the independent claims of the '631 patent, the claims are entitled to a priority date no earlier than October 30, 2017. Ex. 1003, ¶123.

The 2016 KR document also fails to provide written description support for at least one limitation recited in dependent claims 2, 4, 8, 10, 14, and 16, including (1) a “non-access stratum (NAS) message,” and (2) a “radio resource control (RRC) connection setup message” in which a “non-access stratum (NAS) message” is included. Ex. 1003, ¶¶146-126. Indeed, a “non-access stratum (NAS) message” first appears in the 2017 KR priority document. *See* Ex. 1008, ¶¶[0073], [0086], [0106], [0130], [0151], Claims 3, 9, 13, 19; Ex. 1003, ¶¶124-126.

D. Claim Construction (37 C.F.R. §42.104(b)(3))

The terms should receive their respective plain and ordinary meaning as understood by a person of ordinary skill in the art under *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005). Ex. 1003, ¶¶127-128. Petitioners reserve the right to contend that claim 7 and its dependents are indefinite for improperly mixing method steps into apparatus claims in other forums. *See IPXL Holdings, L.L.C. v. Amazon.com, Inc.*, 430 F.3d 1377, 1384 (Fed. Cir. 2005).

V. PRIOR ART REFERENCES

A. R3-173152

R3-173152, titled “Xn based mobility across RA,” is a contribution by Huawei for the 3GPP TSG-RAN WG3 Meeting #97, held August 21-25, 2017. Ex. 1011, 1; Ex. 1003, ¶¶129-155.

As explained in detail by Craig Bishop (Ex. 1012), 3GPP technical contributions, including R3-173152 (Ex. 1011), are publicly accessible as of the date they were uploaded to the 3GPP FTP server. Ex. 1012, ¶¶29-53, 55.

R3-173152 (Ex. 1011) was uploaded to 3GPP’s file server August 11, 2017. Ex. 1012, ¶¶54, 56-57. As a result, R3-173152 became a “printed publication” under 35 U.S.C. § 102(a) (AIA) on August 11, 2017. Ex. 1012, ¶58; *see also, e.g., Samsung Elecs. Co.*, 2018 WL 6519544, *3–5 (concluding that technical reports and specifications uploaded to a standards organization’s file server before a challenged patent’s priority date qualify as prior art under 35 U.S.C. § 102(a) (AIA)).

Because the ’631 Patent is entitled to a priority date of no earlier than October 30, 2017 (see § IV.C *supra*), R3-173152 thus qualifies as prior art under at least 35 U.S.C. § 102(a)(1) (AIA).

B. TR 38.801

TR 38.801 is a 3GPP Technical Report. Ex. 1013, 1, 5; Ex. 1003, ¶¶155-164.

As explained in detail by Craig Bishop (Ex. 1012), 3GPP technical reports, including TR 38.801 (Ex. 1013), are publicly accessible as of the date they were uploaded to the 3GPP FTP server. Ex. 1012, ¶¶29-53, 59-62.

TR 38.801 was uploaded to 3GPP's file server September 13, 2016. Ex. 1012, ¶¶63-66. As a result, TR 38.801 became a "printed publication" under 35 U.S.C. § 102(a) (AIA) on September 13, 2016. Ex. 1012, ¶66; *see also, e.g., Samsung Elecs. Co.*, 2018 WL 6519544, *3–5. TR 38.801 thus qualifies as prior art to the '631 Patent at least under 35 U.S.C. § 102(a)(1) (AIA) irrespective of the '631 Patent's priority date.

C. Han

Han (Ex. 1015) is a certified English translation of International Publication WO 2018/059592 of PCT application (PCT/CN2017/105046) (Ex. 1014), filed September 30, 2017, published as WO2018/059582 on April 5, 2018, which claims priority to CN Application No. 201610875317.9 (Ex. 1016), filed September 30, 2016. Ex. 1015, Cover; Ex. 1003, ¶¶165-166.

A certified English translation of CN Application No. 201610875317.9 (Ex. 1016) is provided herewith as Exhibit 1017 ("Han-CN"). Han is generally directed to ensuring quality of service (QoS) requirements are supported during handover. Ex. 1003, ¶¶167-182.

Han properly claimed benefit to (Ex. 1015, (30)), was filed copending with (Ex. 1015, (22)), and shared common inventors (Ex. 1015, (72)) with Han-CN. Ex. 1017, 2; *see* 35 U.S.C. §102(d) (AIA); MPEP §2154.01(b). Thus, for prior art purposes, Han was therefore effectively filed on September 30, 2016, and qualifies as prior art under 35 U.S.C. § 102(a)(2) (AIA). Also, the subject matter relied upon in Han is disclosed in Han-CN. *See* MPEP §2154.01(b) (“If the subject matter relied upon is described in the application to which there is a priority or benefit claim, the U.S. patent document is effective as prior art as of the filing date of the earliest such application, regardless of where filed.”).

To the extent Patent Owner argues that Petitioner is required to establish that at least one claim of Han is supported by Han-CN under *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1379-80 (Fed. Cir. 2015), this is incorrect because AIA §§ 102(a)(2) and 102(d) do not require such analysis. *See Dynamic Drinkware*, 800 F.3d at 1382 nn.1-2. In *Dynamic Drinkware*, the Court considered only pre-AIA § 102(e) and not the AIA’s impact on *In re Wertheim*, 646 F.2d 527 (CCPA 1981), in newly designated § 102(d). *See id.*; *see also* MPEP §2154.01(b); 78 Fed. Reg. 11059, 11087 (February 14, 2013); *see also* 157 Cong. Rec. 1369-70 (Mar. 8, 2011). In the limitation-by-limitation analysis in Section VII below, Petitioners provide citations to Ex. 1015 and Ex. 1017 showing that every disclosure relied upon in Han was described in Han-CN. *See* MPEP §§ 2151, 2154.01.

Additionally, for efficient comparison of the subject matter described in Han and Han-CN, Petitioners provide a chart comparing the applicable excerpts/figures in Han with the corresponding excerpts/figures in Han-CN. *See* Ex. 1003, ¶183, Appendix A.

As demonstrated by the citations below, Han-CN fully supports and is substantially similar to Han. *Id.* Han is entitled to an effective filing date of September 30, 2016, and is prior art to the '631 Patent irrespective of the '631 Patent's priority date.

D. TS 36.300

TS 36.300 (Ex. 1024) is a 3GPP Technical Specification. Ex. 1024, 1, 15; Ex. 1003, ¶¶184-190.

As explained in detail by Craig Bishop (Ex. 1012), 3GPP technical specifications, including TS 36.300 (Ex. 1024), are publicly accessible as of the date they were uploaded to the 3GPP FTP server. Ex. 1012, ¶¶29-53, 67-68.

TS 36.300 was uploaded to 3GPP's file server July 7, 2016. Ex. 1012, ¶¶69-73. As a result, TS 36.300 became a "printed publication" under 35 U.S.C. § 102(a) (AIA) on July 7, 2016. Ex. 1012, ¶73; *see also, e.g., Samsung Elecs. Co.*, 2018 WL 6519544, *3–5. TS 36.300 thus qualifies as prior art to the '631 Patent at least under 35 U.S.C. § 102(a)(1) (AIA) irrespective of the '631 Patent's priority date.

VI. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art (“POSITA”) pertinent to the ’631 Patent would have had a bachelor’s degree in electrical engineering, computer engineering, or a related discipline, knowledge of the relevant 3GPP standards as of this time, and at least 2 years of experience working in a field involving wireless communications. Ex. 1003, ¶¶49-51. A person with a different degree but with additional relevant experience could still qualify if the additional experience compensates for the different educational background. *Id.* A person with less than 2 years of experience working in a field involving wireless communications could still qualify if the person has additional education that compensates for their lesser experience. *Id.*

VII. THE CHALLENGED CLAIMS ARE UNPATENTABLE**A. Ground 1: R3-173152 renders obvious Claims 1, 7, and 13****1. *Ground 1***

R3-173152 renders obvious the independent claims of the ’631 Patent. Ex. 1003, ¶¶191-382.

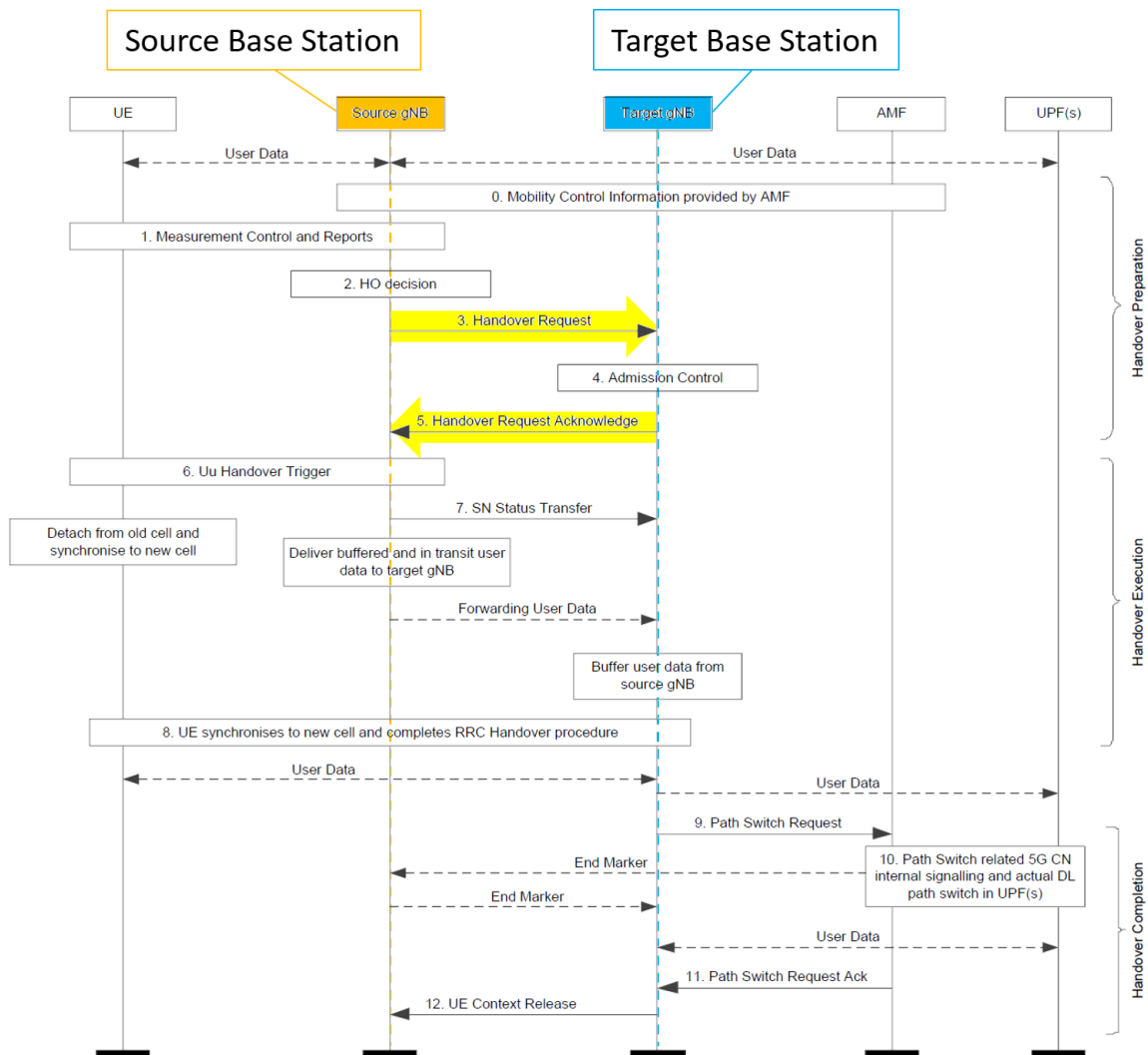
2. *Claim 1****i. [1.PRE]***

To the extent [1.PRE] is limiting, R3-173152 renders obvious [1.PRE]. Ex. 1003, ¶¶192-202.

R3-173152 discloses an “Xn based handover” in which data is transmitted and received between a source base station and a target base station during handover.

Ex. 1011, 2, 5, Figure 1. Ex. 1003, ¶193.

Ex. 1011, Figure 1 (annotated)



In Figure 1, R3-173152 discloses a known process for handover, including a “Handover Request” message sent from “Source gNB” to “Target gNB,” and a

“Handover Request ACK” message sent from “Target gNB” to “Source gNB.” Ex. 1011, 2; Ex. 1003, ¶194.

R3-173152 proposes a supplement to the handover process of Figure 1 so as to take slice information into account. Ex. 1003, ¶194. Specifically, R3-173152 “discuss[es] whether the Xn based handover can be used for mobility across Registration Area (RA), regardless of slice availability,” providing examples that can be added to respective messages which are already exchanged in Figure 1 and transmitted and received between base stations to enable slice-aware handover. Ex. 1011, 2-3, 5, Figure 17.3.4.5-x; Ex. 1003, ¶¶194-201. The various transmission and reception of data to enable slice-aware handover is further explained in [1.A] – [1.C2] below and the dependent claims.

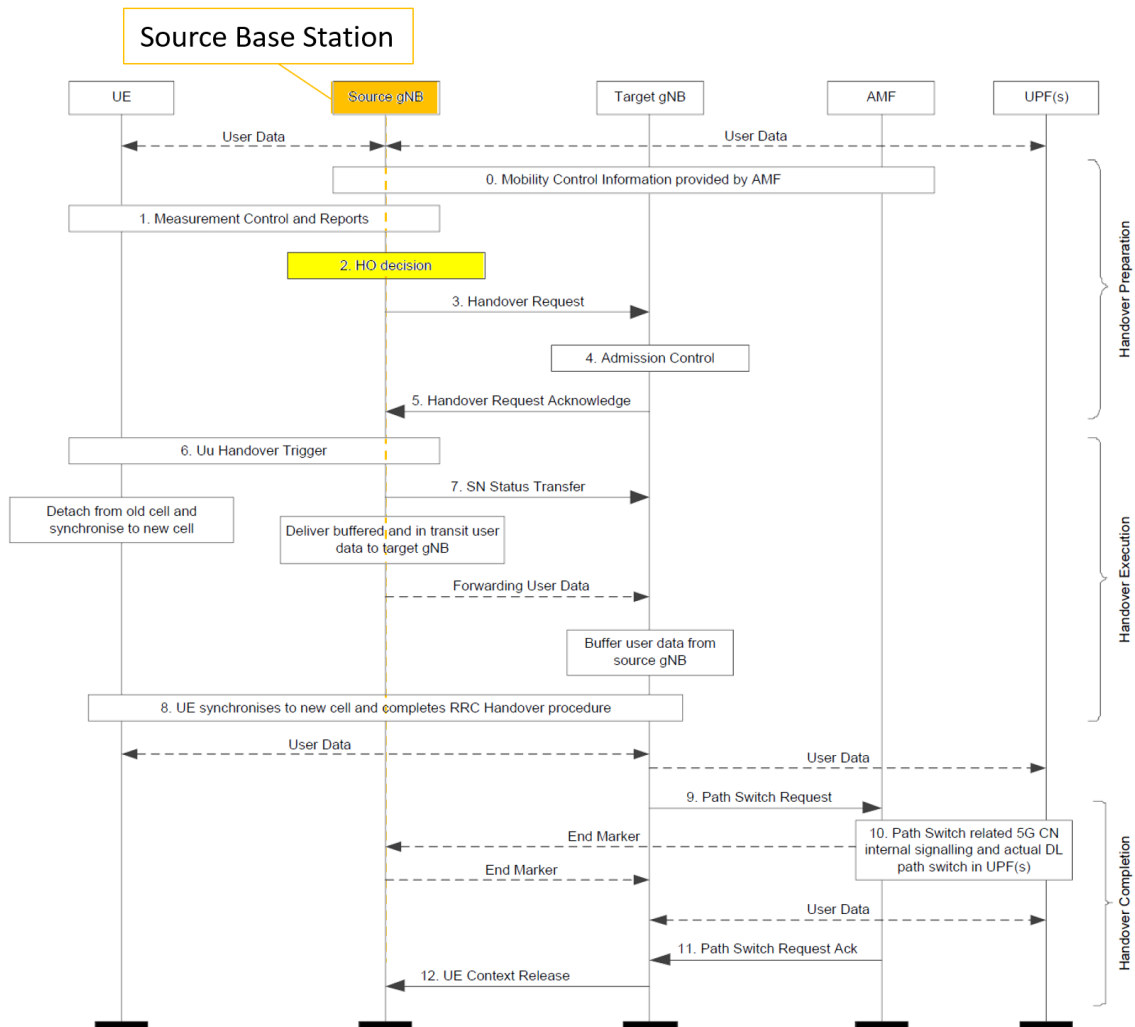
ii. [1.A]

R3-173152 renders obvious [1.A]. Ex. 1003, ¶¶203-208.

R3-173152 depicts a well-known “Xn based handover,” where a “Source gNB”¹ performs step “2. HO decision” (yellow, below), and discloses that the “Source gNB may check the slice availability for handover decision.” Ex. 1011, 2-3, Figure 1; Ex. 1003, ¶205.

¹ The ’631 patent provides examples of base stations, including a gNB. Ex. 1001, 3:62-4:4; Ex. 1003, ¶204.

Ex. 1011, Figure 1 (annotated)



In view of the explicit disclosure of and supporting documentation referenced by R3-173152, a POSITA would have found it obvious that the “Source gNB” decides whether to perform a handover because it would have been unnecessary and inefficient to send handover request messages to other base stations when it had not been determined that handover was imminent. Ex. 1011, 2; Ex. 1003, ¶¶206-207.

Sending messages unprompted, such as by not using a handover decision, would increase network traffic and decrease bandwidth. Ex. 1003, ¶¶206-207.

Figure 1 of R3-173152, represents the then-functioning standard. Ex. 1003, ¶¶206-207.² A POSITA thus would have found it obvious that a handover decision occurred before any handover request message in Figure 17.3.4.5-x. Ex. 1003, ¶207.

R3-173152 also includes Figure 17.3.4.5-x, which supplements the messages of Figure 1, such as “3. Handover Request” and, thus, discloses sending certain messages after deciding to handover in that it discloses “Slice aware handover . . . [is] triggered” prior “Handover Request.” Ex. 1011, 5; Ex. 1003, ¶206.

iii. [1.B1]

R3-173152 renders obvious [1.B1]. Ex. 1003, ¶¶209-213.

R3-173152 includes what was the then-current standard for performing handover in its Figure 1, and provides Figure 17.3.4.5-x, which supplements Figure

² TS 38.300, specifically referenced by R3-173152 as being the source of Figure 1 (see Ex. 1011, 2), states that the “source gNB decides to handover the gNB.” Ex. 1019, 33; Ex. 1003, ¶207. TS 38.300 depicts the procedure of Figure 1 and includes a “handover decision” block. Ex. 1019, Figure 9.2.3.2-1; Ex. 1003, ¶207. TS 38.300 is not part of the grounds but is referenced to demonstrate the knowledge of the POSITA reviewing R3-173152.

1 and the contents of the “3. Handover Request” message of Figure 1 to enable slice-aware handover. Ex. 1011, 2; Ex. 1003, ¶211. A POSITA would have understood the “1. Handover Request” message of Figure 17.3.4.5-x corresponds to the “3. Handover Request” message of Figure 1, and provides additional details of the contents of the Request for enabling slice-aware handover. Ex. 1003, ¶212. As such, Figure 1 and Figure 17.3.4.5-x render obvious a handover request message that is transmitted from the source to the target once it is decided to perform handover (*see* yellow, below). Ex. 1003, ¶¶211-212.

