

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ONEPLUS TECHNOLOGY (SHENZHEN) CO., LTD.

Petitioner

v.

PANTECH CORPORATION

Patent Owner

IPR2025-00887

U.S. PATENT 8,995,372

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT 8,995,372

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LIST OF EXHIBITS

Exhibit	Description
EX1001	U.S. Patent No. 8,995,372 to Kwon <i>et al.</i> (“the ’372 Patent”)
EX1002	Prosecution History of U.S. Patent No. 8,995,372 (“File History”)
EX1003	Declaration of Dr. Robert Akl (“Akl Decl.”)
EX1004	U.S. Patent Application Publication No. 2011/0158116 in the name of Tenny <i>et al.</i> (“Tenny ’116”)
EX1005	U.S. Provisional Application No. 61/218,769 in the name of Tenny <i>et al.</i> (“Tenny-Prov”)
EX1006	“R2-100110, Multiple Timing Advance Impact on RAN2, Huawei (3GPP TSG-RAN WG2 Meeting #68bis),” Valencia, SP, Jan 18–22, 2010 (“Huawei”)
EX1007	U.S. Patent Application Publication No. 2010/0303039 in the name of Zhang <i>et al.</i> (“Zhang”)
EX1008	U.S. Patent No. 9,426,765 in the name of Wang <i>et al.</i> (“Wang ’765”)
EX1009	U.S. Provisional Application No. 61/293,871 in the name of Wang <i>et al.</i> (“Wang-Prov”)
EX1010	“R2-100372, RACH and carrier aggregation, Nokia (3GPP TSG-RAN WG2 Meeting #68bis),” Valencia, SP, Jan 18–22, 2010 (“Nokia”)
EX1011	Declaration of Friedhelm Rodermund (“Rodermund Decl.”)
EX1012	Joint Claim Construction and Prehearing Statement (Dkt. 49) of <i>Pantech Corporation et al. v. Oneplus Technology (Shenzhen) Co., Ltd.</i> , 5:24-cv-00038-RWS-JBB (E.D. Tex. Mar. 26, 2025)
EX1013	First Amended Docket Control Order (Dkt. 47) of <i>Pantech Corporation et al. v. Oneplus Technology (Shenzhen) Co., Ltd.</i> , 5:24-cv-00038-RWS-JBB (E.D. Tex. Mar. 12, 2025)
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EX1015	“R2-100054, Primary Component Carrier, Nokia (3GPP TSG-RAN WG2 Meeting #68bis),” Valencia, SP, Jan 18–22, 2010
EX1016	“3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA) Medium Access Control (MAC) Protocol Specification (Release 8),” 3GPP TS 36.321 V8.8.0 (2009-12) (“TS36321-V880”)
EX1017	“3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access

Exhibit	Description
	(E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall Description; Stage 2 (Release 9),” 3GPP TS 36.300 V9.2.0 (2009-12) (“TS36300-V920”)
EX1018	E. Dahlman <i>et al.</i> , “3G Evolution: HSPA and LTE for Mobile Broadband,” 1st ed. Elsevier, 2007 (“Dahlman”)
EX1019	“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 10),” 3GPP TS 36.300 V10.0.0 (2010-06) (“TS36300-Va00”)

All citations to 35 U.S.C. § 103 in this paper refer to the Pre-AIA statutes.

All emphases in quotations are added unless otherwise noted.

Direct quotations of claim language are italicized.

This paper includes color illustrations and should be viewed in color.

I. INTRODUCTION

OnePlus Technology (Shenzhen) Co., Ltd. (“Petitioner”) petitions for *inter partes* review (“IPR”) of claims 1-4, 7-11, and 14 (“challenged claims”) of U.S. Patent No. 8,995,372 (“’372 patent,” EX1001) assigned to Pantech Corporation (“Patent Owner”).

The challenged claims recite the well-known random access procedure in multicarrier wireless communication, in particular, updating a timing advance (TA) value of a timing group of multiple component carriers (CCs) via a delegate CC representative of the CCs in the timing group. Each and every purported patentable feature of the challenged claims was disclosed by references that predate the earliest possible priority date of the ’372 patent. For example, the uplink (UL) timing group configuration, the TA value acquirement, and the TA value update are disclosed by US2011/0158116 and its provisional (collectively, “Tenny,” EX1004 and EX1005); the delegate CC setting is disclosed by 3GPP TSG-RAN WG2 proposal R2-100110 (“Huawei,” EX1006); and the timing group reconfiguration is disclosed by US2010/0303039 (“Zhang,” EX1007).

Petitioner’s expert, Dr. Robert Akl, who has over three decades of experience in wireless telecommunication, confirms that the challenged claims are unpatentable over these references, as well as others prior to the ’372 patent.

Petitioner thus respectfully requests the Board cancel the challenged claims.

II. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8

A. Real Party-in-Interest

The real parties-in-interest are OnePlus Technology (Shenzhen) Co., Ltd. and Guangdong OPPO Mobile Telecommunications Corp., Ltd.

B. Related Matters

The '372 patent is asserted in *Pantech Corp. et al. v. OnePlus Tech. (Shenzhen) Co., Ltd.*, No. 5:24-cv-00038-RWS-JBB (E.D. Tex.) (“EDTX case”).

C. Lead and Back-up Counsel and Service Information

Petitioner identifies the following lead and back-up counsels:

Lead Counsel	Back-up Counsel
Zhiwei (Wayne) Zou (Reg. No. 66,041) wayne.zou@bayes.law Bayes PLLC 8260 Greensboro Drive, Suite 625 McLean, VA 22102 Tel: 703-995-9887 Fax: 703-821-8128	Wenchong Shu (Reg. No. 73,999) wenchong.shu@bayes.law Bayes PLLC 8260 Greensboro Drive, Suite 625 McLean, VA 22102 Tel: 703-995-9887 Fax: 703-821-8128 Zhe (Philip) Wang (<i>Pro Hac Vice to be filed</i>) philip.wang@bayes.law Bayes PLLC 8260 Greensboro Drive, Suite 625 McLean, VA 22102 Tel: 703-995-9887 Fax: 703-821-8128

Petitioner consents to electronic service at OnePlus-Pantech-IPR@bayes.law, as well as the above email addresses.