Ex. 1011, Figure 1 (annotated)

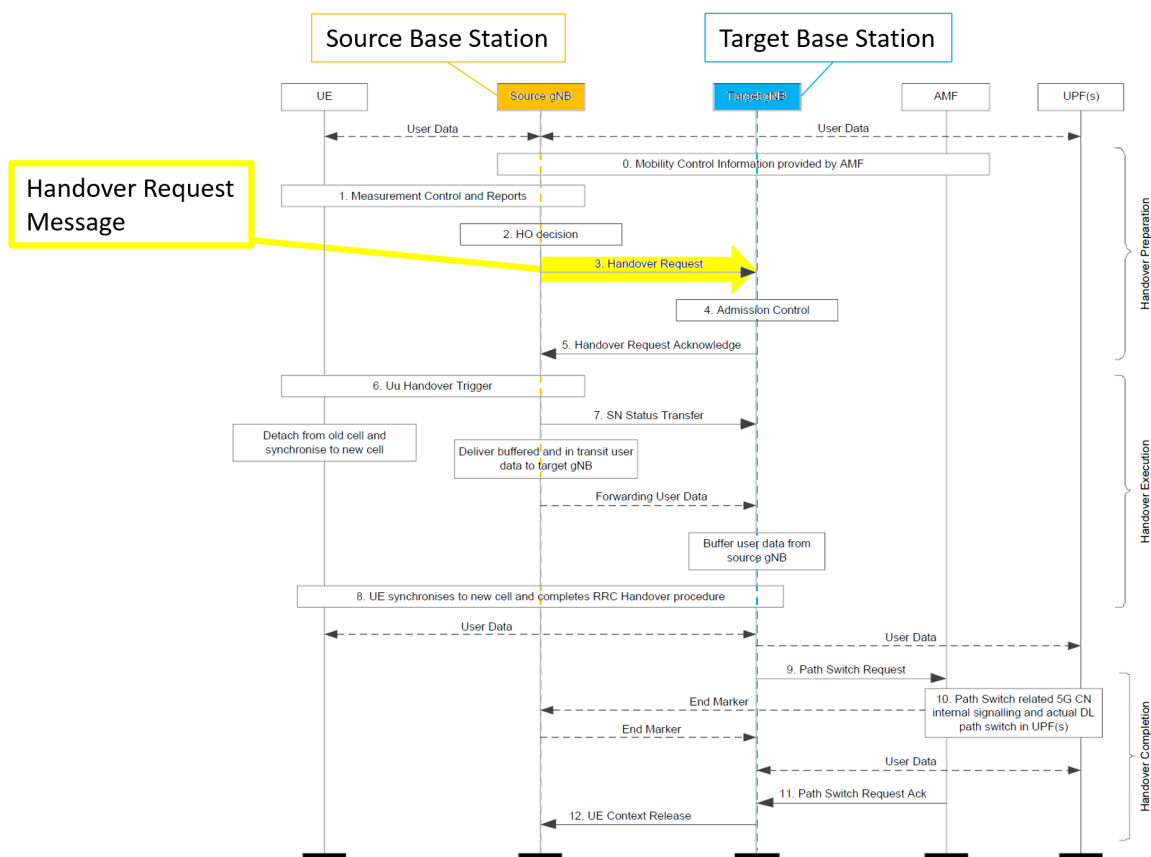
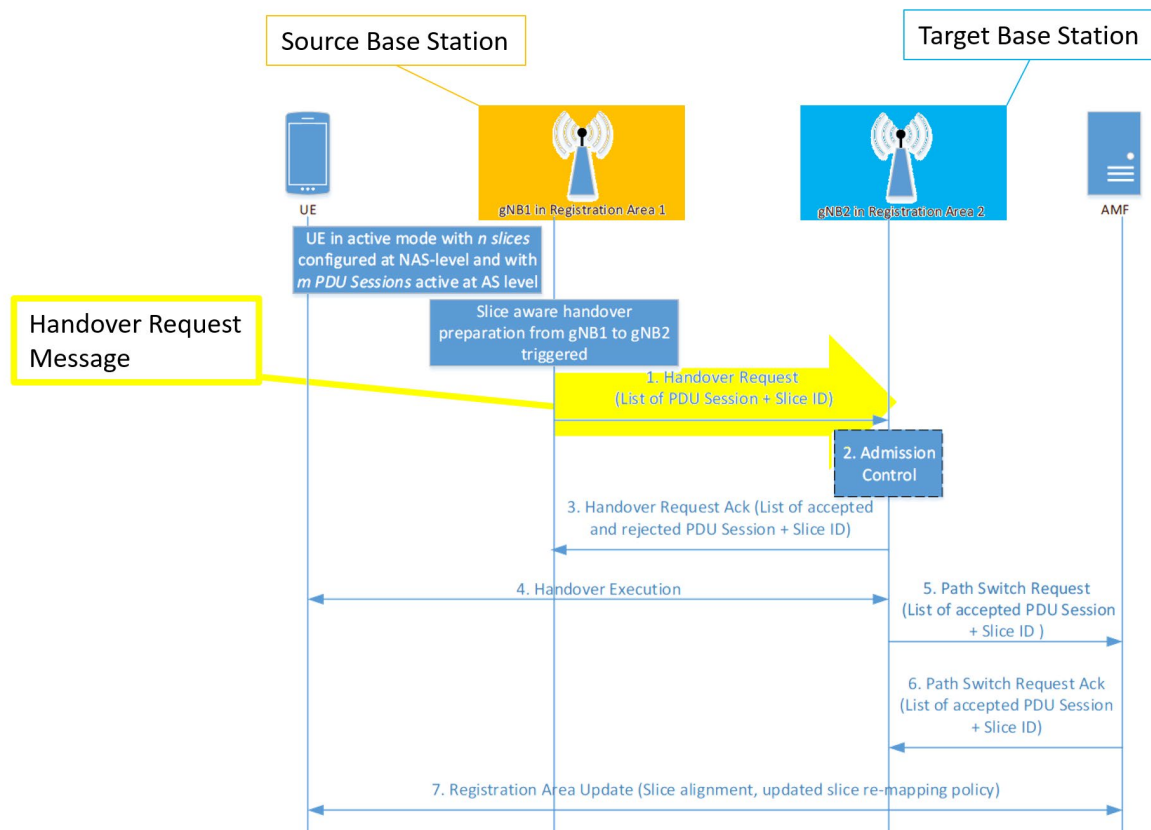


Figure 17.3.4.5-x, supplementing Figure 1, depicts a “gNB1 in Registration Area 1” sending a “Handover Request” including a “[l]ist of PDU Session + Slice ID” to a “gNB2 in Registration Area 2.” Ex. 1011, 5; Ex. 1003, ¶212. Including “(List of PDU Session + Slice ID)” in the “1. Handover Request” message enables slice-aware handover because the source gNB is not required to “check the slice availability.” Ex. 1011, 3; Ex. 1003, ¶212.

Ex. 1011, Figure 17.3.4.5-x (annotated)



iv. [1.B2]

R3-173152 renders obvious [1.B2]. Ex. 1003, ¶¶214-222.

R3-173152 specifically included additional information in the form of a Slice ID and PDU sessions (network slice information) in its handover request message to enable slice-aware handover. Ex. 1003, ¶¶211-213. In addition, R3-173152 discloses details with regard to the Handover Request message, which “includes (all) PDU sessions with active UP connections handled by the source gNB, to indicate the target gNB which PDU session should handover to the target,” and/or that it “includ[es] all parts of PDU sessions.” Ex. 1011, 2-3; Ex. 1003, ¶¶215-216.

R3-173152 discloses additional details regarding the contents of the included network slice information:

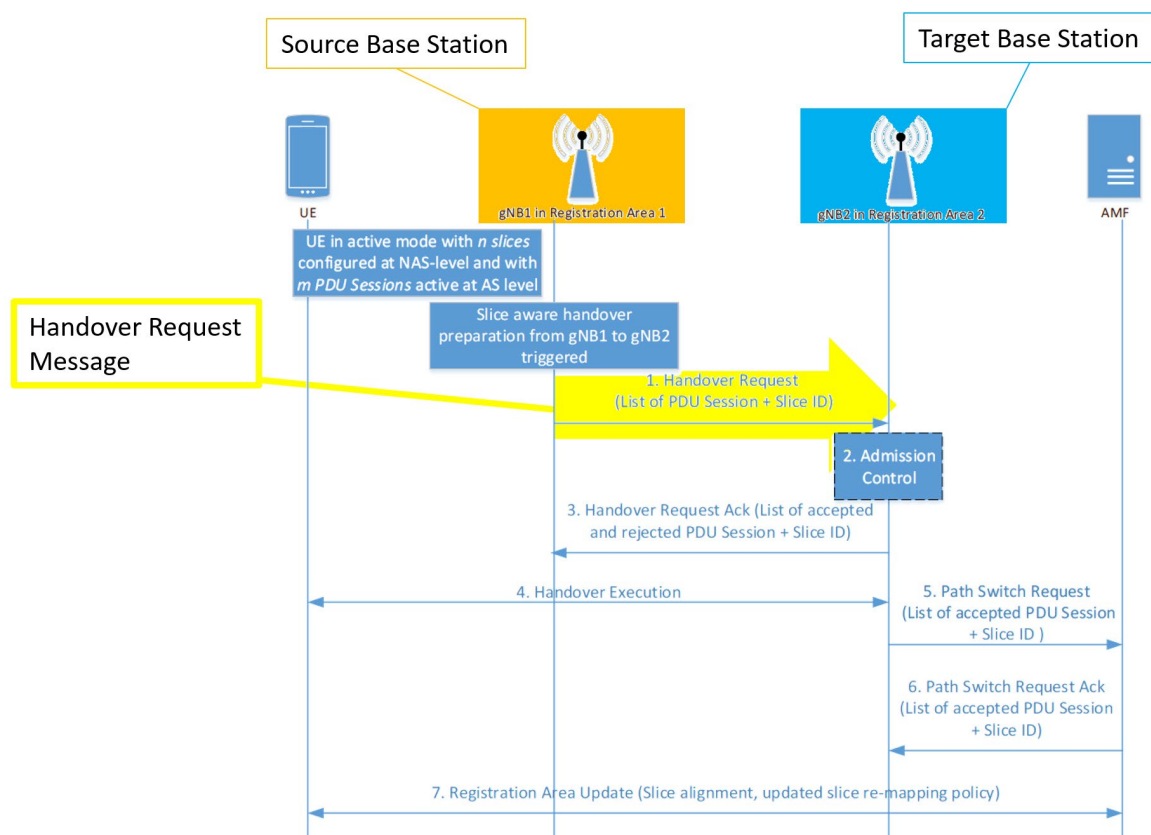
As the target gNB cannot support all the *slices*, the PDU sessions with active UP connections handled by the source gNB can be divided to two part: one part is the PDU sessions which *associated slice(s)* is supported by the target gNB, another part is the PDU sessions which *associated slice(s)* is *not* supported by the target gNB. One option is only including the latter part of PDU sessions, however, for this option, the source gNB always check the slice availability before handover. Another option is *including all parts of PDU sessions in the Handover Request message*. In this option, check the slice availability is not mandatory, but the source gNB may also check the *slice availability* for selecting the suitable target gNBs (in step 2 as in figure 1), e.g., the

source gNB will not request handover UE to a gNB cannot support any slice.

Ex. 1011, 3³; Ex. 1003, ¶¶217-218.

Figure 17.3.4.5-x depicts a “Handover Request” message including “List of PDU Session + Slice ID.” Ex. 1011, 5; Ex. 1003, ¶¶219-220.

Ex. 1011, Figure 17.3.4.5-x (annotated)



The '631 Patent explains that “network slice information may include information on at least one of network slice configured for the UE, *information for*

³ All emphasis is added herein unless indicated otherwise.

identifying a network slice service/PDU session/bearer associated with the corresponding network slice information, and information on a priority of the corresponding network slice.” Ex. 1001, 11:26-37; Ex. 1003, ¶221. In view of the explicit disclosure in R3-173152 of “PDU Session” with corresponding information for identifying a corresponding network slice (“Slice ID”) being included in the handover request message, a POSITA would have understood that the handover request message of R3-173152 included the claimed network slice information. Ex. 1003, ¶221.

v. *[1.C1]*

R3-173152 renders obvious [1.C1]. Ex. 1003, ¶¶223-235.

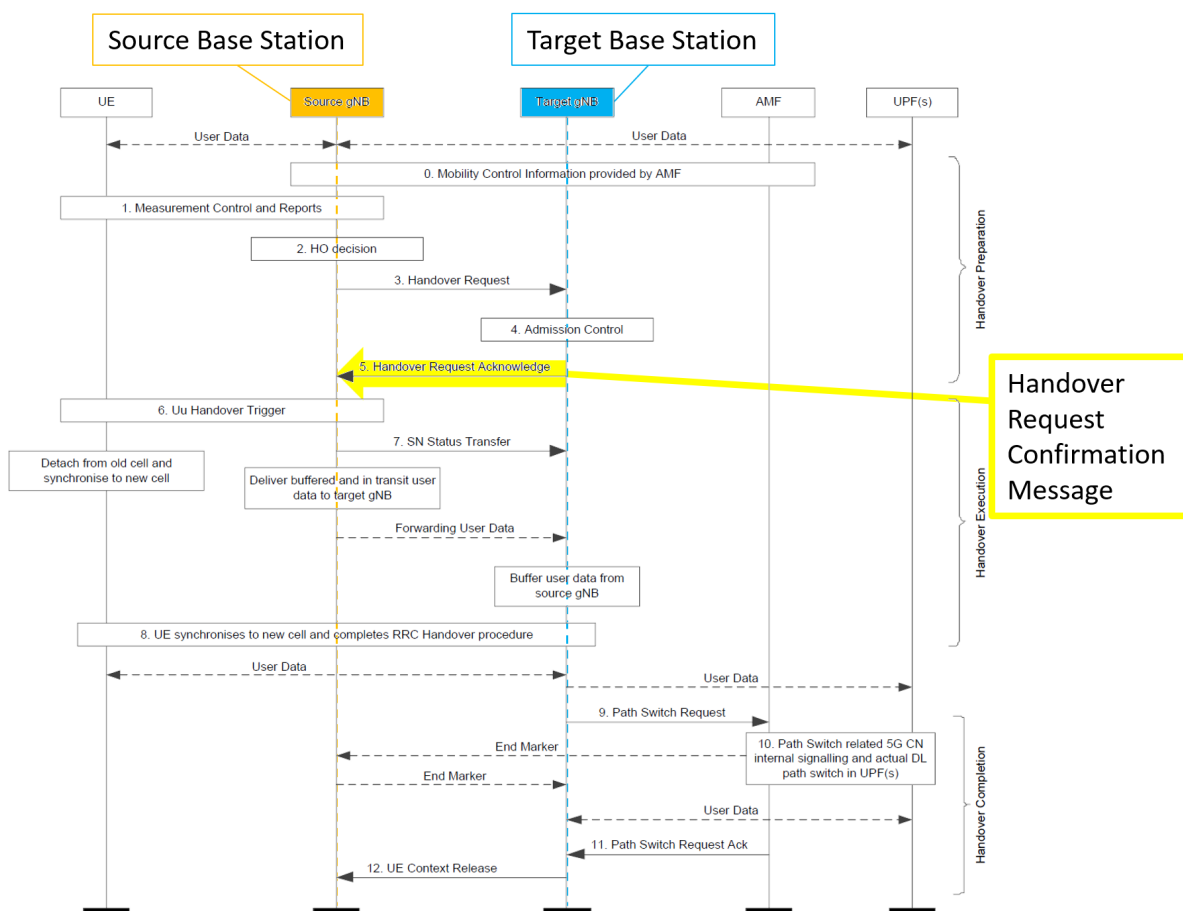
R3-173152 discloses a “Handover Request Acknowledge” message, a message sent in response to a handover request message, sent from “Target gNB” to “Source gNB.” Ex. 1011, 2, Figure 1. Ex. 1003, ¶224.

R2-173152 provides additional detail regarding the proposed contents of the “Handover Request Acknowledge” message of Figure 1 to enable slice-aware handover. Ex. 1011, 2-3; Ex. 1003, ¶¶224. The additional changes only impact the contents of the confirmation. Ex. 1003, ¶224.

Specifically, R3-173152 discloses a “Handover Request ACK message” sent from “Target gNB” or target base station to a “Source gNB” or source base station, where the message “includes the admitted PDU session list and not admitted PDU

session list, to indicate which PDU session can handover to the target.” Ex. 1011, 2; Ex. 1003, ¶¶226-227. R3-173152 also discloses that the “Handover Request ACK message” includes a list of “non-admitted PDU sessions.” Ex. 1011, 3; Ex. 1003, ¶¶227-228.

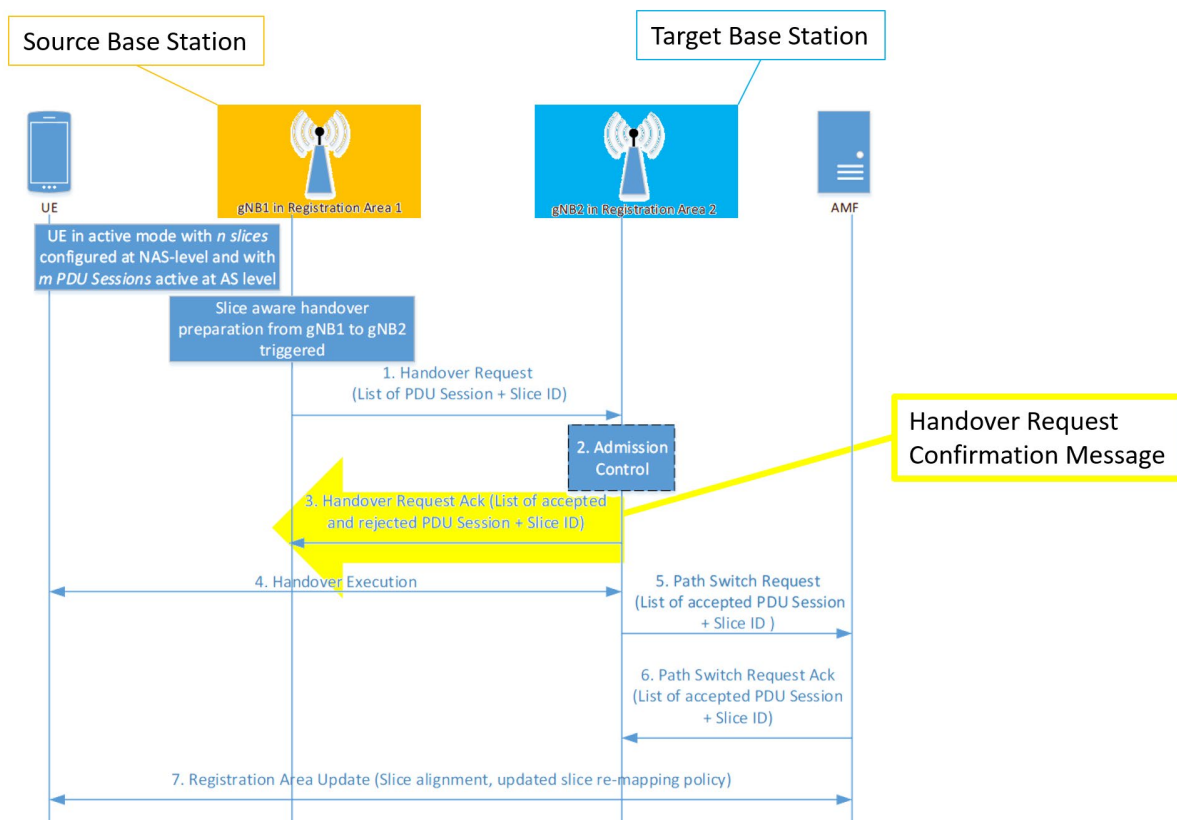
Ex. 1011, Figure 1 (annotated)



R3-173152 also proposes Figure 17.3.4.5-x, in which a “Handover Request Ack” message including a “List of accepted and rejected PDU Session + Slice ID” is received from the second or target “gNB2” or base station by the first or source

“gNB1” or base station in response to the “Handover Request” message. Ex. 1011, 4-5; Ex. 1003, ¶¶229-230. A POSITA would have understood that the “3. Handover Request ACK” message of Figure 17.3.4.5-x corresponds to the “5. Handover Request Acknowledge” message of Figure 1 and included additional detail to enable slice-aware handover. Ex. 1003, ¶¶230-234.

Ex. 1011, Figure 17.3.4.5-x (annotated)



vi. [1.C2]

R3-173152 renders obvious [1.C2]. Ex. 1003, ¶¶236-246.