III. CERTIFICATION OF GROUNDS FOR STANDING

Petitioner certifies under 37 C.F.R. § 42.104(a) that the '372 patent is available for IPR, and Petitioner is not barred or estopped from requesting IPR challenging the patent claims on the grounds identified in this Petition.

IV. RELIEF REQUESTED

A. Claims for Which Review Is Requested

Petitioner requests IPR and cancellation of challenged claims 1-4, 7-11, and 14 of the '372 patent under 35 U.S.C. § 311 based on the following grounds. This Petition is supported by the Declaration of Dr. Robert Akl ("Akl Decl.," EX1003) and the Declaration of Friedhelm Rodermund ("Rodermund Decl.," EX1011).

B. Specific Art on Which the Challenge Is Based

Petitioner relies on the following prior art:

EX.	Reference	Relevant Date	Prior Art Under At Least
1004	US2011/0158116 (“Tenny ’116”)	6/19/2009 ¹	§ 102(e)
1006	R2-100110 (“Huawei”)	1/12/2010	§ 102(a)
1007	US2010/0303039 (“Zhang”)	3/12/2010	§ 102(e)
1008	US9,426,765 (“Wang”)	1/11/2010 ²	§ 102(e)
1010	R2-100372 (“Nokia”)	1/12/2010	§ 102(a)

Table 1

(1) Tenny ’116 (EX1004) is entitled to the priority date of Tenny-Prov (EX1005), because (i) at least claims 1 and 53 of Tenny ’116 are supported by disclosures from Tenny-Prov, as set forth in Table 2 below, and (ii) Tenny-Prov provides written description for the specific disclosures in Tenny ’116 that are

¹ As discussed in Section V.B, *infra*, the ’372 patent may be entitled to a priority date no earlier than March 29, 2011. Thus, Tenny ’116 (EX1004) qualifies as prior art under 35 U.S.C. § 102(e) based on its filing date of June 17, 2010. In case the Board determines that the ’372 patent is entitled to the priority date of March 29, 2010, the filing date of its Korean priority application, Petitioner relies on the filing date of Tenny-Prov (EX1005), June 19, 2009, as its 102(e) prior art date against the ’372 patent, because Tenny ’116 is entitled to the priority date of Tenny-Prov, as explained in this section, *infra*. Tenny ’116 and Tenny-Prov are collectively referred to as “Tenny” herein. Tenny ’116 expressly incorporated the entire disclosure of Tenny-Prov by reference. EX1004, ¶1.

² As discussed in Section IV.B, *infra*, the ’372 patent may be entitled to a priority date no earlier than March 29, 2011. Thus, Wang ’765 (EX1008) qualifies as prior art under 35 U.S.C. § 102(e) based on its filing date of January 10, 2011. In case the Board determines that the ’372 patent is entitled to the priority date of March 29, 2010, the filing date of its Korean priority application, Petitioner relies on the filing date of Wang-Prov (EX1009), January 11, 2010, as its 102(e) prior art date against the ’372 patent, because Wang ’765 is entitled to the priority date of Wang-Prov, as explained in this section, *infra*. Wang ’765 and Wang-Prov are collectively referred to as “Wang” herein. Wang ’765 expressly incorporated the entire disclosure of Wang-Prov by reference. EX1008, 1:8-12.

identified and relied on in Grounds 1-4 of this Petition, as discussed in Sections VII-X, *infra*. *In re Riggs*, 131 F.4th 1377, 1384 (Fed. Cir. 2025) (citing, *inter alia*, *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1382 (Fed. Cir. 2015)); EX1003, ¶74, Table A.

Tenny '116 Claims 1 and 53	Exemplary Disclosures from Tenny-Prov
[1.pre] A method that facilitates a timing alignment in a multicarrier system, the method comprising:	Appx. A (claim 1, 1:1-23), ¶¶34, 39, Figs. 3-4.
[1.a] determining at least one downlink timing associated with at least one downlink carrier;	Appx. A (Figs. 2-3, 3:19-4:13); ¶¶34, 37, claims 1, 7, 16.
[1.b] ascertaining an uplink timing associated with an uplink group of carriers, wherein the uplink timing is ascertained based on a processing of at least one downlink timing and a timing offset associated with the uplink group of carriers; and	Appx. A (3:19-4:13, Figs. 2-3); ¶¶33-34, 36, claims 1, 5.
[1.c] transmitting each of the uplink group of carriers within a threshold value of the uplink timing.	<i>See</i> [1.b]; <i>see also</i> Appx. A (1:17-21; 2:18-22, 3:19-4:13, Figs. 2-3, claim 1); ¶¶33-35, 37, 39, 40, claims 5, 14, 23, 32.
[53.pre] A method that facilitates a timing alignment in a multicarrier system, the method comprising:	<i>See</i> [1.pre].
[53.a] transmitting a downlink communication to a wireless terminal via at least one downlink carrier;	<i>See</i> [1.a]; <i>see also</i> ¶¶16, 33, 34, claim 1, Appx. A (3:19-4:13, Figs. 2-3).