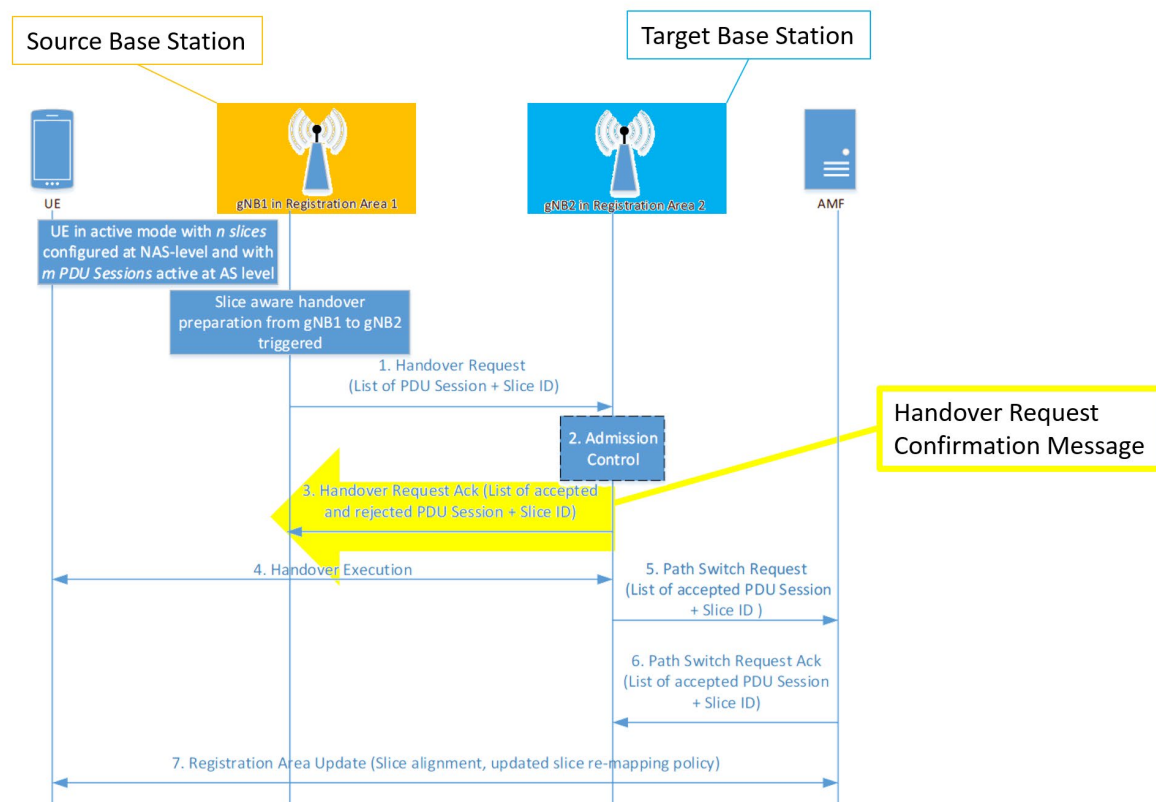
The '631 Patent provides no explanation for what “information for indicating a rejection of the one or more PDU sessions by the target BS” entails. Ex. 1003, ¶237. Indeed, as is described above in the section related to priority, this lack of disclosure regarding rejection is fatal to the '631 Patent priority claim. Nonetheless, R3-1713152 renders the limitation obvious because R3-1713152 explicitly discloses including information for indicating a rejection of one or more PDU sessions by the target BS in its acknowledgement message. Ex. 1003, ¶237.

R3-1713152 discloses “the Handover Request ACK message” “includes the admitted PDU session list and *not admitted PDU session list*, to indicate which PDU session can handover to the target.” Ex. 1011, 2-3; Ex. 1003, ¶¶238-241. R3-1713152 discloses the “Handover Request ACK message also includes the *RRC Context IE*,” and, “*if some PDU sessions are rejected, the target gNB will put the DRBs associated to the rejected PDU sessions in the DRB-ToReleaseList (which is included in the RRC Context IE)*.” *Id.* R3-1713152 discloses the “Handover Request ACK message” includes information about “*rejected PDU sessions*” from the target gNB. Ex. 1011, 2; Ex. 1003, ¶241. R3-1713152 also discloses “[f]or the Handover Request ACK message, the target gNB informs *non-admitted PDU sessions (e.g., including due to slice availability) list to the source gNB*.” Ex. 1011, 3; Ex. 1003, ¶242.

Figure 17.3.4.5-x depicts a “3. Handover Request Ack” message including a “(List of accepted and *rejected PDU Session* + Slice ID)” being received from the target “gNB2” by the source “gNB1.” Ex. 1011, 5; Ex. 1003, ¶¶243-245.

Including “(List of accepted and *rejected PDU Session* + Slice ID)” in the “Handover Request Ack” message provides additional detail to the “Handover Request ACK message” including a list of “non-admitted PDU sessions (e.g., including due to slice availability)” to achieve slice-aware handover. Ex. 1011, 3; Ex. 1003, ¶¶244-245.

Ex. 1011, Figure 17.3.4.5-x (annotated)



In view of the explicit disclosure in R3-173152 of “rejected PDU Session[s]” and “Slice ID” being included in a “Handover Request Ack” message, a POSITA would have understood that the “Handover Request Ack” message included information for indicating a rejection of one or more PDU sessions. Ex. 1003, ¶245.

3. Claim 7

i. [7.PRE]

To the extent [7.PRE] is limiting, R3-173152 renders obvious [7.PRE]. Ex. 1003, ¶¶247-264.⁴

The '631 Patent describes a “controller” as part of a “base station” and provides several examples of base stations, including gNBs. Ex. 1001, 21:62-22:35, 3:61-4:4; Ex. 1003, ¶¶248, 250. The '631 Patent generically discloses that the controller “control[s] the overall operations of the base station,” including receiving and “controlling” the network slice information, and “controlling” the mobility of the UE. Ex. 1001, 22:27-31. In light of the specification of the '631 Patent, a POSITA would understand that the claimed “controller” is merely referring to

⁴ Petitioners believe claim 7 is invalid under 35 U.S.C. § 112 for covering *both* an apparatus and a method of using the apparatus. *IPXL Holdings, LLC v. Amazon.com, Inc.*, 430 F.3d 1377, 1384 (Fed. Cir. 2005). Claim 7 is also invalid as obvious.

hardware and software included in the gNB for controlling the operation of the gNB. Ex. 1003, ¶249. R3-173152 discloses a gNB or base station and a POSITA would readily understand that the gNB or base station includes software and hardware capable of controlling the operation of the gNB or base station with respect to the network slice information. Ex. 1003, ¶249-251.

Moreover, a POSITA would have known or found it obvious that base stations included a controller and therefore that a base station could satisfy the claimed “controller.” Ex. 1003, ¶¶252-256; *see also Sprint Spectrum, L.P. v. General Access Solutions Ltd.*, IPR2017-01885, Paper 57 at 25 (Board “persuaded by Petitioner’s arguments and evidence” that known base stations “include similar equipment, such as a controller, processor, and transceivers.”). For example, Fujishiro (Ex. 1023) depicts a base station including a “control unit” that “controls various functions of the [base station].” Ex. 1023, ¶¶[0098-0102]; Ex. 1003, ¶¶62-66, 252-256.

R3-173152 renders obvious a base station controller transmitting and receiving data. *See* §VII.A.2.i. Ex. 1003, ¶¶257-264.

ii. [7.A]

R3-173152 renders obvious [7.A]. Ex. 1003, ¶¶265-273.

R3-173152 discloses a gNB or base station, and a POSITA would have known or found it obvious that a base station included a processor. Ex. 1003, ¶¶266-268; *see also* §VI.A.3.i. As described above, the POSITA would have known, at least in

view of the knowledge of the POSITA demonstrated by Huang-Fu and Fujishiro (Huang-Fu depicts a base station with a processor that “perform[s] the features in [the] base station,” Ex. 1022, ¶[0031]; Fujishiro depicts a base station including a “control unit” that “controls various functions of the [base station].”⁵ Ex. 1023, ¶¶[0098-0102]), that a base station included a processor and the POSITA would have found it obvious to include a processor in a base station so as to perform the functions of the base station. Ex. 1003, ¶¶269-270.

Therefore, R3-173152 discloses a processor. Ex. 1003, ¶¶266-270.

R3-173152 renders obvious deciding whether to perform a handover. *See* §VII.A.2.ii; Ex. 1003, ¶¶271-273.

iii. [7.B1]

R3-173152 renders obvious [7.B1]. *See* § VII.A.2.iii; Ex. 1003, ¶¶274-278.

iv. [7.B2]

R3-173152 renders obvious [7.B2]. *See* § VII.A.2.iv; Ex. 1003, ¶¶279-287.

v. [7.C1]

R3-173152 renders obvious [7.C1]. *See* §VII.A.2.v; Ex. 1003, ¶¶288-300.

⁵ Huang-Fu and Fujishiro are not part of the grounds but are referenced to demonstrate the knowledge of the POSITA. Ex. 1003, ¶¶62-66.

vi. [7.C2]

R3-173152 renders obvious [7.C2]. *See* §VII.A.2.vi; Ex. 1003, ¶¶301-311.

4. Claim 13

i. [13.PRE]

To the extent [13.PRE] is limiting, R3-173152 renders obvious [13.PRE]. Ex. 1003, ¶¶312-321.

The '631 Patent refers to a “base station” as “an apparatus,” and lists a gNB as an example of a base station. Ex. 1001, 3:61-62, 4:13-21; Ex. 1003, ¶313. A POSITA would have understood that the claimed “apparatus” was a base station, and a gNB was an example of a base station. Ex. 1003, ¶315. R3-173152 discloses a gNB (base station); therefore, R3-173152 discloses an apparatus. Ex. 1003, ¶313.

R3-173152 renders obvious transmitting and receiving data. *See* §VII.A.2.i. Ex. 1003, ¶¶314-321.

ii. [13.A]

R3-173152 renders obvious [13.A]. Ex. 1003, ¶¶322-335.

The '631 Patent defines a “controller” as part of a “base station,” and states that the “controller” “may control the overall operations of the base station.” Ex. 1001, 21:62-22:35; Ex. 1003, ¶¶323-325. Accordingly, a POSITA would have understood that the claimed “controller” was part of a base station. Ex. 1003, ¶¶323-325; *see also Sprint Spectrum*, IPR2017-01885, Paper 57 at 25. R3-173152 discloses

a base station, therefore R3-173152 discloses a controller. Ex. 1003, ¶326. Moreover, a POSITA would have known, at least in view of the corroborated knowledge of the POSITA (Huang-Fu depicts a base station with a processor that “perform[s] the features in [the] base station,” Ex. 1022, ¶[0031]; Fujishiro depicts a base station with a “control unit” that “controls various functions of the [base station].” Ex. 1023, ¶[0098-0102]), that a base station included a controller, and the POSITA would have found it obvious that a base station included a controller so as to perform the functions of the base station. Ex. 1003, ¶¶327-332.

R3-173152 renders obvious deciding whether to perform a handover. *See* §VII.A.2.ii; Ex. 1003, ¶¶333-335.

iii. [13.B1]

R3-173152 renders obvious [13.B1]. Ex. 1003, ¶¶336-346.

The '631 Patent states that a base station includes a transmitter. Ex. 1001, 21:65-66, 22:20-21; Ex. 1003, ¶337. A POSITA would have understood that the claimed “transmitter” was part of a base station and that a base station can be a gNB, which R3-173152 discloses. Ex. 1011, Figure 1, Figure 17.3.4.5-x; Ex. 1003, ¶338. Moreover, as discussed in [13.A], a POSITA would have been familiar with base stations and their components and would have known or found it obvious that a base station included a transmitter. Ex. 1003, ¶¶339-343.

R3-173152 renders obvious transmitting a handover request message when it is decided to perform the handover. *See* §VII.A.2.iii; Ex. 1003, ¶¶344-346.

iv. [13.B2]

R3173152 renders obvious [13.B2]. *See* § VII.A.2.iv; Ex. 1003, ¶¶347-355.

v. [13.C1]

R3-173152 renders obvious [13.C1]. Ex. 1003, ¶¶356-371.

The '631 Patent states that a base station includes a receiver. Ex. 1001, 2:65-66 22:20-21; Ex. 1003, ¶357. A POSITA would have understood that the claimed “receiver” was part of a base station and that a base station can be a gNB, which R3-173152 discloses. Ex. 1003, ¶¶358. Moreover, as discussed in [13.A], a POSITA would have been familiar with base stations and their components and would have known or found it obvious that a base station included a receiver. Ex. 1003, ¶¶359-363.

R3-173152 renders obvious receiving a handover request confirmation message in response to the handover request message. *See* §VII.A.2.v; Ex. 1003, ¶¶364-371.

vi. [13.C2]

R3-173152 renders obvious [13.C2]. *See* §VII.A.2.vi; Ex. 1003, ¶¶372-382.

B. Ground 2: R3-173152 and TR 38.801 render obvious Claims 2-6, 8-12, and 14-18

1. Ground 2

R3-173152 and TR 38.801 render obvious the dependent claims of the '631 Patent. Ex. 1003, ¶¶383-537. The Ground 1 analysis of independent claims 1, 7, and 13 is incorporated by reference herein.

i. Motivation to Combine R3-173152 and TR 38.801

A POSITA would have several reasons to combine R3-173152 and TR 38.801. Ex. 1003, ¶¶384-399.

R3-173152 and TR 38.801 are both directed to the field of radio access technology or network communications, and are publications associated with the 3rd Generation Partnership Project (3GPP). Ex. 1011, 1; Ex. 1013, Cover; Ex. 1003, ¶385. Both references address handover for moving UEs. Ex. 1001, 1:20-24; Ex. 1003, ¶385.

Both R3-173152 and TR 38.801 identify and provide a solution to the problem to be solved by the '631 Patent (“mobility guarantee of the user equipment and transmission/reception procedures of data in case the network slicing technology is employed,” and “service continuity and service stability.”). Ex. 1001, 1:51-55; Ex. 1003, ¶¶386-389. R3-173152 solves the problem by providing a “Xn based handover procedure” that accounts for slice availability. Ex. 1011, 1; Ex. 1003, ¶¶386-387. TR 38.801 explains key principles for supporting network slicing, and specifically

provides “support of Network Slicing in RAN.”. Ex. 1013, 23; Ex. 1003, ¶¶388-389.

In view of R3-173152’s explicit teaching of providing slice-aware handovers and the need for the same, a POSITA would have looked to TR 38.801, which discloses multiple options for supporting network slicing, and additional mechanisms for enabling mobility of UEs. Ex. 1003, ¶390. A POSITA would have been motivated to combine R3-173152 and TR 38.801 to provide the system of R3-173152 with the additional option of using a core network node to notify a UE of slice IDs it can access, and/or configuring network slice information based on network slice request information, as taught by TR 38.801, to enable differentiated handling of traffic for different network slices, selection of network slice by a slice ID provided by the UE, support for resource management and resource isolation between slices, and QoS differentiation within a slice. Ex. 1013, 28; Ex. 1003, ¶391.

In view of the teachings of R3-173152 regarding mobility across registration areas (*see* Ex. 1011, 3), a POSITA would have also looked to TR 38.801-- which discloses multiple implementations for providing slice information from the UE to the gNB (or base station)-- for details regarding how to convey required network slice information (network slice request information) from a UE to a base station. Ex. 1003, ¶¶393-394. The POSITA would have been motivated to utilize an NAS message, or an NAS message encapsulated in an RRC message, to transmit the information about the slices configured at NAS-level of R3-173152’s UE to the

gNB, as taught by TR 38.801, to “enable[] support of multiple slices simultaneously supported by a UE.” Ex. 1013, 24; Ex. 1003, ¶394. The POSITA would have had a reasonable expectation of success in such a combination because the POSITA would have been well aware of encapsulating an NAS message in an RRC message, and the use of the RRC sublayer for communication of NAS messages from a UE to a core network via a base station, as also taught by TR 38.801. Ex. 1003, ¶395, ¶¶75-81.

A POSITA would have also looked to TR 38.801, which discloses multiple implementations for providing slice information from the core network to the gNB (or base station), for details regarding how to convey required network slice information from a core network entity to a base station. Ex. 1003, ¶396. TR 38.801 realizes network slice selection where a gNB can “identify the CN node that supports the slice ID presented by [a] UE,” and therefore the source gNB would be aware of slice availability to select suitable targets for handover. Ex. 1013, 26; Ex. 1003, ¶396. A POSITA would have had a reasonable expectation of success in such a combination because both R3-173152 and TR 38.801 disclose supporting network slicing among base stations interconnected with the Xn interface. Ex. 1011, 1; Ex. 1013, 19, 29; Ex. 1013, ¶397.

Combining R3-173152 and TR 38.801 is additionally obvious because such a combination relies on known solutions to improve similar systems and methods in

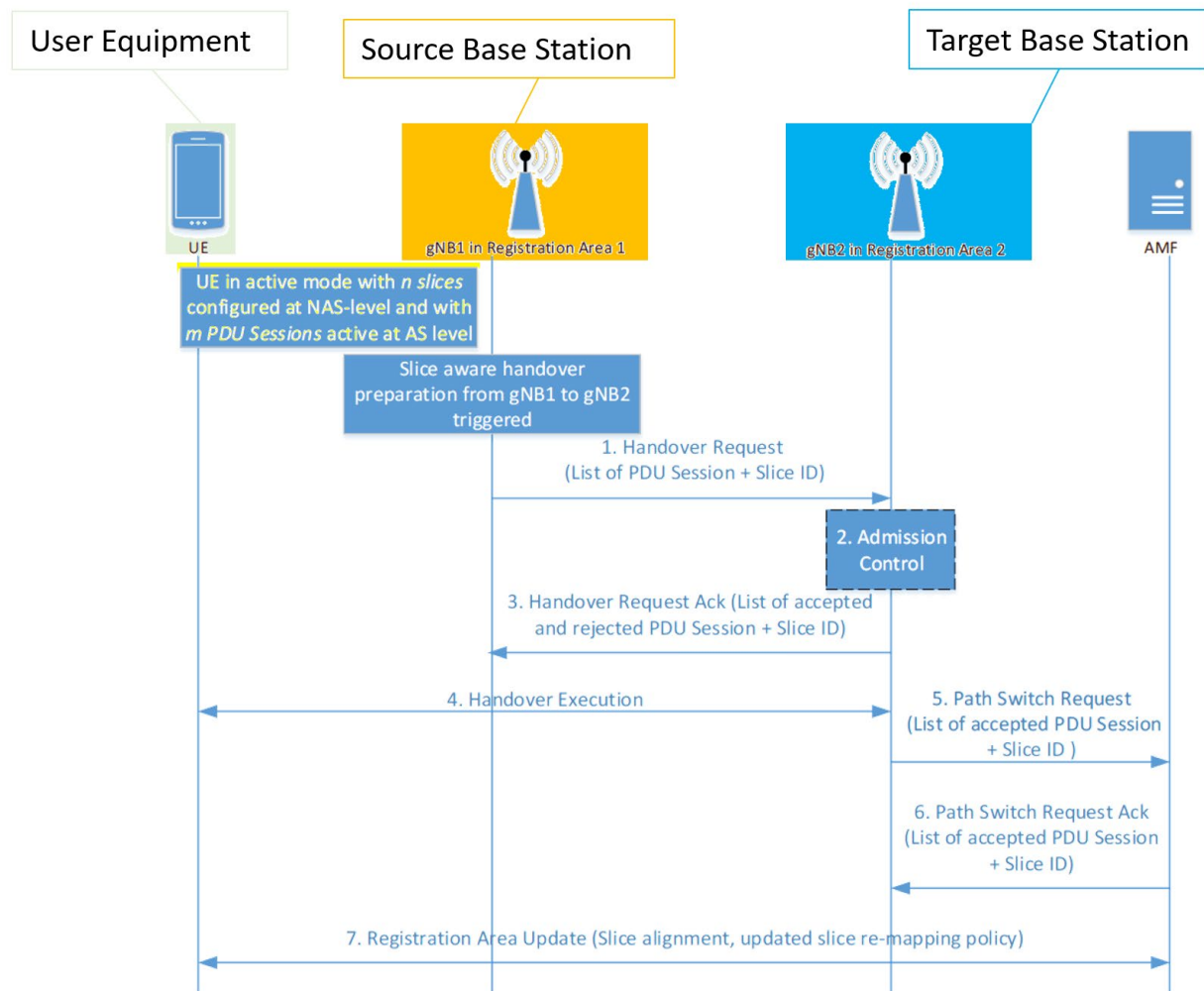
the same way. Here, “when a patent ‘simply arranges old elements with each performing the same function it had been known to perform’ and yields no more than one would expect from such an arrangement, the combination is obvious.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007). The POSITA would have understood that the networks and base stations of R3-173152 and TR 38.801 were or included similar systems and/or devices and that the ability to (1) convey network slice information to an eNB by the core network, where the network slice information is configured based on network slice request information, and (2) convey network slice information from a UE to a base station via an NAS message, or an NAS message encapsulated in an RRC message, was an improvement to the system of TR 38.801 and would therefore improve the similar system of R3-173152 in a similar way. Ex. 1003, ¶¶395, 398.

A POSITA would have had a reasonable expectation of success in the combination of R3-173152 and TR 38.801 based on their explicit teachings, the knowledge of the POSITA, and the knowledge that both relate to 3GPP. Ex. 1003, ¶392.

2. Claim 2

R3-173152 discloses a “UE” or user equipment “in active mode with *n slices* configured at NAS-level” or non-access stratum level, “and with *m PDU Sessions* active at AS level.” Ex. 1011, 5; Ex. 1003, ¶¶402-403; *see also* §VII.A.2.

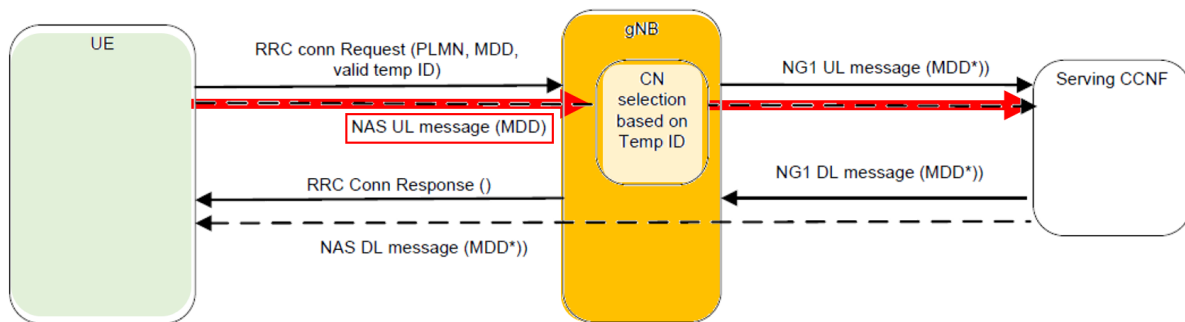
Ex. 1011, Figure 17.3.4.5-x (annotated)



TR 38.801 discloses a user equipment or UE sending an “RRC connection request” and/or an NAS uplink or UL message containing “MDD” or a “Multi-Dimensional Descriptor,” to a “gNB” or base station. Ex. 1013, 24-26; Ex. 1003, ¶¶403-404. TR 38.801 discloses that the “MDD” is used for “RAN slice awareness

(slice specific behavior, congestion control, resource isolation).” Ex. 1013, 26; Ex. 1003, ¶405.

Ex. 1013, 25 (annotated)



While the dotted arrow associated with the NAS UL message in the above drawing of TR 38.801 appears to pass from the UE to the “Serving CCNF,” a POSITA would have understood or found it obvious that the NAS UL message was sent from the UE to the gNB, and then from the gNB to the Serving CCNF. Ex. 1003, ¶¶405-406. Thus, TR 38.801 discloses receiving, by the source BS (“gNB,” orange) from a user equipment (“UE,” green), a non-access stratum (NAS) message (“NAS UL message,” red) including network slice request information (“MDD”). *Id.*

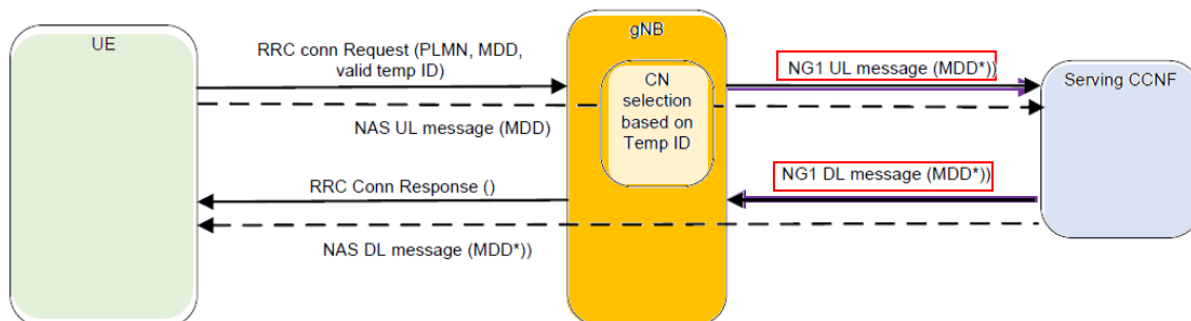
A POSITA would have combined R3-173152 and TR 38.801 for at least the reasons in §VII.B.1.i. Ex. 1003, ¶¶407-409, ¶¶75-81.

3. *Claim 3*

R3-173152 renders obvious a source BS receiving network slice request information. Ex. 1003, ¶412; §VII.A.2.

TR 38.801 discloses that the core network entity (“Serving CCNF,” light blue) receives the network slice request information (MDD) in an uplink or “UL message.” Ex. 1013, 25-26; Ex. 1003, ¶413. TR 38.801 then states that the “MDD is sent back to the UE with the Temp ID at NAS level to either reconfirm the initially requested MDD or indicates a new one if policy has changed,” and the MDD is “also indicated in the NG1 DL message to gNB for confirmation.” Ex. 1013, 25-26; Ex. 1003, ¶413. Thus, TR 38.801 discloses that the source BS (“gNB,” orange) receives from the core network entity (“Serving CCNF,” light blue) network slice information (“MDD*”), where the network slice information is configured by the network slice request information (“MDD”). Ex. 1013, 25-26; Ex. 1003, ¶¶413-414.

Ex. 1013, 25 (annotated)



A POSITA would have combined R3-173152 and TR 38.801 for at least the reasons in §VII.B.1.i. Ex. 1003, ¶¶415-417.

4. *Claim 4*

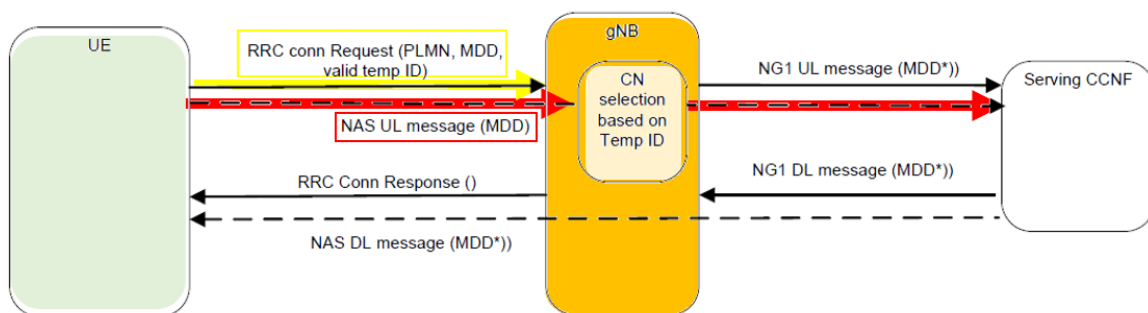
The '631 Patent merely describes an “RRC connection setup complete message” that is used to “transmit[]” “network slice information” from a UE “to a base station” by including the “network slice request information” in “a NAS message.” Ex. 1001, 15:19-37; Ex. 1003, ¶422. A POSITA would understand that the claimed “RRC connection setup completion message” is merely referring to an RRC message (not specifically a “connection setup completion message”) used to transmit network slice request information to a base station by including the network slice request information in an NAS message. Ex. 1003, ¶423. R3-173152 and TR 38.801 render obvious a message used to transmit network slice request information to a base station by including the network slice request information in an NAS message, and a POSITA would readily understand or find it obvious that the NAS message would be encapsulated in an RRC message. Ex. 1003, ¶¶421-422; §VII.B.2.

R3-173152 discloses a UE “complet[ing] [an] RRC Handover procedure.” Ex. 1011, 2, Figure 1; Ex. 1003, ¶¶423-424.

TR 38.801 discloses a UE sending, to the gNB, an NAS message including the network slice request information (“NAS UL message (MDD)”), or an RRC message including network slice request information (“RRC conn Request,”

yellow), where the MDD is used for slice awareness. Ex. 1013, 24-26; Ex. 1003, ¶¶425-428. A POSITA would have understood that the NAS message would have been transmitted one of two ways – either on its own from the UE to the gNB, or encapsulated in an RRC message from the UE to the gNB. Ex. 1003, ¶428.

Ex. 1013, 25 (annotated)



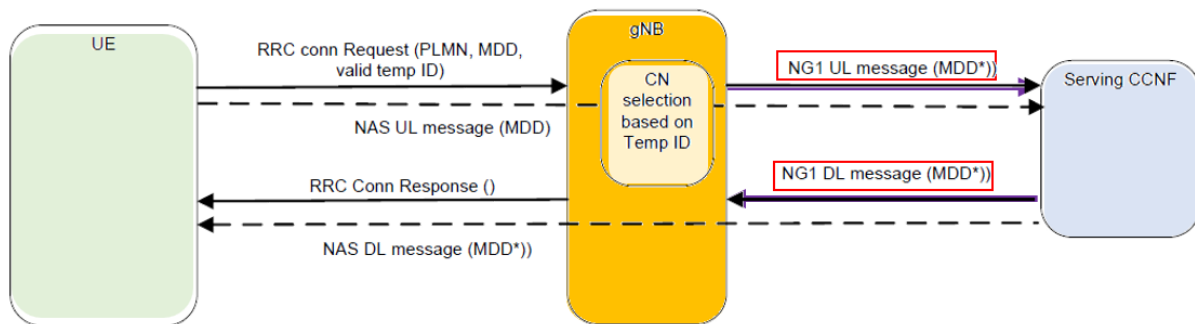
A POSITA would have combined R3-173152 and TR 38.801 for at least the reasons in §VII.B.1.i. Ex. 1003, ¶¶429-431, ¶¶75-81.

5. Claim 5

TR 38.801 discloses several cases for network slice selection that are based on a solution described in “section 6.1.2 of TR 23.799” (Ex. 1020, p. 61). Ex. 1013, 24; Ex. 1003, ¶435. TR 38.801 discloses that the core network entity (“Serving CCNF,” light blue) receives the network slice request information (MDD*) in an uplink or “UL message.” Ex. 1013, 25-26; Ex. 1003, ¶¶434-435. TR 38.801 then states that the “MDD is sent back to the UE with the Temp ID at NAS level to either reconfirm the initially requested MDD or indicates a new one if policy has changed,”

and the MDD* is “also indicated in the NG1 DL message to gNB for confirmation.” Ex. 1013, pp. 25-26; Ex. 1003, ¶¶434-435. In the solution described in section 6.1.2 of TR 23.799, the “CCNF decides the initial set of [network slice instances] for the UE based on an evaluation of the Requested MDD, Subscribed MDD (if available), ...,” and the “Accepted MDD” “is passed to the UE in [an] Attach Accept message.” Ex. 1020, p. 67. Thus, TR 38.801 discloses that the source BS (“gNB,” orange) receives from the core network entity (“Serving CCNF,” light blue) network slice information (“MDD*”), where the network slice information (“MDD*”) is configured by the core network entity based on the network slice request information (“MDD”) because, while it appears in the image above that the Serving CCNF receives and sends the same MDD*, a POSITA would have understood or found it obvious that the Serving CCNF modified the MDD* prior to sending it back because the Serving CCNF would indicate a new MDD if a requested MDD is not available. Ex. 1013, 25-26; Ex. 1003, ¶¶434-436.

Ex. 1013, 25 (annotated)



A POSITA would have combined R3-173152 and TR 38.801 for at least the reasons in §VII.B.1.i. Ex. 1003, ¶¶437-438.

6. Claim 6

The '631 Patent refers to “X2” as an “inter-base station interface,” and states that a “handover based on an interface between a core network entity and a base station may be used only when a handover based on an inter-base station interface cannot be used.” Ex. 1001, 19:6-34; Ex. 1003, ¶443. A POSITA would have understood that the claimed “direct interface” meant that the handover request message was performed between the source and target base stations without the core network, and/or an “X2” or “Xn” interface. Ex. 1003, ¶443.

R3-173152 discloses “the Xn based handover is proceeded between the source gNB and the target gNB directly.” Ex. 1011, 3; Ex. 1003, ¶443. TS 38.300 (source of Figure 1 of R3-173152) states that “preparation messages are directly exchanged between the gNBs,” meaning “without involvement of the 5GC.” Ex. 1019, 32; Ex.

1003, ¶443. Thus, it would have been obvious to a POSITA that R3-173152 discloses that the transmission of the handover request message (“3. Handover Request” message of Figure 1) is performed through a direct interface (“Xn”) associated with the target base station. Ex. 1003, ¶444.

A POSITA would have combined R3-173152 and TR 38.801 for at least the reasons in §VII.B.1.i. Ex. 1003, ¶¶443-444.

7. Claim 8

Ground 2 renders obvious [8]. *See* §§VII.A.3, VII.B.2; Ex. 1003, ¶¶446-455.

8. Claim 9

Ground 2 renders obvious [9]. *See* §§VII.B.7, VII.B.3; Ex. 1003, ¶¶456-464.

9. Claim 10

Ground 2 renders obvious [10]. *See* §§VII.B.7, VII.B.4; Ex. 1003, ¶¶465-477.

10. Claim 11

Ground 2 renders obvious [11]. *See* §§VII.B.5, VII.B.8; Ex. 1003, ¶¶478-486.

11. Claim 12

Ground 2 renders obvious [12]. *See* §§VII.B.6, VII.B.10; Ex. 1003, ¶¶487-491.

12. Claim 14

Ground 2 renders obvious [14]. *See* §§VII.A.4, VII.B.2; Ex. 1003, ¶¶492-501.

13. Claim 15

Ground 2 renders obvious [15]. *See* §§VII.B.3, VII.B.12; Ex. 1003, ¶¶502-510.

14. Claim 16

Ground 2 renders obvious [16]. *See* §§VII.B.4, VII.B.12; Ex. 1003, ¶¶511-523.

15. Claim 17

Ground 2 renders obvious [17]. *See* §§VII.B.5, VII.B.13; Ex. 1003, ¶¶524-532.

16. Claim 18

Ground 2 renders obvious [18]. *See* §§VII.B.6, VII.B.15; Ex. 1003, ¶¶533-537.

C. Ground 3: Han and TS 36.300 render obvious Claims 1, 7, and 13

1. Ground 3

Han and TS 36.300 render obvious the independent claims of the '631 Patent. Ex. 1003, ¶¶538-688.

i. Motivation to Combine Han and TS 36.300

A POSITA would have had several reasons to combine Han and TS 36.300. Ex. 1003, ¶¶539-548.

Both Han and TS 36.300 relate to the field of radio access technology or network communications and are directed to technology for providing services to moving UEs. *see* Ex. 1015, 3, 24; Ex. 1017, 10, 29; Ex. 1024, 1, 16; Ex. 1003, ¶¶540. TS 36.300 provides the then existing standard that was necessary for implementation in the network to include details for supporting UE handover for maintaining UE mobility. Ex. 1024, 90; Ex. 1003, ¶540. TS 36.300 provides an overview of “Mobility Management” procedures, including “Mobility Support for UEs” and “necessary steps” for “[h]andover procedures.” Ex. 1024, 90; Ex. 1003, ¶¶541-542.

Given Han’s disclosure of configuring a radio resource during a handover process based on pre-authorized QoS information, and a desire to ensure “mobility performance of [a] terminal” during handover, a POSITA would have looked to TS 36.300 to understand how the standard described configuring resources based on QoS information during handover. Ex. 1024, 93; Ex. 1003, ¶¶543-544. Moreover, even when implementing a handover process based on pre-authorized QoS information, the POSITA would have been motivated to look to and include the then existing standard to allow for backwards compatibility with devices and base stations that were reliant on the previous standard and/or generation. Ex. 1003, ¶¶543-544. Moreover, reliance on TS 36.300 would have allowed a more efficient handover process in that the Han system would not sample QoS information until the TS 36.300 process rendered a handover decision. Ex. 1003, ¶¶543-544.

A POSITA would have had a reasonable expectation of success in combining Han and TS 36.300 based on the teachings of the references, and recognizing that both Han and TS 36.300 relate to LTE systems and that the handover-related messages disclosed in Han and TS 36.300 were similar messages directed to similar goals. Ex. 1015, 24; Ex. 1017, 29; Ex. 1024, 83, 121, 89; Ex. 1003, ¶¶545-546.

The combination would also simply have been the combination of well-known steps in a well-known handover process to yield predictable results. Specifically, the inclusion of the handover request/response process that is laid out in TS 36.300 with the Han QoS information exchange as part of handover. Likewise, including the steps of TS 36.300 with those of Han would have been a simple substitution of one known element and corresponding fabrication step for another to obtain predictable results.

2. *Claim 1*

i. [1.PRE]

To the extent [1.PRE] is limiting, Han renders obvious [1.PRE]. Ex. 1003, ¶¶550-557.

Han discloses “a communication method, an apparatus, a system, a terminal, and an access network device.” Ex. 1015, 1; Ex. 1017, 10; Ex. 1003, ¶551. Han discloses a “communication system 100,” which “may be an LTE system, a 5G system, or a subsequent evolved system of the 5G system” that is capable of

transmitting and receiving data. Ex. 1015, 22-27; Ex. 1017, 27-33; Ex. 1003, ¶¶552-556. The various transmission and reception of data to enable slice-aware handover is further explained in [1.A] – [1.C2] and the dependent claims.

Ex. 1015, FIG. 1 (Ex. 1017, FIG. 1)

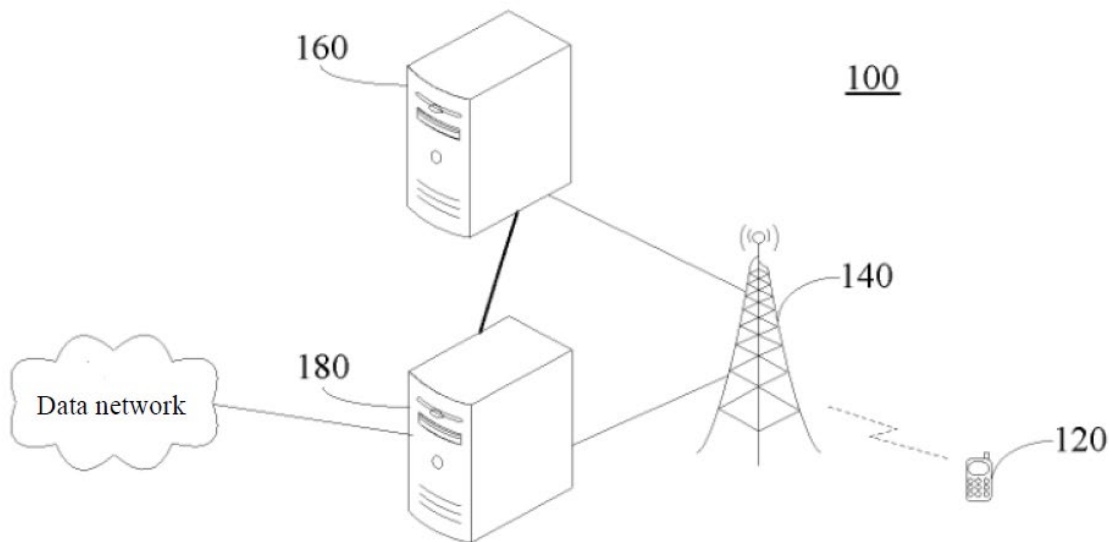


FIG. 1

ii. [1.A]

Han and TS 36.300 render obvious [1.A]. Ex. 1003, ¶¶558-567.