[53.b] assigning a timing offset to an uplink group of carriers;	¶¶16, 33, 34, 36-40, claims 1, 8, 9, Appx. A (3:26-4:13, Figs. 2-3).
[53.c] providing the timing offset to the wireless terminal via the at least one downlink carrier; and	See [53.a]-[53.b]; <i>see also</i> ¶¶16, 33, 34, 36-40, claims 1, 8, 9, Appx. A (3:26-4:13, Figs. 2-3).
[53.d] receiving an uplink communication via the uplink group of carriers, wherein the uplink group of carriers are received according to the timing offset.	See [53.b]-[53.c], [1.a]-[1.b]; <i>see also</i> ¶¶13, 16, 33, 35, 39, Fig. 1; Appx. A (1:1-14, 3:26-4:13, Figs. 2-3).

Table 2 (EX1003 – Table A)

(2) Huawei (EX1006) is a proposal submitted by Huawei to the 3GPP Technical Specification Group (TSG) Radio Access Network (RAN) Working Group 2 (WG2). EX1006, 1; EX1011, ¶¶66-67. Huawei was published and freely available on 3GPP's File Transfer Protocol (FTP) server no later than January 12, 2010. EX1011, ¶¶69-76.

(3) Zhang (EX1007), filed on March 12, 2010 and published on December 2, 2010, is prior art at least under 35 U.S.C. § 102(a) if the '372 patent is not entitled to the foreign priority date of March 29, 2010, or under 35 U.S.C. § 102(e) if the '372 patent is entitled to the priority date above.

(4) Wang '765 (EX1008) is entitled to the priority date of Wang-Prov (EX1009), because (i) at least claims 1, 9, and 10 of Wang '765 are supported by disclosures from Wang-Prov, as set forth in Table 3 below, and (ii) Wang-Prov

provides written description for the specific disclosures in Wang '765 that are identified and relied on in Ground 3 of this Petition, as discussed in Section IX, *infra*.

In re Riggs, at 1384; EX1003, ¶92.

Wang '765 Claim 1	Exemplary Disclosures from Wang-Prov
[1.pre] A method of handling uplink synchronization for a mobile device capable of receiving and transmitting on a plurality of component carriers in a wireless communication system, the method comprising:	p. 1 (Title; Introduction); pp. 26-28 (Title; Introduction; Background)
[1.a] performing a first random access procedure on a first component carrier of the plurality of component carriers to establish uplink synchronization on the first component carrier; and	pp. 5-6 (<i>e.g.</i> , Exemplary embodiment #2-1, Steps 1-3); pp. 39-40 (Embodiment #2-1, and Procedure for the Embodiment #2-1)
[1.b] performing a second random access procedure on at least a component carrier of the plurality of component carriers to establish uplink synchronization on the at least a component carrier, which comprises:	pp. 5-6 (<i>e.g.</i> , Exemplary embodiment #2-1, Steps 4-5); pp. 39-40 (Embodiment #2-1, and Procedure for the Embodiment #2-1)
[1.c] receiving at least a random access preamble assigned by a network of the wireless communication system for the at least a component carrier;	pp. 5-6 (<i>e.g.</i> , Exemplary embodiment #2-1, Step 4); pp. 39-40 (Embodiment #2-1, and Procedure for the Embodiment #2-1)
[1.d] sending at least a random access preamble message	pp. 5-6 (<i>e.g.</i> , Exemplary embodiment #2-1, Step 5);

including the at least a random access preamble to the network; and	pp. 39-40 (Embodiment #2-1, and Procedure for the Embodiment #2-1)
[1.e] receiving a random access response message on the first component carrier corresponding to the at least a random access preamble message from the network, wherein the random access response message includes at least a timing advance value determined by the network according to the at least a random access preamble message.	pp. 5-6 (<i>e.g.</i> , Exemplary embodiment #2-1, Step 6); p. 8 (<i>e.g.</i> , Exemplary embodiment #3-5); pp. 9-11 (<i>e.g.</i> , The design of Timing Alignment Timer) pp. 33-34 (Contention/Non-Contention based Random Access Channel) pp. 39-40 (Embodiment #2-1, and Procedure for the Embodiment #2-1); p. 49 (Embodiment #3-5)
Wang '765 Claim 9	Exemplary disclosures from Wang-Prov
[9.pre] A mobile device of a wireless communication system for handling uplink synchronization, the mobile device capable of receiving and transmitting on a plurality of component carriers, the mobile device comprising:	p. 1 (Title; Introduction); pp. 26-28 (Title; Introduction; Background)
[9.a] a processor for executing a program; and a storage unit coupled to the processor for storing the program; wherein the program instructs the processor to perform the following steps:	pp. 24-25
[9.b] performing a first random access procedure on a first component carrier of the plurality of component carriers	pp. 5-6 (<i>e.g.</i> , Exemplary embodiment #2-1, Steps 1-3);

to establish uplink synchronization on the first component carrier; and	pp. 39-40 (Embodiment #2-1, and Procedure for the Embodiment #2-1)
[9.c] performing a second random access procedure on at least a component carrier of the plurality of component carriers to establish uplink synchronization on the at least a component carrier, which comprises:	pp. 5-6 (<i>e.g.</i> , Exemplary embodiment #2-1, Steps 4-5); pp. 39-40 (Embodiment #2-1, and Procedure for the Embodiment #2-1)
[9.d] receiving at least a random access preamble assigned by a network of the wireless communication system for the at least a component carrier;	pp. 5-6 (<i>e.g.</i> , Exemplary embodiment #2-1, Step 4); pp. 39-40 (Embodiment #2-1, and Procedure for the Embodiment #2-1)
[9.e] sending at least a random access preamble message including the at least a random access preamble to the network; and	pp. 5-6 (<i>e.g.</i> , Exemplary embodiment #2-1, Step 5); pp. 39-40 (Embodiment #2-1, and Procedure for the Embodiment #2-1)
[9.f] receiving a random access response message on the first component carrier corresponding to the at least a random access preamble message from the network, wherein the random access response message includes at least a timing advance value determined by the network according to the at least a random access preamble message.	pp. 5-6 (<i>e.g.</i> , Exemplary embodiment #2-1, Step 6); p. 8 (<i>e.g.</i> , Exemplary embodiment #3-5); pp. 9-11 (<i>e.g.</i> , The design of Timing Alignment Timer) pp. 33-34 (Contention/Non-Contention based Random Access Channel) pp. 39-40 (Embodiment #2-1, and Procedure for the Embodiment #2-1); p. 49 (Embodiment #3-5)