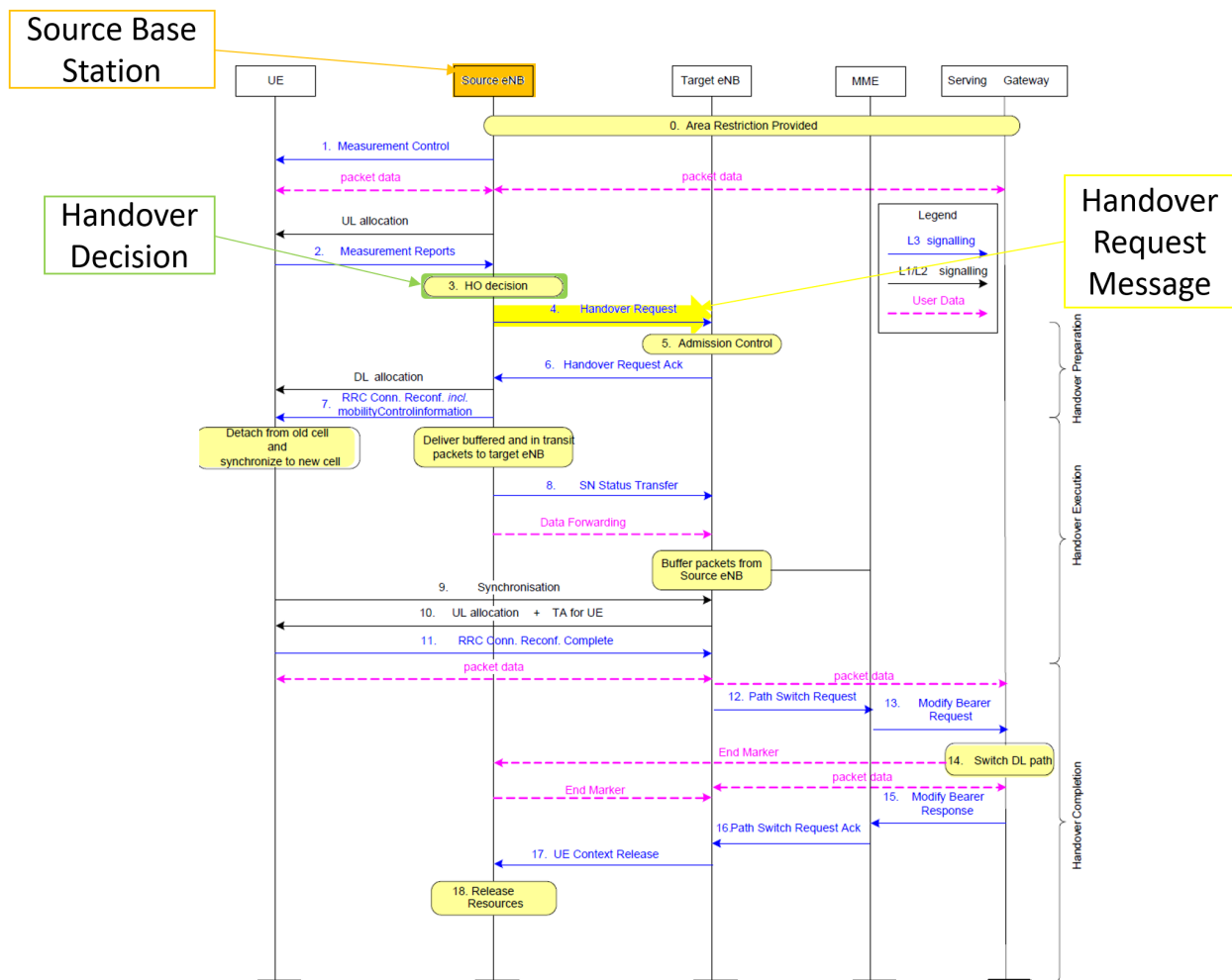
It would thus have been obvious to a POSITA to improve Han’s “second [source-side] access network device” or “base station” with software that decided to perform a handover prior to sending the handover request message to the “first [target-side] access network device” or “base station.” The POSITA would have known it obvious because it would have been unnecessary and inefficient to

randomly send handover request messages to other base stations when it had not been determined that handover was imminent. Ex. 1003, ¶560. Indeed, sending messages unprompted, such as by not using a handover decision, would increase network traffic and decrease bandwidth. Ex. 1003, ¶560. Moreover, a POSITA would have had reasonable expectation of success in making the improvement, which would give the “second [source-side] access network device” or “base station” a reason to send the handover request message to the “first [target-side] access network device” or “base station.” Ex. 1003, ¶560. Finally, as explained above, the ’631 Patent provides no detail related to this limitation, demonstrating that even the inventors of the ’631 Patent considered the limitation to be well known. Ex. 1003, ¶560.

To the extent the Board finds the limitation is not obvious in view of Han alone, it would have been obvious to the POSITA to combine the teachings of Han with those of TS 36.300 as TS 36.300 explicitly discloses a handover decision performed by a base station prior to transmitting a handover request message to another base station. Ex. 1003, ¶561. The POSITA would have made such a combination to ensure compatibility with the standard, for backwards compatibility with prior versions (e.g., 4G), and it would reduce network traffic by only triggering the process of FIG. 6 of Han once a handover decision had been made. Ex. 1003, ¶561.

TS 36.300 provides an overview of “Mobility Support for UEs” and “necessary steps” for “[h]andover procedures.” Ex. 1024, 90; Ex. 1003, ¶562. A “basic handover scenario” is depicted in Figure 10.1.2.1.1-1. Ex. 1024, 91-92; Ex. 1003, ¶562.

Ex. 1024, Figure 10.1.2.1.1-1 (annotated)



TS 36.300 discloses that, in step 2, (“2. Measurement Reports”), a “MEASUREMENT REPORT is triggered and sent to the eNB,” and then, in step 3 (“3. *HO Decision*”), “[t]he source eNB makes *[a] decision based on*

MEASUREMENT REPORT and RRM information to hand off the UE.” Ex. 1024, 92-93; Figure 10.1.2.1.1-1; Ex. 1003, ¶563.

A POSITA would have been motivated to combine Han and TS 36.300 for at least the reasons in §VII.C.1.i. Ex. 1003, ¶¶564-566.

iii. [1.B1]

Han renders obvious [1.B1]. Ex. 1003, ¶¶568-573.

Han renders obvious deciding to perform a handover. *See* §VII.C.2.ii; Ex. 1003, ¶569.

Han discloses step “S601,” in which a “second access network device” or “source-side” “base station” “sends” or transmits “a handover request message to a first access network device” or “target-side” “base station.” Ex. 1015, 44; Ex. 1017, 50; Ex. 1003, ¶¶570-572. Step “S601” is part of a “handover process.” *Id.*

Ex. 1015, FIG. 6 (annotated) (Ex. 1017, FIG. 6)

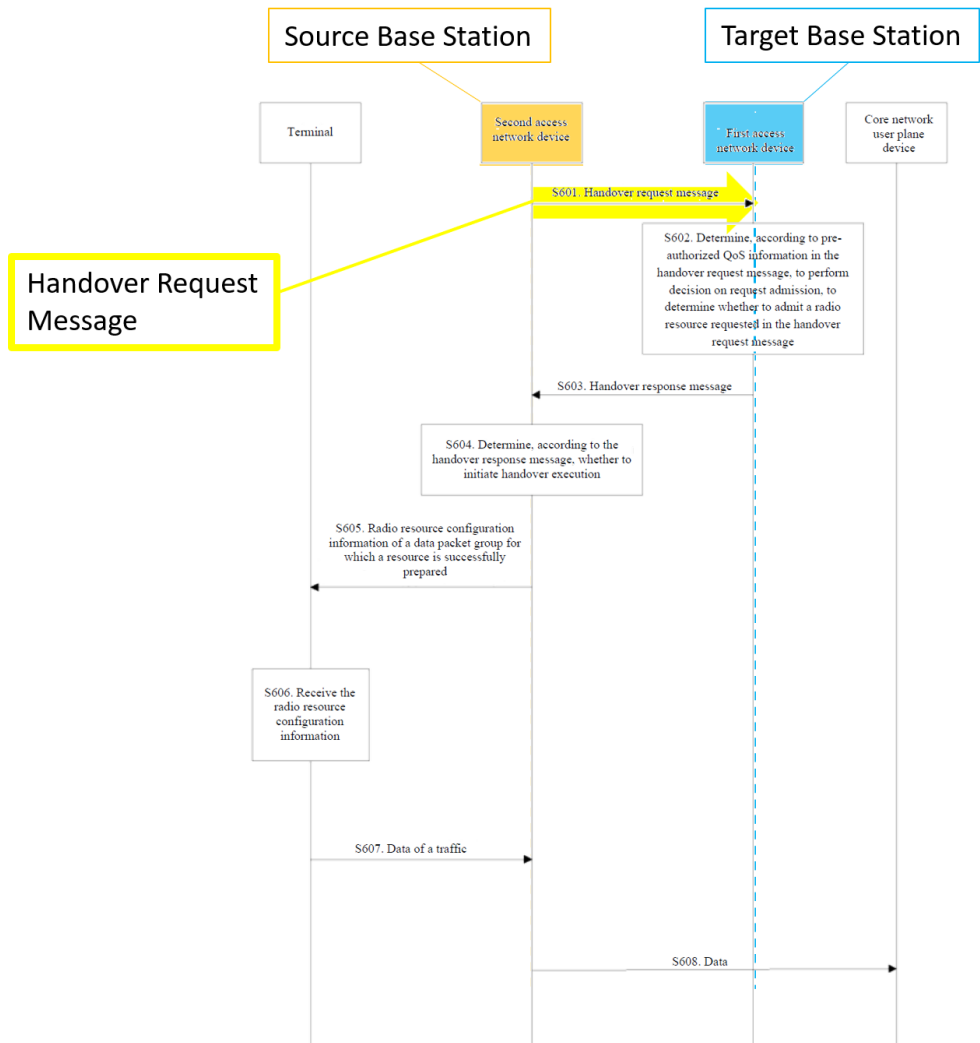


FIG. 6

iv. [1.B2]

Han discloses that the “*handover request message includes pre-authorized QoS information,*” where the “pre-authorized QoS information in the handover request message may include a part or all of [] second pre-authorized QoS information,” and “the second pre-authorized QoS information” “may explicitly or

implicitly include the PDU session information.” Ex. 1015, 42-44; Ex. 1017, 49-51; Ex. 1003, ¶¶574-575. Han also discloses that “*the quality of service information further comprises* at least one of PDU session information and *identification information of network slice of the traffic*,” where the “identification information of the slice includes at least one of the following: a slice ID, a slice type, a tenant type, a tenant identifier, a network function identifier, and the like.” Ex. 1015, 20, 31; Ex. 1017, 7, 57; Ex. 1003, ¶575.

The ’631 Patent explains that “network slice request information may include specific network slice information configured for [a] UE,” and that the “network slice information may include information on at least one of network slice configured for the UE, *information for identifying a network slice service/PDU session/bearer associated with the corresponding network slice information*, and information on a priority of the corresponding network slice.” Ex. 1001, 11:26-37; Ex. 1003, ¶576. In view of the explicit disclosure of “identification information of the slice includes at least one of the following: a slice ID, a slice type, a tenant type, a tenant identifier, a network function identifier, and the like” being included in the handover request message of Han, as well as the disclosure of the ’631 Patent, a POSITA would have understood the handover request message of Han included network slice information. Ex. 1003, ¶576.

v. *[1.C1]*

Han discloses, with reference to step “S602,” that “[t]he first [target-side] access network device receives the handover request message, and determines, according to pre-authorized QoS information in the handover request message, to perform judgment on request admission, to determine whether to admit a radio resource requested in the handover request message.” Ex. 1015, 46; Ex. 1017, 52-53; Ex. 1003, ¶¶577-579. Han explains that “[a]dmitting the radio resource requested in the handover request message refers to configuring the radio resource for the terminal according to the radio resource requested in the handover request message.” Ex. 1015, 46; Ex. 1017, 52; Ex. 1003, ¶579.

Han then discloses, with reference to step “S603,” that “[t]he first [target-side] access network device” or “target-side” “base station” “sends a handover response message to the second [source-side] access network device” or “source-side” “base station,” where “the handover response message may be a handover preparation failure message or a handover preparation success message.” Ex. 1015, 47; Ex. 1017, 53; Ex. 1003, ¶¶580-581. Because Han’s “handover response message” is sent in response to the handover request message and may include an indication of failure or success, a POSITA would have understood or found it obvious that Han’s “handover response message” included a “request confirmation” in view of Han’s

explicit disclosure that the “handover response message” may be a “handover preparation success message.” Ex. 1003, ¶¶582-584.

Ex. 1015, FIG. 6 (annotated) (Ex. 1017, FIG. 6)

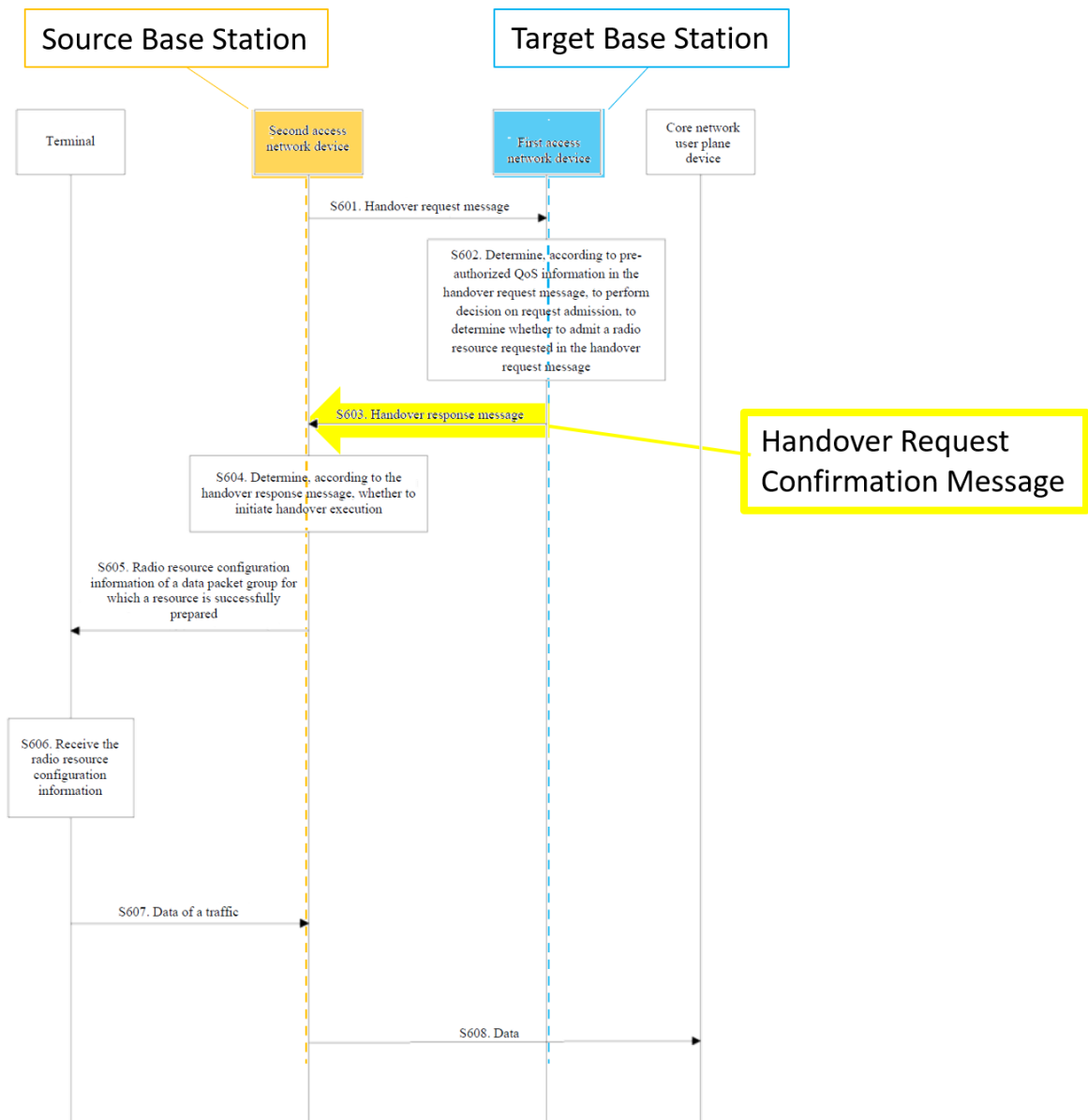


FIG. 6

vi. [1.C2]

Han discloses, referencing step “S603,” that “[t]he first [target-side] access network device” or “target-side” “base station” “sends a handover response message,” where “*the handover response message may be a handover preparation failure message* or a handover preparation success message.” Ex. 1015, 44-47; Ex. 1017, 50-59; Ex. 1003, ¶¶585-589.

Han discloses, “when determining that none of resources requested in the handover request message is admitted, the first [target-side] access network device sends the handover preparation failure message,” where “the handover preparation failure message is used to indicate that none of the resources requested in the handover request message is admitted,” or, “when determining that all or some resources requested in the handover request message are admitted, the first [target-side] access network device sends a handover preparation success message.” *Id.*; Ex. 1003, ¶590. That “some of the resources requested in the handover request message are not admitted may include that *some data packet groups in the pre-authorized QoS information for which radio bearers need to be pre-established are not admitted* by the first [target-side] access network device.” *Id.* Han discloses “[a]dmitting the radio resource requested in the handover request message refers to configuring the radio resource for the terminal according to the radio resource

requested in the handover request message.” Ex. 1015, 46; Ex. 1017, 50-53; Ex. 1003, ¶590.

Han discloses the “handover preparation failure message may further carry a handover failure cause,” where a “*failure cause may be provided for each data packet group of the handover request*,” and a “failure cause” may include: “there is no available radio resource, pre-establishment of a radio bearer with pre-authorized QoS is not supported, a QoS parameter is not supported, a geographic area is not supported, and the like.” Ex. 1015, 47; Ex. 1017, 53-54; Ex. 1003, ¶¶591-593. Han’s “handover preparation failure message” includes a “handover failure cause” “for each data packet group of the handover request,” where a “failure cause” for a “data packet group” (part of a PDU session) may include that a “radio bearer with [the] pre-authorized QoS,” *or network slice information, associated with a PDU session, “is not supported.”* *Id.* Thus, Han discloses that a handover request confirmation message (“handover preparation failure message”) includes information (“handover failure cause”) for indicating a rejection of the one or more PDU sessions (“data packet group” which is part of a PDU session), when the one or more protocol data unit (PDU) sessions (“pre-authorized QoS” which includes the PDU sessions) are not supported by the target BS. *Id.*

3. *Claim 7*

i. *[7.PRE]*

To the extent [7.PRE] is limiting, Han renders obvious [7.PRE]. Ex. 1003, ¶¶594-601. Han renders obvious transmitting and receiving data. *See* §VII.C.2.i. Ex. 1003, ¶¶597-600.

A POSITA would have understood that the claimed “controller” was a base station and that an eNB was a base station. *See* §VII.A.3.i; Ex. 1001, 21:62-22:35, 3:61-4:4; Ex. 1003, ¶¶595-596; *see also Sprint Spectrum*, IPR2017-01885, Paper 57 at 25.

Han discloses a “communication system 100,” that includes “at least one access network device 140,” where an “access network device 140” is “an eNB.” Ex. 1015, 22-24; Ex. 1017, 27-30; Ex. 1003, ¶¶597-598. Because Han discloses a base station, a POSITA would have understood that Han discloses the claimed “controller.” Ex. 1003, ¶¶599-600.

Ex. 1015, FIG. 1 (Ex. 1017, FIG. 1)

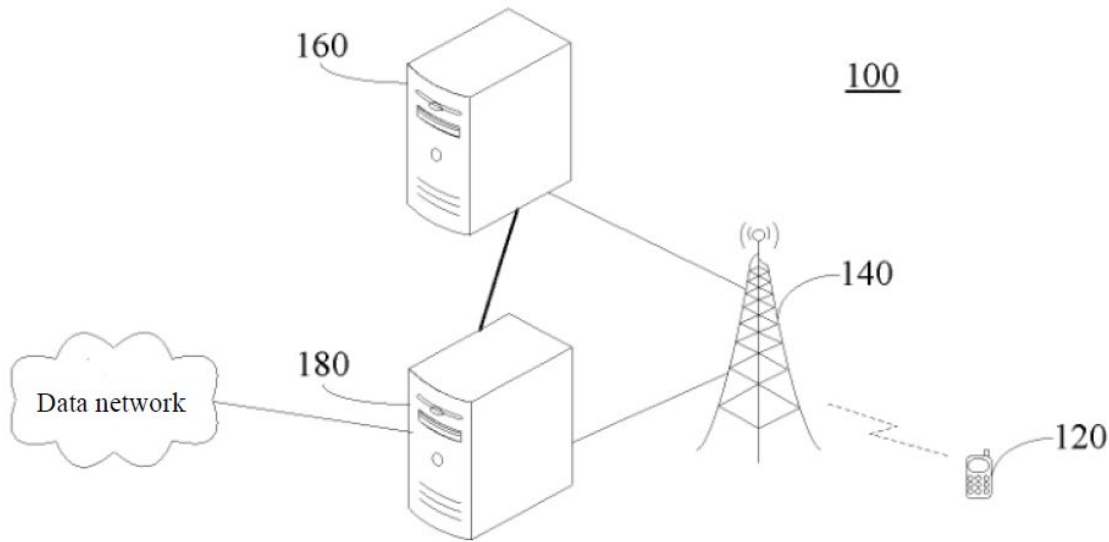


FIG. 1

ii. [7.A]

Han and TS 36.300 render obvious [7.A]. Ex. 1003, ¶¶602-615.

Han and TS 36.300 render obvious deciding whether to perform a handover.
See §VII.C.2.ii; Ex. 1003, ¶¶607-614.

Because the “controller” of the ’631 Patent “control[s] the overall operations of the base station,” the POSITA would have understood that the claimed “controller” is satisfied by a processor of a base station, which Han discloses. See §VII.A.3.ii; Ex. 1001, 21:62-22:35, FIG. 5; Ex. 1003, ¶¶603-605.

With reference to FIG. 3, *Han* discloses that the “access network device” or base station “includes a processor.” Ex. 1015, 25; Ex. 1017, 30; Ex. 1003, ¶606.