Wang '765 Claim 10	Exemplary disclosures from Wang-Prov
[10.pre] A method of handling uplink synchronization for a mobile device capable of receiving and transmitting on a plurality of component carriers in a wireless communication system, the method comprising:	p. 1 (Title; Introduction); pp. 26-28 (Title; Introduction; Background)
[10.a] performing a random access procedure on a first component carrier of component carriers with the same timing advance value to obtain a timing advance value; and	p. 9 (<i>e.g.</i> , The design of Timing Alignment Timer)
[10.b] managing a plurality of time alignment timers each corresponding to some of the plurality of component carriers for indicating a synchronization state on the component carriers with the same timing advance value, wherein the managing step comprises:	p. 9 (<i>e.g.</i> , The design of Timing Alignment Timer)
[10.c] starting or restarting the time alignment timer when a timing advance command in a random access response message of the random access procedure is received for the first component carrier, and a random access preamble of the random access procedure is not selected by the mobile device or the time alignment timer is not running.	p. 11 (Fig. 5 and accompanying descriptions) p. 58 (Time Alignment Timer in LTE)

Table 3

(5) Nokia (EX1010) is a proposal submitted by Nokia to the 3GPP TSG-RAN WG2. EX1010, 1; EX1011, ¶¶56-57. Nokia was published and freely available on 3GPP's File Transfer Protocol (FTP) server no later than January 12, 2010. EX1011, ¶¶21, 58-65.

C. Statutory Grounds of the Challenge

Petitioner relies on the following statutory grounds:

Ground	Claims	Basis	References
1	1 and 8	§ 103	Tenny in view of Huawei
2	2 and 9	§ 103	Tenny in view of Huawei and further in view of Zhang
3	3, 4, 10, and 11	§ 103	Tenny in view of Huawei and further in view of Wang
4	7 and 14	§ 103	Tenny in view of Huawei and further in view of Nokia

Table 4

V. THE '372 PATENT

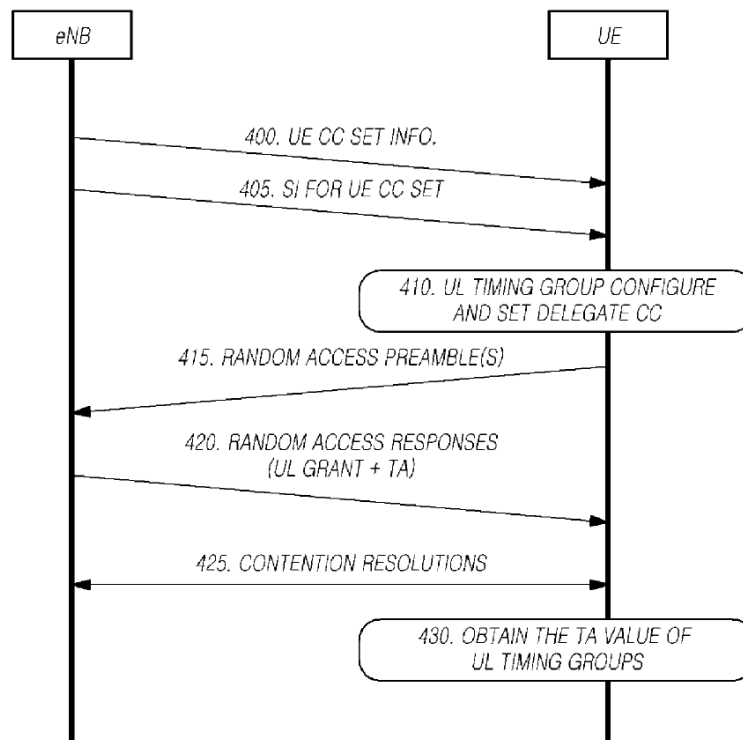
A. Overview

The '372 patent is directed to a method and an apparatus for performing random access in a wireless communication system that supports multiple component carriers (CCs). EX1001, 1:15-18. It purports to address the need for “synchronization between a user equipment (UE) and an evolved NodeB (eNB)” when a plurality of CCs are used in the wireless communication system. EX1001, 1:21-35; EX1003, ¶53.

To achieve the purpose, the '372 patent claims a method of configuring at least one of the multiple CCs into an uplink (UL) timing group, setting a delegate CC in the configured UL timing group, obtaining a TA value through the delegate CC, and updating the TA value of each group based on the obtained TA value. EX1001, 34:20-39 (claim 1); EX1003, ¶54.

Reproduced FIG. 4 of the '372 patent below illustrates a process of obtaining a UL synchronization between a UE and an eNB, in which the UE configures UL timing groups and sets delegate CCs of each UL timing group at step 410 based on the information of multiple UE CCs received from the eNB at steps 400 and 405. EX1001, 7:24-9:12; EX1003, ¶55.