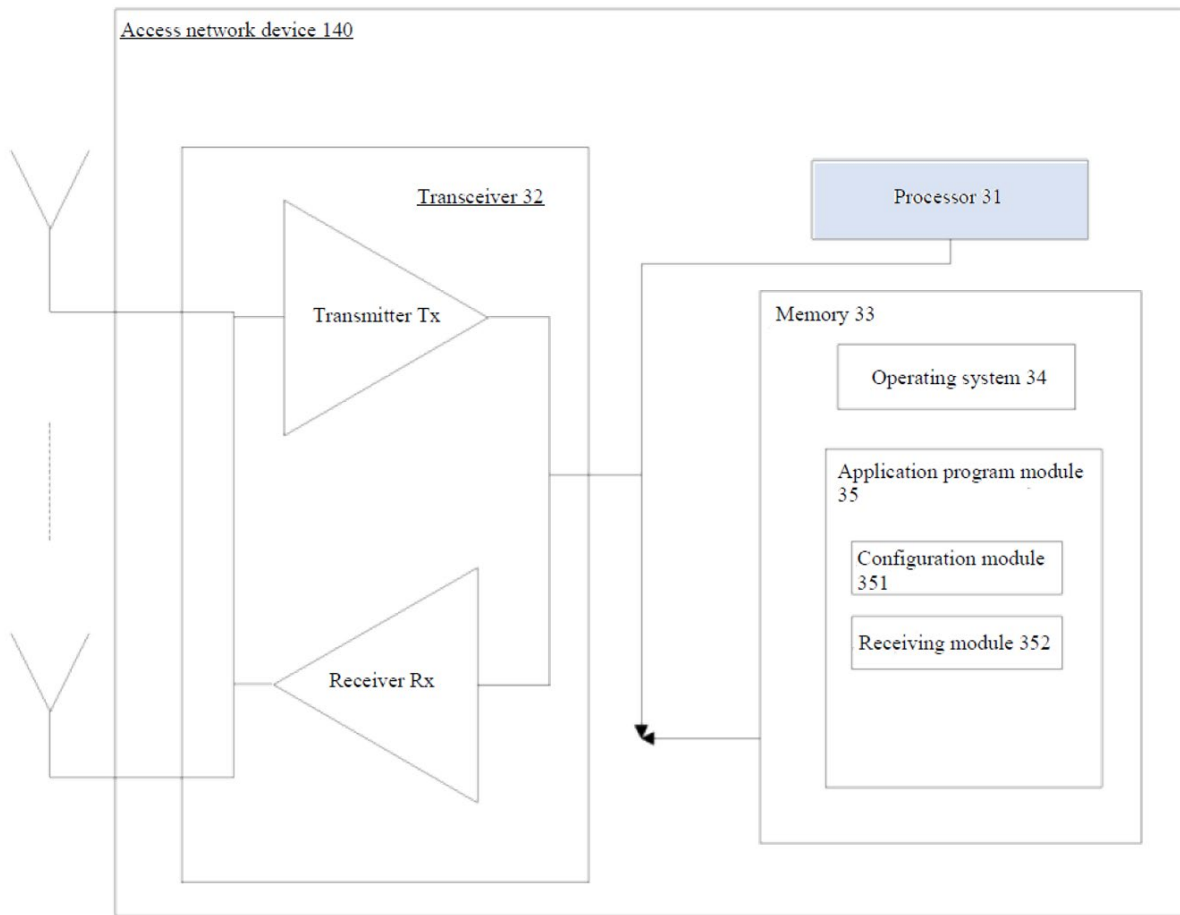
Ex. 1015, FIG. 3 (annotated) (Ex. 1017, FIG. 3)

FIG. 3

iii. [7.B1]

Han renders obvious [7.B1]. See §VII.C.2.iii; Ex. 1003, ¶¶616-620.

iv. [7.B2]

Han renders obvious [7.B2]. See §VII.C.2.iv; Ex. 1003, ¶¶621-623.

v. [7.C1]

Han renders obvious [7.C1]. *See* §VII.C.2.v; Ex. 1003, ¶¶624-631.

vi. [7.C2]

Han renders obvious [7.C2]. *See* §VII.C.2.vi; Ex. 1003, ¶¶632-640.

4. Claim 13

i. [13.PRE]

To the extent [13.PRE] is limiting, Han renders obvious [13.PRE]. Ex. 1003, ¶¶641-645. Han renders obvious transmitting and receiving data. *See* §VII.C.2.i. Ex. 1003, ¶¶643-645.

A POSITA would have understood that the claimed “apparatus” was a base station, and an eNB was an example of a base station. *See* §VII.A.4.i; Ex. 1001, 3:61-62, 4:13-21; Ex. 1003, ¶642. Han discloses an eNB or base station and therefore an apparatus. *Id.*

Han discloses a “communication system 100,” that includes “at least one access network device 140,” where an “access network device 140” “may be” “an eNB.” Ex. 1015, 22-24; Ex. 1017, 27-30; Ex. 1003, ¶¶643-644.

Ex. 1015, FIG. 1 (Ex. 1017, FIG. 1)

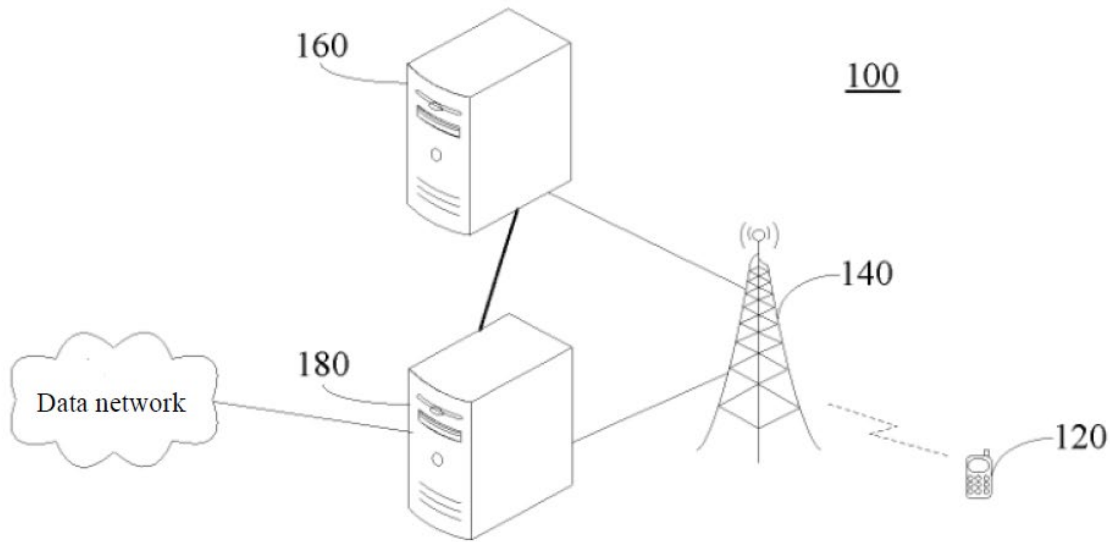


FIG. 1

ii. [13.A]

Han and TS 36.300 render obvious deciding whether to perform a handover. *See* §VII.C.2.ii. Ex. 1003, ¶¶651-659.

A POSITA would have understood that the claimed “controller” was a processor of a base station, which Han discloses. *See* VII.A.4.ii; Ex. 1001, 21:62-22:35, 3:61-4:4; Ex. 1003, ¶649.

Han discloses that the “access network device” or base station “includes a processor.” Ex. 1015, 25; Ex. 1017, 30; Ex. 1003, ¶650.

Ex. 1015, FIG. 3 (annotated) (Ex. 1017, FIG. 3)

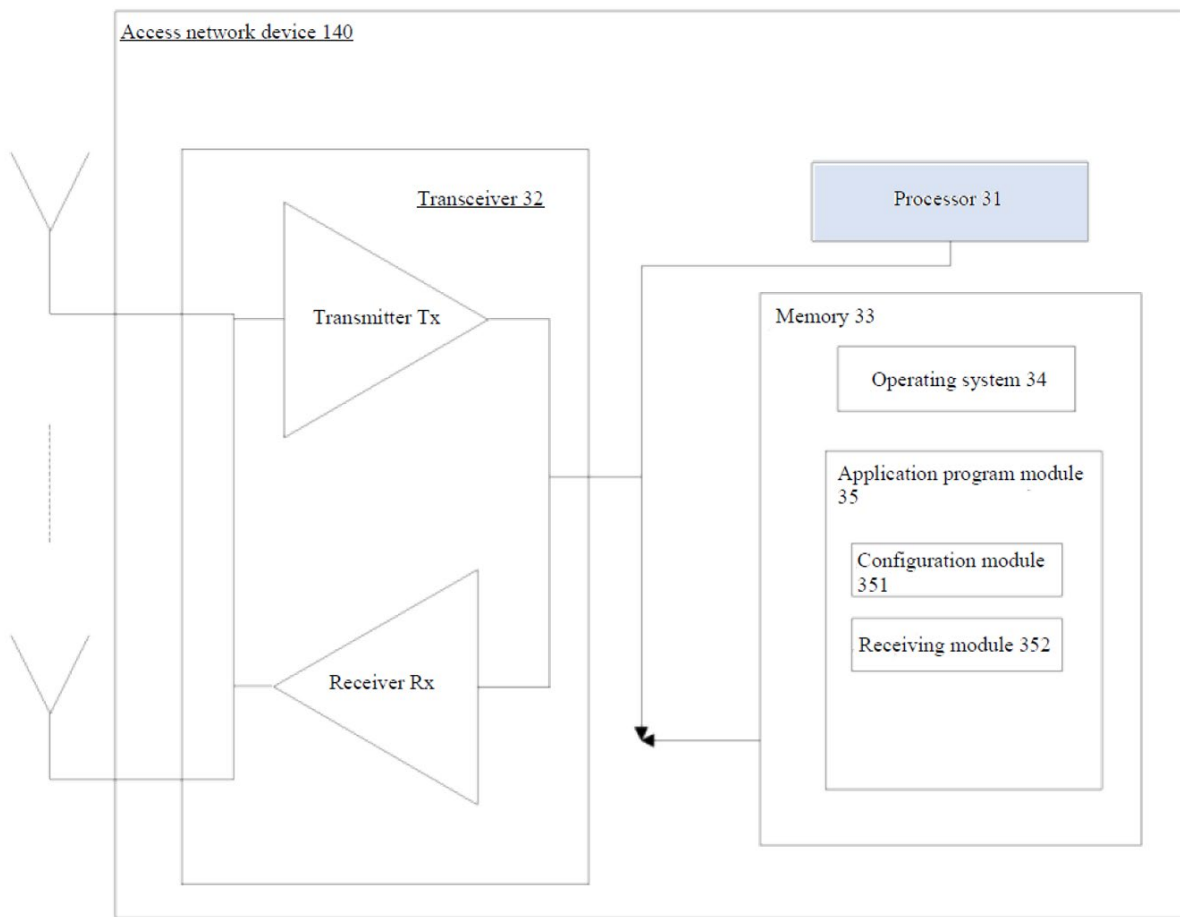


FIG. 3

iii. [13.B1]

Han renders obvious transmitting a handover request message when it is decided to perform the handover. *See* §VII.C.2.iii. Ex. 1003, ¶¶664-666.

A POSITA would have understood that the claimed “transmitter” was part of a base station and that a base station can be an eNB, which Han discloses. *See* VII.A.4.iii; Ex. 1001, 21:65-66, 22:20-21; Ex. 1003, ¶¶660-662.

Han discloses that a “access network device 140” or base station “includes a processor 31, a transceiver 32, and a memory 33,” where “transceiver 32 includes a receiver Rx and a transmitter Tx.” Ex. 1015, 27; Ex. 1017, 33; Ex. 1003, ¶663.

Ex. 1015, FIG. 3 (annotated) (Ex. 1017, FIG. 3)

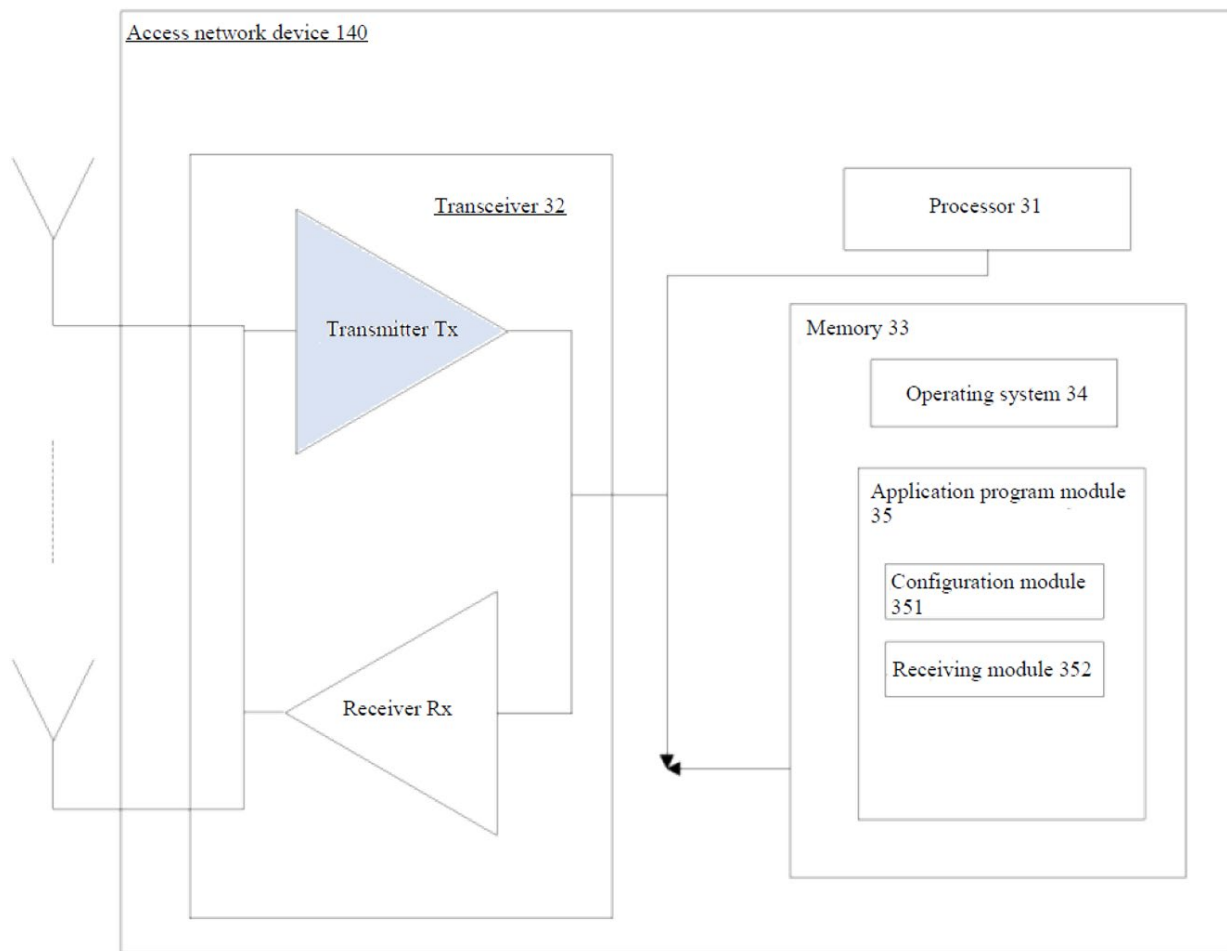


FIG. 3

iv. [13.B2]

Han renders obvious [13.B2]. See §VII.C.2.iv; Ex. 1003, ¶¶667-669.

v. [13.C1]

Han renders obvious [13.C1]. Ex. 1003, ¶¶670-679. Han renders obvious receiving a handover request confirmation message in response to the handover request message. *See* §VII.C.2.v; Ex. 1003, ¶¶674-679.

A POSITA would have understood that the claimed “receiver” was part of a base station, which Han discloses. *See* §VII.A.4.v; Ex. 1001, 21:65-66, 22:20-21; Ex. 1003, ¶¶671-672.

Han discloses that a “access network device 140” or base station “includes a processor 31, a transceiver 32, and a memory 33,” where “transceiver 32 includes a receiver Rx and a transmitter Tx.” Ex. 1015, 27; Ex. 1017, 33; Ex. 1003, ¶673.

Ex. 1015, FIG. 3 (annotated) (Ex. 1017, FIG. 3)

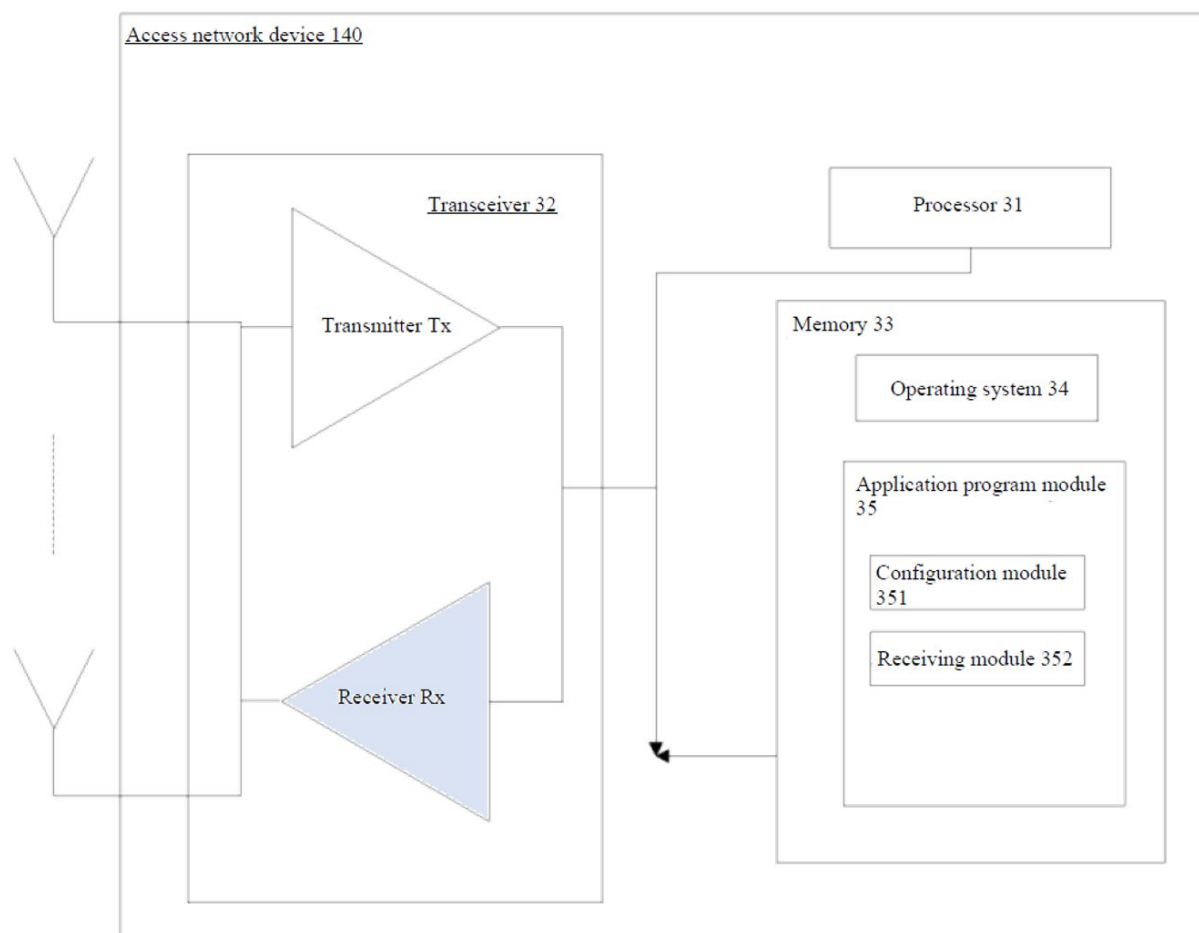


FIG. 3

vi. [13.C2]

Han renders obvious [13.C2]. See §VII.C.2.vi; Ex. 1003, ¶¶680-688.

D. Ground 4: Han, TS 36.300, and TR 38.801 render obvious Claims 2-6, 8-12, and 14-18

1. Ground 4

Han, TS 36.300, and TR 38.801 render obvious the dependent claims of the '631 Patent. Ex. 1003, ¶¶689-849. The Ground 3 analysis of independent claims 1, 7, and 13 is incorporated by reference herein.

i. Motivation to Combine Han, TS 36.300, and TR 38.801

A POSITA would have had several reasons to combine Han, TS 36.300, and TR 38.801. Ex. 1003, ¶¶690-703.