FIG. 4



EX1003 — FIG. B

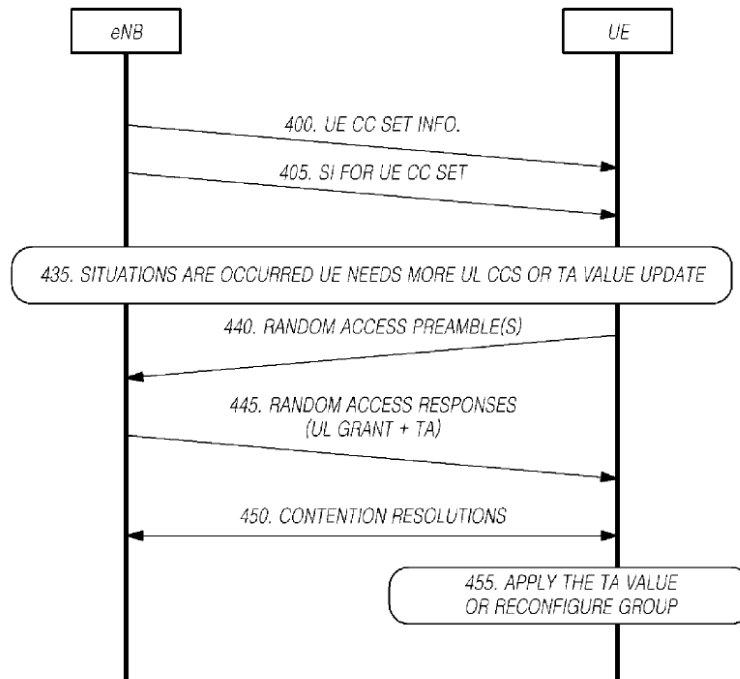
The '372 patent discusses three different conditions that can be used by the UE to configure the UL timing groups: (i) CCs of which a difference in center frequency values is within a threshold range may have similar propagation characteristic and thus, the CCs may be configured to be a single group; (ii) CCs to which the same beamforming scheme is applied may be configured to be a single group; and (iii) CCs used in devices in the same radio network may be configured to be a single group. EX1001, 10:9-18; EX1003, ¶56.

The '372 patent further discusses various conditions for selecting the delegate CC in each group to perform a TA value obtaining procedure for obtaining a UL synchronization: (1) a CC having a lowest center frequency value, (2) a CC having a center frequency value that is closest to a mean value, (3) a CC having a highest center frequency value; (4) an SCC in which a radio link monitoring (RLM) is defined; (5) a CC having a broadest frequency band; and (6) a primary CC (PCC) in the group. EX1001, 10:19-31, 11:48-56; EX1003, ¶57.

Next, the '372 patent discloses that the UE can perform a random access process for obtaining TA values of UL timing groups based on the delegate CCs at steps 415-430 by receiving random access response (RAR) messages including the TA values from the eNB. EX1001, 11:57-63, 13:57-61, 13:66-14:14; EX1003, ¶58.

The '372 patent also discusses situations of updating a TA value without reconfiguration of a UL timing group at step 435, as shown in the reproduced FIG. 5 below. These include (a) a case in which the eNB requests the UE to re-establish synchronization with respect to all DL CCs, (b) a case in which the UE initializes and retries transmission of all UL data, (c) a case in which a UE-specific time alignment timer expires, (d) a case in which a time alignment timer set for each group expires; and (e) a case in which a new UL CC is added. EX1001, 14:36-59; EX1003, ¶59.

FIG. 5

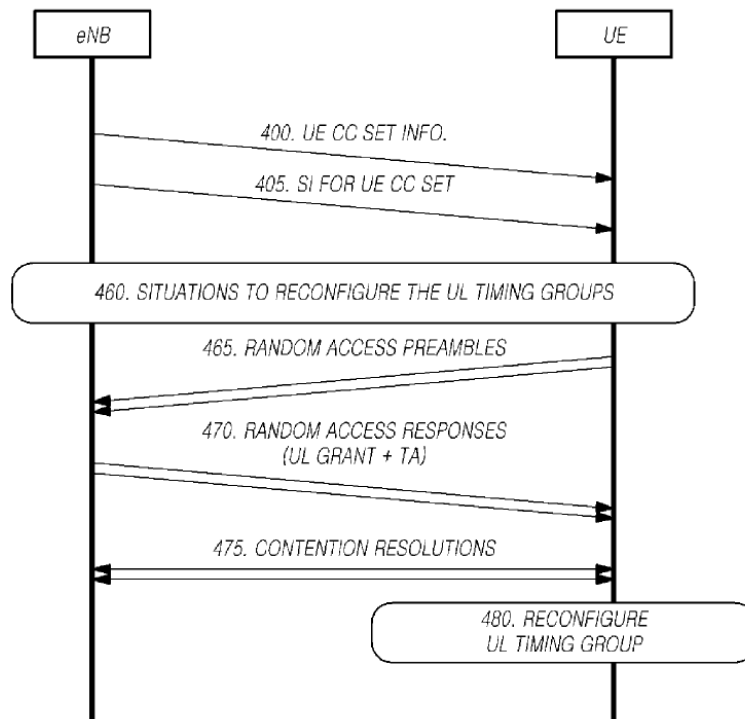


EX1003 — FIG. C

In addition, the '372 patent discusses situations of reconfiguration of UL timing groups at step 460, as shown in the reproduced FIG. 6 below. These include (I) a case in which a response is not obtained in response to UL transmission data transmitted through a few UL CCs of CCs in a group of the UE, (II) a case in which the eNB requests reconfiguration with respect to a few CCs in a group associated with a DL synchronization, (III) a case in which a CC time alignment timer set for each CC expires, (IV) a case in which a linkage set between a DL and a UL in the eNB is changed, (V) a case in which a UL timing group is changed and a linkage

between a DL and a UL in a group is changed; and (VI) all cases that require reorganization of a UL timing group. EX1001, 16:29-59; EX1003, ¶¶60.

FIG. 6



EX1003 — FIG. D

B. Priority Date of the '372 Patent

The '372 patent claims foreign priority to Korean Patent Application No. 10-2010-0027782 (the "'782 Korean application"), filed on March 29, 2010. EX1001, code (30), 1:5-10. However, no certified English translation of the '782 Korean application was submitted during the prosecution of the '372 patent, and therefore Patent Owner's foreign priority claim has not been perfected.

EX1014 is a machine translation of KR20110108563A, which is the publication of the '782 Korean application, by Google Patents (with highlights added to one paragraph on page 7). Both challenged independent claims 1 and 8 require the limitation of “*set[ting] a CC satisfying at least one of a CC having a lowest center frequency value, a CC having a center frequency value that is closest to a mean value, a CC having a highest center frequency [value], a CC having a broadest frequency band, and a CC in which a radio link monitoring (RLM) is defined, in the configured UL timing group as a delegate CC*” (brackets indicating the minor differences between the two claims). However, the '782 Korean application fails to provide written description support to claims 1 and 8 because it does not disclose at least “*set[ting] a CC satisfying at least one of ... a CC in which a radio link monitoring (RLM) is defined.*” Compare EX1001, 10:25-31 and 11:48-56 with EX1014, at 7 (highlighted paragraph without mentioning the representative CC being selected based on defined RLM). Since the other challenged claims all depend on claims 1 and 8, respectively, the '782 Korean application fails to provide written description support to them either. EX1003, ¶64.

Accordingly, the challenged claims of the '372 patent are not entitled to the priority date of March 29, 2010. Thus, the '372 patent may be entitled to a priority date no earlier than March 29, 2011. EX1001, code (22) (PCT filing date). EX1003, ¶65.

It is Patent Owner's burden to establish that the claims are entitled to the priority date of the earlier-filed application. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1379–80 (Fed. Cir. 2015) (internal citations omitted); *see also Maxlite Inc. v. Jiaxing Super Lighting Electric Appliance Co., Ltd.*, IPR2020-00208, Paper 14 at 8 (PTAB Jun. 1, 2021) (finding the burden of production shifted to Patent Owner to “present argument and evidence to show that each of the limitations of the challenged claims” being able to rely on an earlier priority date than the cited reference).

Last but not least, Petitioner reserves the right to rebut in a Petitioner's Reply any argument or evidence subsequently presented by the Patent Owner in the Patent Owner Preliminary Response (POPR) that the '372 patent is entitled to a priority date predating any of the relevant dates of the prior art relied upon in this IPR. *See* Section IV.B.

C. Prosecution History of the '372 Patent

During the prosecution of the U.S. Patent Application No. 13/638,507 that later issued as the '372 patent, the Examiner allowed all claims 1-16 without issuing any Office Action. EX1002, 68-72. The Examiner did not give any reason for allowance. *Id.* In response to a post-allowance Request for Continued Examination submitted along with an additional Information Disclosure Statement, the Examiner maintained the allowance of all the claims. EX1002, 39-44. The '372 patent was

issued on March 31, 2015. EX1002, 31.

None of the prior art relied upon by Petitioner herein was presented or considered by the Office during the prosecution of the '372 patent. *See generally* EX1002.

D. The Level of Ordinary Skill in the Art

A person of ordinary skill in the art (“POSITA”) at the time of the claimed invention would have had a Bachelor’s degree in electrical engineering, computer engineering, computer science, or a related field, and two to three years of experience in the design or development of telecommunication systems, or the equivalent. EX1003, ¶¶20-22. A higher level of education might make up for less experience, and vice versa. *Id.*

VI. CLAIM CONSTRUCTIONS

Claim terms subject to IPR are construed under the framework established in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005). 37 C.F.R. § 42.100(b). Only terms necessary to resolve the controversy need construction. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). Because the prior art asserted herein discloses embodiments within the claims’ scope, the Board need not construe the claims to resolve this IPR.

In the EDTX case, Petitioner proposes construing the following two claim terms of claim 8 as containing means-plus-function (“MPF”) claim limitations under

35 U.S.C. § 112, paragraph 6, while Patent Owner argues for construing the terms in their plain and ordinary meaning.

Claim term #1: “a[n] uplink timing group configuring unit to configure a[n] uplink (UL) timing group including...from among a plurality of CCs.”

Claim term #2: “a delegate CC setting unit to set a CC satisfying . . . in the configured UL timing group as a delegate CC.”

EX1012, 8-9.

For the purpose of this IPR, Petitioner construes the above terms as follows.³

Claim Term	Petitioner’s Proposed Construction
#1	MPF claim limitation under 35 U.S.C § 112, paragraph 6 Function: configure an uplink (UL) timing group including ... from among a plurality of CCs Corresponding Structure: hardware of the UE that implements Function above. <i>See</i> EX1001, 8:23-26, 14:20-23, 16:15-18, 17:52-55, 18:54-57, 32:31-37, 33:51-56, FIGs. 15-16; EX1003, ¶69.
#2	MPF claim limitation under 35 U.S.C § 112, paragraph 6 Function: set a CC satisfying ... in the configured UL timing group as a delegate CC Corresponding Structure: hardware of the UE that implements the

³ Petitioner notes that terms “TA value obtaining unit” and “TA value updating unit” of claim 8, “determining unit” and “timing group reconfiguring unit” of claim 9, and “condition sensing unit” of claim 11, which are not in dispute between the parties in the EDTX case, are to be construed according to their plain and ordinary meaning for the purpose of this IPR. To the extent that the Board invokes 35 U.S.C § 112, paragraph 6 to construe any of these terms, Petitioner proposes to construe them similarly as the above two terms in Table 5 with a structure represented by hardware of the UE that implements the respective functions thereof.