Han, TS 36.300, and TR 38.801 all relate to the field of radio access technology or communications, and are directed to technology for providing services to moving UEs. Ex. 1015, 3, 24; Ex. 1017, 10, 29; Ex. 1024, 1, 16; Ex. 1013, Cover, 6; Ex. 1001, 1:20-24; Ex. 1003, ¶691.

Han, TS 36.300, and TR 38.801 identify and provide a solution to the problem to be solved by the '631 Patent. *see* Ex. 1001, 1:51-55; Ex. 1003, ¶¶692-695. Han provides a “handover process” in which a “radio resource is configured according to pre-authorized QoS information,” which ensures “mobility performance of [a] terminal” when the terminal “is handed over between access network devices in a radio access network.” Ex. 1015, 44, 49; Ex. 1017, 50, 55; Ex. 1003, ¶692. TS 36.300 provides “Mobility Support for UEs” and “necessary steps” for “[h]andover procedures.” Ex. 1024, 90; Ex. 1003, ¶693. TR 38.801 explains key and necessary

principles for supporting network slicing, and specifically provides “support of Network Slicing in RAN” (a “Radio Access Network”). Ex. 1013, 23, 26; Ex. 1003, ¶¶694-695.

In view of Han’s explicit teaching of configuring a radio resource during a handover process based on pre-authorized QoS information and a desire to ensure mobility performance during handover, a POSITA would have looked to TS 36.300 to understand how the standard described such processes, and to TR 38.801, which discloses multiple options for supporting network slicing, for additional mechanisms for enabling mobility of UEs. Ex. 1003, ¶696. A POSITA would have been motivated to combine Han, TS 36.300, and TR 38.801 to provide the system of Han with details regarding standard handover procedures as taught by TS 36.300, and the additional option of using a core network node to notify a terminal of slice IDs it can access, as taught by TR 38.801, to enable differentiated handling of traffic for different network slices, selection of network slice by a slice ID provided by the UE, support for resource management and resource isolation between slices, and QoS differentiation within a slice. Ex. 1013, 28; Ex. 1003, ¶697.

A POSITA would have had a reasonable expectation of success in the combination of Han, TS 36.300, and TR 38.801 based on their explicit teachings, the knowledge of the POSITA, and the knowledge they all relate to LTE systems. Ex. 1003, ¶698.

A POSITA would have been motivated to utilize the handover-related disclosure of TS 36.300 for details regarding implementing UE handover based on QoS information with one of the multiple implementations of TR 38.801 for details regarding how to convey required network slice information from a terminal to a base station in Han, and/or to configure network slice information based on network slice request information to “enable[] support of multiple slices simultaneously supported by a UE” and/or to ensure differentiated handling of traffic for different network slices, selection of network slice by a slice ID provided by the UE, support for resource management and resource isolation between slices, and QoS differentiation within a slice, as disclosed by TR 38.801 Ex. 1013, 24, 28; Ex. 1003, ¶669.

Further, a POSITA would have had a reasonable expectation of success in the combination because the handover-related messages disclosed in Han, TS 36.300, and TR 38.801 were similar messages directed to similar goals, with different details, and because the POSITA would have been well aware of encapsulating an NAS message in an RRC message, and the use of the RRC sublayer for communication of NAS messages from a UE to a core network via a base station, as also taught by TR 38.801. Ex. 1003, ¶¶700, 702, 75-81.

Combining Han, TS 36.300, and TR 38.801 is additionally obvious because such a combination relies on known solutions to improve similar systems and

methods in the same way. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007). The POSITA would have understood that the networks, terminals, and base stations of Han, TS 36.300, and TR 38.801 were or included similar systems and/or devices and that the ability to (1) convey network slice information to an eNB by the core network, where the network slice information is configured based on network slice request information, and (2) convey network slice information from a terminal to a base station via an NAS message, or an NAS message encapsulated in an RRC message, was an improvement to the system of TR 38.801 and would therefore improve the similar system of Han and TS 36.300 in a similar way. Ex. 1003, ¶701.

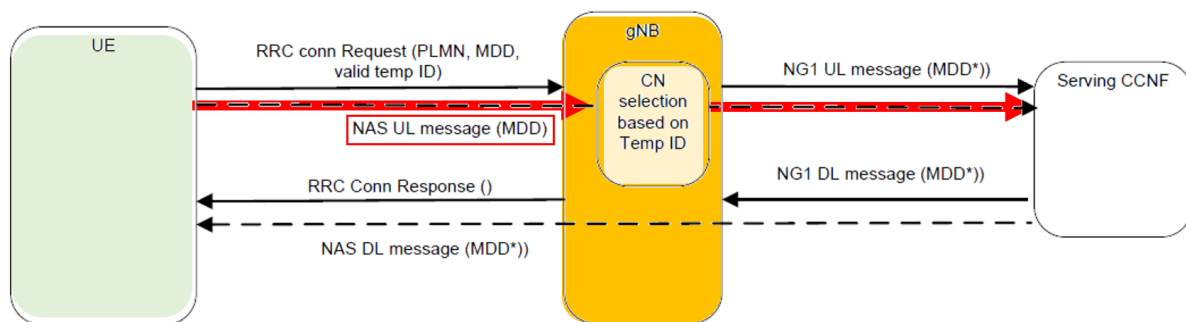
2. Claim 2

Han discloses “receiving, by [an] access network device, an access stratum AS message sent by [a] terminal,” or “user equipment,” “where the AS message includes a non-access stratum protocol data unit” or “NAS PDU,” and the “data packet for which no QoS parameter has been configured is carried in the NAS PDU.” Ex. 1015, 15; Ex. 1017, 23; Ex. 1003, ¶¶707-708. Han further discloses a non-access stratum (NAS) message that includes network slice request information. *See*, Ex. 1015, 28-31; Ex. 1017, 36-38; Ex. 1013, ¶708. It would have been obvious to a POSITA that Han’s message sent by the terminal to the access network device was an NAS message because Han explicitly describes the “message sent by the

terminal” including “a non-access stratum protocol data unit” or “NAS PDU.” Ex. 1015, 15; Ex. 1017, 23; Ex. 1003, ¶713.

TR 38.801 discloses receiving, by the source BS (“gnB,” orange) from a user equipment (“UE,” green), a non-access stratum (NAS) message (“NAS UL message,” red) including network slice request information (“MDD”). *See* §VII.B.2; Ex. 1013, 24-26; Ex. 1003, ¶¶709-711.

Ex. 1013, 25 (annotated)



A POSITA would have combined Han, TS 36.300, and TR 38.801 for at least the reasons in §VII.D.1.i. Ex. 1003, ¶¶715-717, ¶¶75-81; §VII.C.2.

3. *Claim 3*

Han discloses that a “core network control plane device sends first pre-authorized QoS information to a terminal, and sends second pre-authorized QoS information to a first access network device,” where the “second pre-authorized QoS

information may include content of [] first pre-authorized QoS information,” “the first pre-authorized QoS information may further include” “identification information of a network slice of a data packet group,” and “the pre-authorized QoS information (including the first pre-authorized QoS information and second pre-authorized QoS information in the following specification) is proactively ***configured by the core network control plane device.***” Ex. 1015, 5, 28, 31-37; Ex. 1017, 12, 36-43; Ex. 1003, ¶¶722-723.

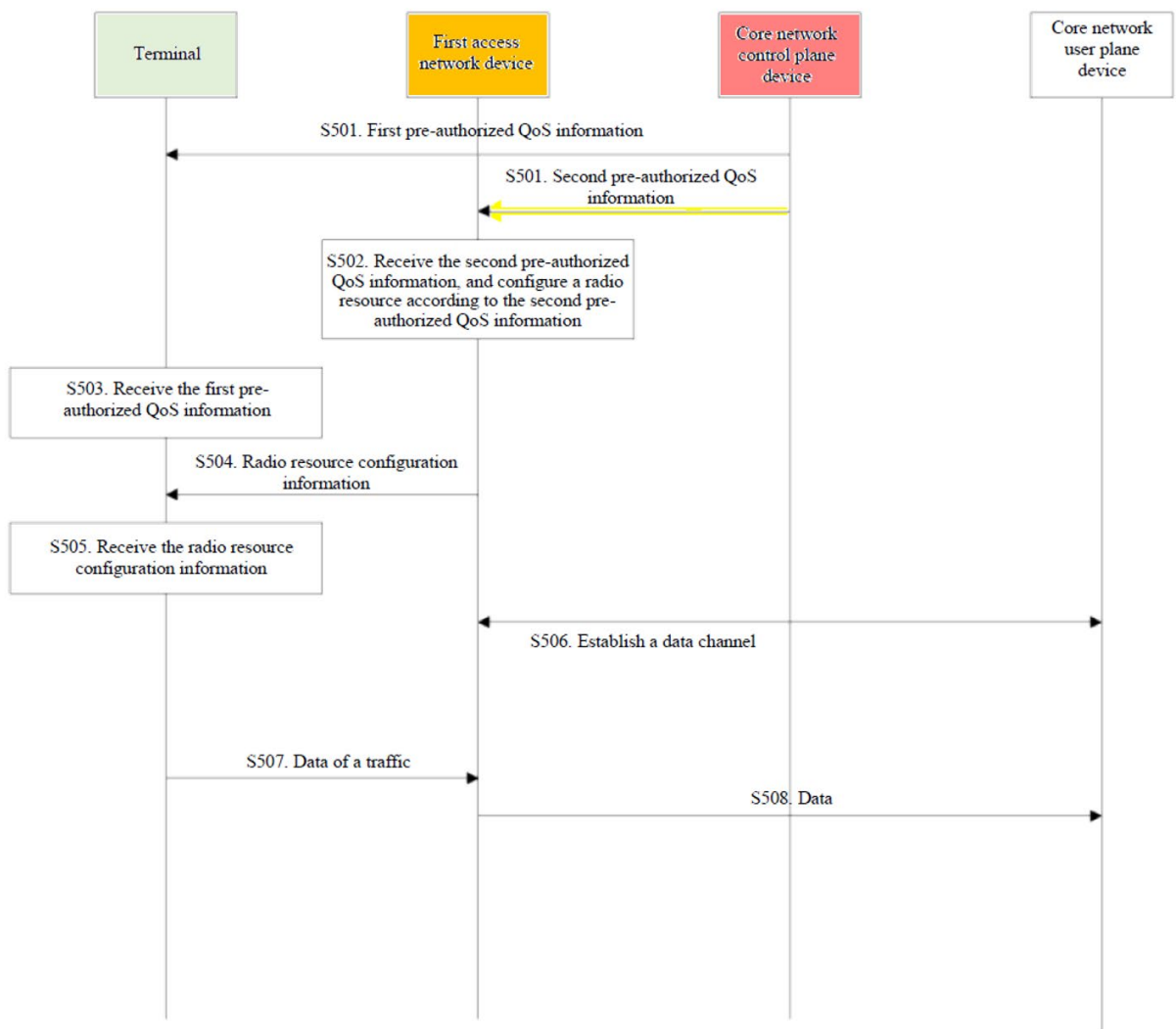
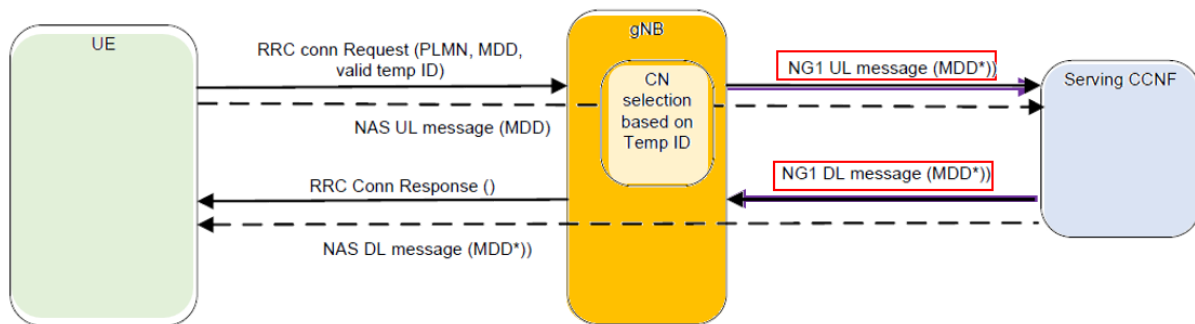
Ex. 1015, FIG. 5 (annotated) (Ex. 1017, FIG. 5)

FIG. 5

TR 38.801 discloses that the source BS (“gNB,” orange) receives from the core network entity (“Serving CCNF,” light blue) network slice information (“MDD*”), where the network slice information is configured by the network slice request information (“MDD”). *See* §VII.B.3; Ex. 1013, 25-26; Ex. 1003, ¶¶724-725.

Ex. 1013, 25 (annotated)



A POSITA would have combined Han, TS 36.300, and TR 38.801 for at least the reasons in §VII.D.1.i. Ex. 1003, ¶¶726-727.

4. Claim 4

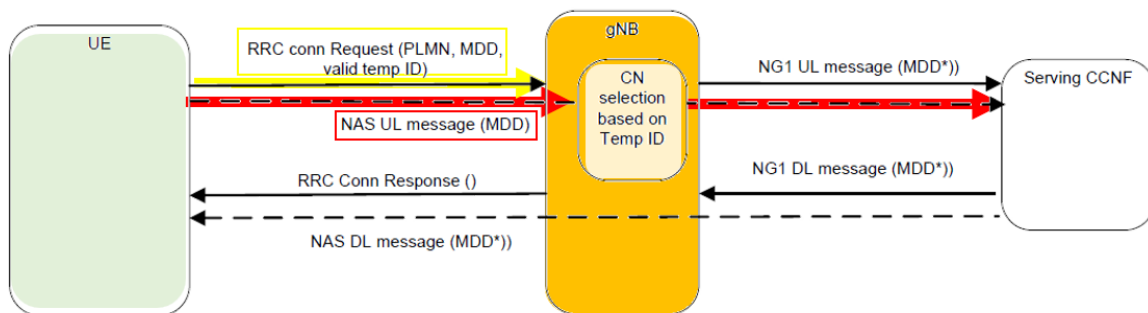
Han, TS 36.300, and TR 38.801 render obvious a “NAS message including the network slice request information.” See §VII.D.2. Ex. 1003, ¶¶728-730.

Han discloses a “terminal send[ing] an AS message” (or access stratum message) “to an access network device,” where the “AS message carries a NAS PDU” (or non-access stratum PDU). Ex. 1015, 58-60; Ex. 1017, 67-68; Ex. 1003, ¶732. Han discloses that the “AS message may be an RRC message.” *Id.*

TR 38.801 discloses a UE sending, to the gNB, an NAS message including the network slice request information (“NAS UL message (MDD)”), or network slice request information (MDD) included in an RRC message (“RRC conn Request,” yellow), where the MDD is used for slice awareness. Ex. 1013, 24-26; Ex. 1003, ¶¶733-735. A POSITA would have understood that the NAS message would

have been transmitted one of two ways – either on its own from the UE to the gNB, or encapsulated in an RRC message from the UE to the gNB. Ex. 1003, ¶736; §VII.B.4.

Ex. 1013, 25 (annotated)



A POSITA would have combined Han, TS 36.300, and TR 38.801 for at least the reasons in §VII.D.1.i. Ex. 1003, ¶¶737-738, ¶¶75-81.

5. *Claim 5*

Han discloses that a “core network control plane device sends first pre-authorized QoS information to a terminal, and sends second pre-authorized QoS information to a first access network device,” where the “second pre-authorized QoS information may include content of [] first pre-authorized QoS information,” “the first pre-authorized QoS information may further include” “identification information of a network slice of a data packet group,” and where “the pre-authorized QoS information (including the first pre-authorized QoS information and second pre-authorized QoS information in the following specification) is proactively

configured by the core network control plane device.” Ex. 1015, 5, 28, 31-33; Ex. 1017, 12, 36-37; Ex. 1003, ¶¶739-742.

Ex. 1015, FIG. 5 (annotated) (Ex. 1017, FIG. 5)

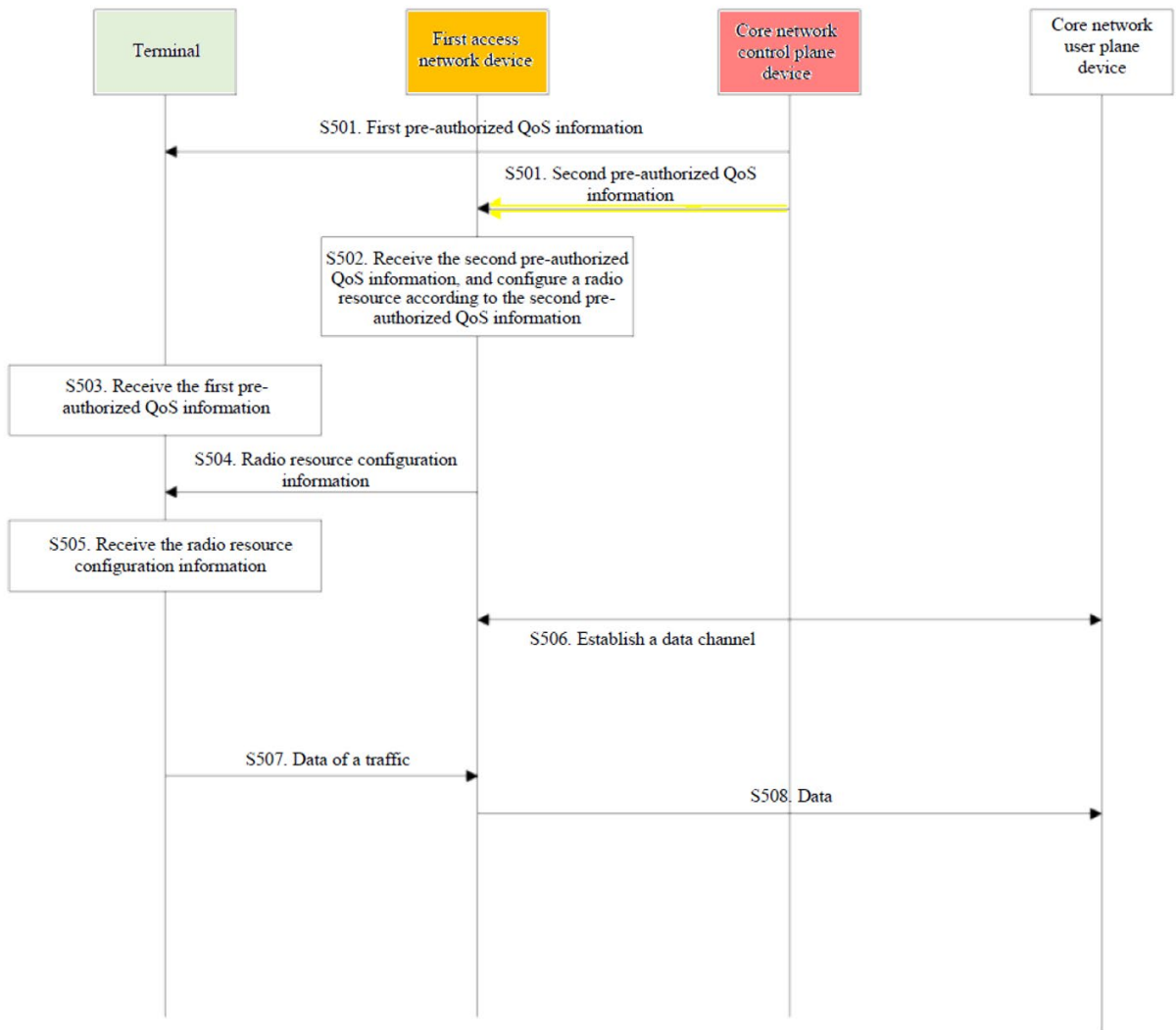
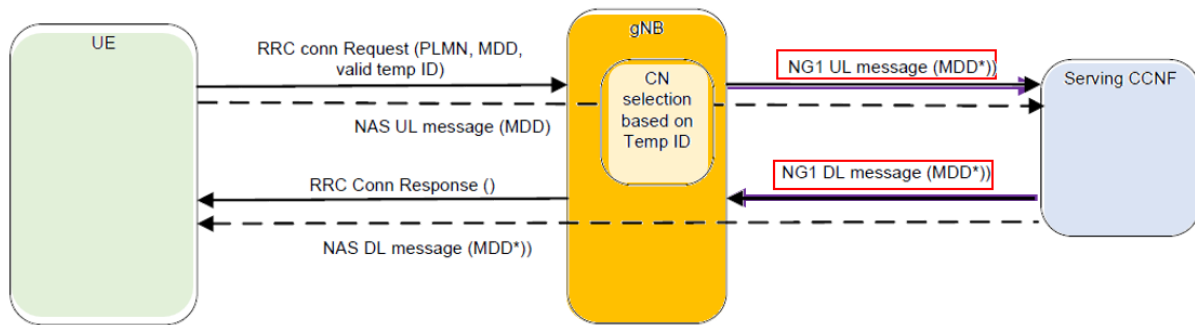


FIG. 5

TR 38.801 discloses that the source BS (“gNB,” orange) receives from the core network entity (“Serving CCNF,” light blue) network slice information (“MDD*”), where the network slice information is configured by the core network

entity based on the network slice request information (“MDD”). §VII.B.5; Ex. 1020, 61, 67; Ex. 1013, 25-26; Ex. 1003, ¶¶742-744.