	Function above. <i>See</i> EX1001, 8:23-26, 14:20-23, 16:15-18, 17:52-55, 18:54-57; EX1003, ¶70.
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Table 5

The situation herein is distinguishable from that in *Cambridge Mobile Telematics, Inc. v. Sfara, Inc.*, IPR2024-00952, Paper 12 (PTAB Dec. 13, 2024). Unlike the petitioner in *Cambridge Mobile Telematics*, Petitioner here does not assert in the EDTX case that the construction of terms #1 and #2 is “most significant” or “case dispositive,” and Petitioner offers a possible construction for each term in this IPR. Neither did Patent Owner provide any competing MPF construction in the EDTX case. *See* EX1012, 8-9 (only asserting “plain and ordinary meaning” for the two terms). Thus, the Board should not deny institution of this IPR based on Petitioner’s MPF construction in the EDTX case. *See Cambridge Mobile Telematics*, at 8 (declining to adopt rules that “prohibit petitioners from taking inconsistent claim construction positions before the Board and a district court”); *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 801, 813 (Fed. Cir. 2021) (holding that “[t]he indefiniteness of a limitation,” such as an MPF limitation, “precludes a patentability determination only when the indefiniteness renders it logically impossible for the Board to reach such a decision”).

The *Markman* hearing in the EDTX case is currently scheduled on June 4, 2025. EX1013, 4. Petitioner reserves the right to, in accordance with 37 C.F.R.

§ 42.100(b), request leave to submit the *Markman* order in the EDTX case so the Board may consider it.

VII. GROUND 1: TENNY IN VIEW OF HUAWEI RENDERS OBVIOUS CLAIMS 1 AND 8

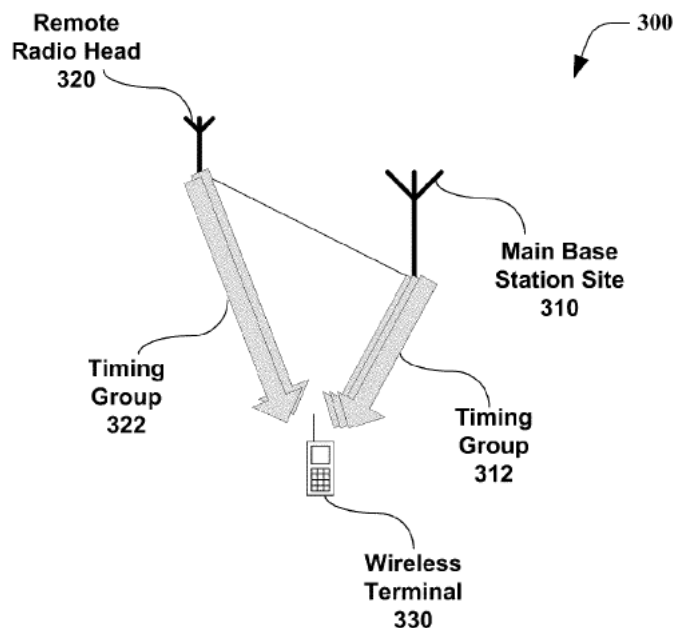
A. Overview of Tenny

Tenny, entitled “Method and Apparatus That Facilitates a Timing Alignment in A Multicarrier System,” describes solutions to problems arising in “maintaining timing synchronisation for user equipment in a multicarrier Long Term Evolution-Advanced (LTE-A) system.” EX1004, ¶3; EX1005, Appx. A⁴ (1:1-3). Like the ’372 patent, Tenny recognizes that different carriers have “some variation in timing for a number of reasons (*e.g.*, cable delays, distance between the base station site and a remote radio head),” and concludes that “separate timing offsets per carrier” may be “beneficial” or “necessary.” EX1004, ¶9; EX1005, Appx. A (1:9-14); EX1003, ¶75.

To solve this timing variation problem, Tenny discloses grouping carriers with similar “uplink timings” (“same to within some tolerance”) to the same “timing group.” EX1004, ¶55; EX1005, Appx. A (1:17-23). For example, as illustrated in FIG. 3 of Tenny ’116 below, a “UE” (*e.g.*, mobile phone) is “assigned carriers from multiple timing groups” (*e.g.*, groups A and B). EX1004, ¶57, FIG.

⁴ EX1005 (Tenn-Prov) includes an Appendix A (*see* Exhibit 1005 at 23), which is referred to as “EX1005, Appx. A” in this Petition.

3; EX1005, Appx. A (1:24-2:6, Fig. 1). Though these groups “originat[e] from the same cell site,” the carriers in these groups come from network components that are distanced from each other, such as the “remote radio head 320 belonging to main base station site 310” (“eNB”), which causes some carriers to have different timing from others. *Id.* Thus, Tenny proposes “maintain[ing] timing separately for each group.” *Id.*; EX1003, ¶76.



Tenny '116, FIG. 3

EX1003 — FIG. E

In particular, Tenny assigns timing groups to the UE by sending an “explicit signaling” in the Radio Resource Control (RRC) layer that maps “a group identifier” (representing a UL “timing group”) to the “particular carriers” the UE has been “configured with.” EX1004, ¶70; EX1005, Appx. A (5:3-10); EX1003,

¶77. To perform synchronization for these timing groups, the UE “perform[s] random access to update its timing” with an eNB using a “random access procedure.” EX1004, ¶58; EX1005, ¶¶37, 40, Appx. A (2:7-17, 4:15-20, Fig. 1); EX1003, ¶78.