Ex. 1013, 25 (annotated)



A POSITA would have combined Han, TS 36.300, and TR 38.801 for at least the reasons in §VII.D.1.i. Ex. 1003, ¶¶745-746.

6. Claim 6

A POSITA would have understood that the claimed “direct interface” meant that the handover request message was performed between the source and target base stations without the core network. *See* §VII.B.6; Ex. 1001, 19:6-34; Ex. 1003, ¶¶747-748.

Han discloses that “[a] handover process message between the first access network device and the second access network device may be sent and received through a direct interface between the first access network device and the second access network device (a handover process between peer entities).” Ex. 1015, 44;

Ex. 1017, 50; Ex. 1003, ¶749. A POSITA would have combined Han, TS 36.300, and TR 38.801 for at least the reasons in §VII.D.1.i. Ex. 1003, ¶¶750-751.

7. Claim 8

Ground 4 renders obvious [8]. *See* §§VII.C.3, VII.D.2; Ex. 1003, ¶¶752-766.

8. Claim 9

Ground 4 renders obvious [9]. *See* §§VII.D.3, VII.D.7; Ex. 1003, ¶¶767-775.

9. Claim 10

Ground 4 renders obvious [10]. *See* §§VII.D.4, VII.D.7; Ex. 1003, ¶¶776-787.

10. Claim 11

Ground 4 renders obvious [11]. *See* §§VII.D.5, VII.D.8; Ex. 1003, ¶¶788-795.

11. Claim 12

Ground 4 renders obvious [12]. *See* §§VII.D.6, VII.D.10; Ex. 1003, ¶¶796-800.

12. Claim 14

Ground 4 renders obvious [14]. *See* §§VII.D.2, VII.C.4; Ex. 1003, ¶¶801-815.

13. Claim 15

Ground 4 renders obvious [15]. *See* §§VII.D.3, VII.D.12; Ex. 1003, ¶¶816-824.

14. Claim 16

Ground 4 renders obvious [16]. *See* §§VII.D.4, VII.D.12. Ex. 1003, ¶¶825-836.

15. Claim 17

Ground 4 renders obvious [17]. *See* §§VII.D.5, VII.D.13; Ex. 1003, ¶¶837-844.

16. Claim 18

Ground 4 renders obvious [18]. *See* §§VII.D.6, VII.D.15; Ex. 1003, ¶¶845-849.

VIII. DISCRETIONARY ISSUES**A. The Petition Does Not Present the Same References Addressed in Prosecution**

Institution should not be denied under §325(d). Under *Advanced Bionics*, the Board uses a two-part framework in determining whether to exercise its discretion under §325(d), specifically:

(1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office; and

(2) if either condition of [the] first part of the framework is satisfied, whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims.

Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH, IPR2019-01469, Paper 6 at 8 (PTAB Feb. 13, 2020) (precedential). The Board has held that

the first prong of *Advanced Bionics* is not met where “neither [the combination references] nor similar prior art was before the examiner and ... the prosecution history does not include any overlapping arguments directed to this prior art.” *Godbersen-Smith Constr. Co. v. Guntert & Zimmerman Const. Div., Inc.*, IPR2021-00050, Paper 24 at 19-21 (PTAB May 7, 2021).

Under the first prong, R3-173152, TR 38.801, TS 36.300, and Han were never considered by the Examiner as they were not discussed during prosecution nor cited on the face of the '631 Patent. Indeed, R3-173152 and Han address the exact limitation the Examiner stated was missing in the prior art. *See Amphenol Corporation v. PPC Broadband, Inc.*, IPR2023-01363, Paper 9 at 30-31 (PTAB Mar. 20, 2024).

Accordingly, the combination of references used in this Petition cannot be cumulative of the art and/or arguments raised during prosecution as there are material differences between the grounds herein and what was previously presented. *Tianma Microelectronics Co., v. Japan Display Inc.*, IPR2021-01058, Paper 16 at 31 (PTAB Jan. 5, 2022); *Samsung Elecs. Co. v. Dodots Licensing Sols. LLC*, IPR2023-00756, Paper 9 at 21-22 (PTAB Oct. 11, 2023). Because the first prong is not met, the Board need not move to the second prong. *See id.* at 21; *Oticon Med. AB v. Cochlear Ltd.*, IPR2019-00975, Paper 15 at 20 (PTAB Oct. 16, 2019).

B. The Board Should Not Deny Institution Under *Fintiv*

The claims of the '631 Patent have never been tested in view of the most relevant prior art. In view of these strong and compelling challenges and the three separate district court proceedings, institution should not be discretionarily denied under §314(a). *See NHK Spring Co. v. Intri-Plex Techs., Inc.*, IPR2018-00752, Paper 8 at 19-20 (PTAB Sept. 12, 2018) (precedential); *Apple v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 13-14 (PTAB Mar. 20, 2020) (precedential) (“*Fintiv*”).

Factor 1—a potential stay of the district court litigation—weighs against discretionary denial. In the district court litigation, counterclaim defendant and patent owner KT Corporation (“KT”) has disputed jurisdiction. The parties are engaged in jurisdictional discovery, and KT is seeking a protective order from (or stay of) non-jurisdictional discovery. Ex. 1027. If granted, KT’s requested relief could extend the district court trial date, which “allays concerns about inefficiency and duplication of efforts” in the PTAB. *Fintiv* at 8.

Factor 2—the district court trial date and the Board’s statutory deadline—should be considered at least neutral because jury selection is far in the future and is not set to begin until at least September 8, 2025. Even if jury selection were to proceed on September 8, 2025, jury selection would proceed with respect to only one of the three cases (e.g., the Verizon case, the AT&T case, and the T-Mobile case, *see* §X.B *infra*). Each of the defendant Petitioners are entitled to separate trials,

which will necessarily proceed on separate dates. As such, there are explicit and inherent uncertainties with this case given the number of parties involved and the number of trials regarding this patent. In addition, and because much can change in eleven months, the current trial date does not support denial. *See Dish Network v. Broadband iTV*, IPR2020-01280, Paper 17 at 16 (PTAB Feb. 4, 2021 (“We cannot ignore the fact that the currently scheduled trial date is more than nine months away and much can change during this time”).⁶

Moreover, given the existence of three cases each with multiple parties, to include multiple intervenors, the likelihood that any trials will be scheduled serially, the potential length of the trials given the number of patents at issue (11) and claims at issue, and post-trial motions, it is likely that the district court proceedings will not be complete before the final written decision in this matter. Indeed, these cases additionally will likely be delayed because (as explained earlier) counterclaim defendant and patent owner KT has disputed jurisdiction and is seeking a protective order from (or stay of) non-jurisdictional discovery.

Altogether, this factor weighs against discretionary denial.

⁶ For these reasons, the “statistics on median time-to-trial for civil actions in the district court in which the parallel litigation resides” do not apply to this case given the number of cases and number of defendants.

Factor 3—investment in the district court proceedings—weighs against discretionary denial. The district court cases are in their early stages and the district court has not issued any substantive rulings in either case with respect to the '631 Patent. Specifically, infringement contentions were served on March 18, 2024, invalidity contentions were served on May 17, 2024, and the claim construction hearing is not scheduled until March 11, 2025. Ex. 1025, 1026. In fact, the parties have not yet exchanged claim terms for construction and will not do so until November 5. In addition, counter claim defendant and patent owner KT Corporation has not yet filed an answer, which will likely further delay progress on the merits.

Altogether, there is much work to be done in the district court and most, if not all, of the work will be well in the future. Accordingly, the district court will not invest significant resources related to the challenged patent prior to the issuance of an institution decision. *See Fintiv*, IPR2020-00019, Paper 11 at 9-12; *DISH Network*, IPR2020-01280, Paper 17 at 18-21.

Factor 4—overlap between this proceeding and the district court proceedings—favors institution. Indeed, there will not be complete overlap between this IPR and the district court cases because there are 18 claims asserted in this case and a total of 113 asserted in the related district court cases. The district court will likely reduce the asserted claims. This factor thus weighs against the Board exercising its discretion to deny.

Factor 5—overlapping parties—is neutral as it is “far from an unusual circumstance that a petitioner in *inter partes* review and a defendant in a parallel district court proceeding are the same.” *Sand Revolution*, IPR2019-01393, Paper 24 at 12-13.

The final *Fintiv* factor—other considerations—weighs strongly against discretionary denial. The merits of this Petition are strong and none of the grounds asserted herein were previously considered. *Cf. Comcast Cable Commn’s, LLC v. Rovi Guides, Inc.*, IPR2019-00231, Paper 14 at 11 (PTAB May 20, 2019) (obviousness challenges not “previously considered by the Office or any court” weigh in favor of not denying institution). Moreover, the ’631 Patent is currently asserted in three district court cases. Institution of this IPR provides the opportunity for narrowing and simplifying the litigations.

C. The Board Should Not Deny Institution Under *General Plastic*

The *General Plastic* factors do not apply because this is the first petition filed with respect to the ’631 Patent.

IX. CONCLUSION

Petitioners request cancellation of the Challenged Claims.

X. MANDATORY NOTICES UNDER 37 C.F.R. §42.8**A. Real Party in Interest Under 37 C.F.R. §42.8(b)(1)**

The real parties in interest are Celco Partnership d/b/a Verizon Wireless, Verizon Business Network Services LLC, Verizon Corporate Services Group Inc., TracFone Wireless, Inc., AT&T Corp., AT&T Services, Inc., AT&T Mobility LLC, AT&T Mobility II LLC, New Cingular Wireless PCS, LLC, Cricket Wireless LLC, T-Mobile USA, Inc., Sprint Solutions LLC, Sprint Spectrum LLC, Ericsson Inc., Telefonaktiebolaget LM Ericsson, and Nokia of America Corporation.

Out of an abundance of caution, Petitioners have identified all current defendants in the below cases, as well as additional involved parties, as potential real parties in interest only for the purpose of this proceeding and only to the extent that Patent Owner contends that these separate legal entities should be named real parties in interest in this IPR. Petitioners do so to avoid the potential expenditure of resources to resolve such a challenge. Petitioners also acknowledge that each petitioner has a number of affiliates. No unnamed entity is funding, controlling, or otherwise has an opportunity to control or direct this Petition or Petitioners' participation in any resulting IPR. Petitioners are also not aware of any affiliate that would be barred from filing this Petition under 35 U.S.C. § 315(e).

B. Related Matters Under 37 C.F.R. §42.8(b)(2)

The '631 Patent is the subject of the following litigation:

- *Pegasus Wireless Innovation LLC. v. AT&T Inc. et al.*, No. 2:23-cv-00638 (E.D. Tex) (hereafter, “AT&T Case”);
- *Pegasus Wireless Innovation LLC. v. T-Mobile US, Inc. et al.*, No. 2:23-cv-00639 (E.D. Tex) (hereafter, “T-Mobile Case”); and
- *Pegasus Wireless Innovation LLC. v. Verizon Communications Inc. et al.*, No. 2:23-cv-00640 (E.D. Tex) (hereafter, “Verizon Case”).

The above cases, which include defendants AT&T, T-Mobile, and Verizon and intervenors Nokia and Ericsson, have been consolidated into the Verizon Case for all pretrial issues. Ex. 1026. Petitioners are not aware of any other judicial or administrative matter that would affect or be affected by a decision in this IPR.

C. Designation of Counsel Under 37 C.F.R. §42.8(b)(3)

Petitioners provide the following designation of counsel.

Lead Counsel	Backup Counsel
Christopher TL Douglas Reg. No. 56,950 ALSTON & BIRD LLP Vantage South End 1120 S. Tryon Street, Suite 300 Charlotte, NC 28203 Phone: 704.444.1119 Fax: 704.444.1799 Email: christopher.douglas@alston.com	Ross R. Barton Reg. No. 51,438 S. Benjamin Pleune Reg. No. 52,421 J. Ravindra Fernando Reg. No. 73,762 ALSTON & BIRD LLP Vantage South End 1120 South Tryon Street, Suite 300 Charlotte, NC 28203-6818 Phone: 704.444.1000 Fax: 704.444.1111 Email: ross.barton@alston.com

	Email: ben.pleune@alston.com Email: ravi.fernando@alston.com David S. Frist Reg. No. 60,511 ALSTON & BIRD LLP One Atlantic Center 1201 West Peachtree Street, Suite 4900 Atlanta, GA 30309-3424 Phone: 404.881.7000 Fax: 404.881.7777 Email: david.frist@alston.com Dana Zottola Reg. No. 65,942 ALSTON & BIRD LLP 55 Second Street, Suite 2100 San Francisco, CA 94105 Phone: 415.243.1000 Fax: 415.243.1001 Email: dana.zottola@alston.com Jason E. Spotts (<i>pro hac vice</i>) ALSTON & BIRD LLP Chase Tower 2200 Ross Avenue, Suite 2300 Dallas, TX 75201 Phone: 214.922.3400 Fax: 214.922.3899 Email: jason.spotts@alston.com
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Pursuant to 37 C.F.R. § 42.8(b)(4), counsel agrees to service by mail as detailed above, and to electronic service by email at the following addresses:

christopher.douglas@alston.com, ross.barton@alston.com,
ben.pleune@alston.com, ravi.fernando@alston.com, david.frist@alston.com,

dana.zottola@alston.com, jason.spotts@alston.com, Pegasus-IPRs@alston.com.

Pursuant to 37 C.F.R. §42.10(b), a Power of Attorney executed by Petitioners accompanies this Petition.

D. Service Information

Please address all correspondence and service to the addresses listed above.

Petitioners consent to electronic service at the addresses above.

Date: October 21, 2024

By: / Christopher TL Douglas /

Christopher TL Douglas

Reg. No. 56,950

ALSTON & BIRD LLP

Vantage South End

1120 S. Tryon Street, Suite 300

Charlotte, NC 28203

Phone: 704.444.1119

Fax: 704.444.1799

Email:christopher.douglas@alston.com

CLAIMS APPENDIX

Claim	Recitation
[1.PRE]	A method for transmitting and receiving data, the method comprising:
[1.A]	deciding, by a source base station (BS), whether to perform a handover;
[1.B1]	transmitting, from the source BS to a target BS, a handover request message when it is decided to perform the handover,
[1.B2]	wherein the handover request message includes network slice information; and
[1.C1]	receiving, by the source BS from the target BS, a handover request confirmation message in response to the handover request message,
[1.C2]	wherein, if one or more protocol data unit (PDU) sessions are associated with one or more network slices that are not supported by the target BS, the handover request confirmation message includes information for indicating a rejection of the one or more PDU sessions by the target BS.
[2]	The method according to claim 1, further comprising: receiving, by the source BS from a user equipment (UE), a non-access stratum (NAS) message including network slice request information.
[3]	The method according to claim 2, further comprising: receiving, by the source BS from a core network entity, the network slice information, wherein the network slice information is configured by the network slice request information.
[4]	The method according to claim 2, wherein the NAS message including the network slice request information is included in a radio resource control (RRC) connection setup completion message.
[5]	The method according to claim 3, wherein the network slice information is configured by the core network entity based on the network slice request information.
[6]	The method according to claim 5, wherein the transmission of the handover request message is performed through a direct interface associated with the target base station.
[7.PRE]	A controller for transmitting and receiving data, the controller comprising:
[7.A]	a processor performs: to decide whether to perform a handover,
[7.B1]	to transmit a handover request message when it is decided to perform the handover,

Claim	Recitation
[7.B2]	wherein the handover request message includes network slice information; and
[7.C1]	to receive a handover request confirmation message in response to the handover request message,
[7.C2]	wherein, if one or more protocol data unit (PDU) sessions are associated with one or more network slices that are not supported by a target BS, the handover request confirmation message includes information for indicating a rejection of the one or more PDU sessions by the target BS.
[8]	The controller according to claim 7, wherein the processor further performs to receive a non-access stratum (NAS) message including network slice request information.
[9]	The controller according to claim 8, wherein the processor further performs to receive the network slice information from a core network, wherein the network slice information is configured by the network slice request information.
[10]	The controller according to claim 8, wherein the NAS message including the network slice request information is included in a radio resource control (RRC) connection setup completion message.
[11]	The controller according to claim 9, wherein the network slice information is configured by the core network entity based on the network slice request information.
[12]	The controller according to claim 11, wherein the transmission of the handover request message is performed through a direct interface associated with the target base station.
[13.PRE]	An apparatus for transmitting and receiving data, the apparatus comprising:
[13.A]	a controller configured to decide whether to perform a handover,
[13.B1]	a transmitter configured to transmit a handover request message when it is decided to perform the handover,
[13.B2]	wherein the handover request message includes network slice information; and
[13.C1]	a receiver configured to receive a handover request confirmation message in response to the handover request message,
[13.C2]	wherein, if one or more protocol data unit (PDU) sessions are associated with one or more network slices that are not supported by a target BS, the handover request confirmation message includes

Claim	Recitation
	information for indicating a rejection of the one or more PDU sessions by the target BS.
[14]	The apparatus according to claim 13, wherein the processor further performs to receive a non-access stratum (NAS) message including network slice request information.
[15]	The apparatus according to claim 14, wherein the processor further performs to receive the network slice information from a core network, wherein the network slice information is configured by the network slice request information.
[16]	The apparatus according to claim 14, wherein the NAS message including the network slice request information is included in a radio resource control (RRC) connection setup completion message.
[17]	The apparatus according to claim 15, wherein the network slice information is configured by the core network entity based on the network slice request information.
[18]	The apparatus according to claim 17, wherein the transmission of the handover request message is performed through a direct interface associated with the target base station.

CERTIFICATION UNDER 37 C.F.R. §42.24

Petitioners certify that the word count in this Petition is 13,995 words, as counted by the word-processing program (Microsoft Word for Office 365) used to generate this Petition, where such word count excludes the table of contents, table of authorities, mandatory notices, certificate of service, appendix of exhibits, and this certificate of word count. This Petition is in compliance with the 14,000-word limit set in 37 C.F.R. § 42.24(a)(1)(i).

Date: October 21, 2024

By: / Christopher TL Douglas /

Christopher TL Douglas

Reg. No. 56,950

ALSTON & BIRD LLP

Vantage South End

1120 S. Tryon Street, Suite 300

Charlotte, NC 28203

Phone: 704.444.1119

Fax: 704.444.1799

Email:christopher.douglas@alston.com

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§42.6(e), 42.105 and in view of the agreement between the Parties under 37 C.F.R. § 42.105(b), the undersigned hereby certifies that true and correct copies of the above-captioned PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO. 11,627,631, all associated exhibits, and Petitioners' Power of Attorney were served in their entireties on October 21, 2024, upon the Patent Owner at the following addresses via UPS Next Day:

Insight Law Group, PLLC
8287 Spring Leaf Ct.
Vienna, VA 22182
UNITED STATES

Service copies are also being sent via email to litigation counsel of record:

Max Tribble

mtribble@susmangodfrey.com

Joseph Grinstein

jgrinstein@susmangodfrey.com

Corey Lipschutz

clipschutz@susmangodfrey.com

Richard Wojtczak

rwojtczak@susmangodfrey.com

Susman Godfrey LLP

1000 Louisiana Ste 5100

Houston, TX 77002

(713) 651-9366

(713) 654-6666

Kalpana Srinivasan

ksrinivasan@susmangodfrey.com

Jordan Rux

jrux@susmangodfrey.com

Susman Godfrey LLP
1900 Avenue of the Stars Ste 1400
Los Angeles, CA 90067
(310) 789-3100
(310) 789-3150

Andrea Fair
andrea@wsfirm.com
Ward, Smith & Hill, PLLC
1507 Bill Owens Parkway
Longview, TX 75604
(903) 757-6400
(903) 757-2323

KTCorpTT@hpcellp.com
Heim Payne & Chorush LLP
609 Main Street Ste 3200
Houston, TX 77002
(713) 221-2000

Date: October 21, 2024

By: / Christopher TL Douglas /
Christopher TL Douglas
Reg. No. 56,950
ALSTON & BIRD LLP
Vantage South End
1120 S. Tryon Street, Suite 300
Charlotte, NC 28203
Phone: 704.444.1119
Fax: 704.444.1799
Email: christopher.douglas@alston.com