Figure 3 of Tenny-Prov (reproduced below) illustrates the components in a “wireless device” (UE) used to perform the steps of this synchronization process. For example, “carrier grouping component 304” “receive[s] one or more groupings” from the “wireless network,” such as the “group identifier[s]” included in the RRC signaling. EX1005, ¶35, Figs. 3-4, Appx. A (5:5-10); EX1003, ¶80. The wireless device configures UL timing groups based on the received grouping in several ways. For example, the wireless device “generates the association of the plurality of carriers into one or more timing groups according to [the] grouping received from a base station associated with a subset of the plurality of carriers.” *Id.*, claim 15. Additionally, the wireless device’s “carrier selection component 306” “choose[s] a carrier in the group from which to acquire timing updates.” *Id.*, ¶36; EX1003, ¶80.

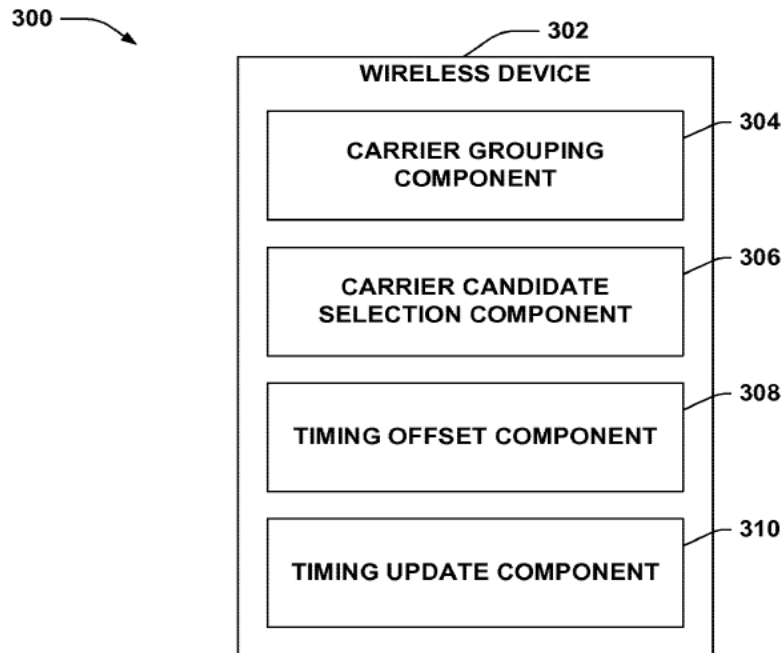


Fig. 3

Tenny-Prov, Fig. 3

EX1003 — FIG. F

“Within each timing group,” the “UE performs random access for timing synchronisation” on the “single carrier of the timing group” selected by the “carrier selection component 306” to “acquire timing updates.” *Id.*, ¶36, Fig. 3, Appx. A (2:7-26, claim 6); EX1003, ¶81.

The “timing offset component 308” “acquire[s] a timing offset from the candidate carrier” selected by the “carrier selection component 306” for “a given group,” where the “timing offset” is received “in response to a random access procedure.” *Id.*, ¶¶36-37, 40, Fig. 3. The “timing offset” is “a single timing advance value” that is “indicated to the UE for use with all carriers in the group.” *Id.*, Appx.

A (claim 1, 2:8-10); EX1003, ¶82.

The “timing update component 310” then “updat[es] timing for the group of carriers based on the offset” received from the “candidate carrier” chosen for the respective timing group. *Id.*, ¶37, Fig. 3, Appx. A (3:26-4:8, claim 1); EX1003, ¶83.

Tenny further discloses a vector timing adjustment command in which a UE assigned to several timing groups can “receive timing adjustments for all groups with a single interaction with the base station.” EX1004, ¶68; EX1005, Appx. A (4:14-17). The network in Tenny knows “the timing groups in which the UE is assigned to at least one carrier.” EX1004, ¶69; EX1005, Appx. A (4:21-22); EX1003, ¶84.

B. Overview of Huawei

Huawei proposes supporting multiple timing advance (TA) values in uplink carrier aggregation (CA) scenarios, specifically focusing on inter-band aggregation where different uplink component carriers (CCs) operate on separate frequency bands. EX1006, 1 (§1); EX1003, ¶85. To reduce “unnecessary RACH operation and TA maintenance overhead” where one separate TA is maintained for each band in the UL aggregate CCs, Huawei suggests a method that would “allow sharing a TA for inter-band aggregated CCs to support multiple TA.” EX1006, 2 (§2.1); EX1003, ¶85.

Potential random access channel (RACH) impact caused by multiple TA is

considered from four aspects, including RRC connection establishment/reestablishment, inter-eNB handover, UL/DL data arrival requiring RACH, and radio link failure (RLF). EX1006, 2-4 (§2.2); EX1003, ¶86. When UL CCs in the different bands are out of synchronization, Huawei discloses that “eNB can send the PDCCH order for each CC group with the identical TA value, and UE can perform the contention-free RACH simultaneously.” EX1006, 3 (§2.2.3); EX1003, ¶86. Since UE only performs RACH on one UL CC in Rel-8, for inter-band aggregated CCs, the UL CC with the lowest frequency is chosen among the multiple CCs with the identical TA value, so that RACH is performed on the chosen UL CC. EX1006, 4 (§2.2.4); EX1003, ¶86.

Regarding maintenance of uplink time alignment, one timing advance command for the CCs with identical TA is sufficient. EX1006, 4 (§2.3); EX1003, ¶87. This results in simplified signaling and UE operations. *Id.*

C. Reasons to Combine Tenny and Huawei

For the reasons stated in detail below, a POSITA would have been motivated to combine Tenny’s random access performance in a multicarrier wireless communication system with Huawei’s delegate CC setting mechanism, which selects a CC having a lowest center frequency value, to modify Tenny’s delegate CC setting mechanism to also select a CC having a lowest center frequency value. EX1003, ¶101.

1. The proposed modification is a simple substitution of Huawei's delegate CC setting mechanism with Tenny's to obtain predictable results.

As discussed in Section VII.D, *infra*, Tenny discloses all limitations of claim 1 of the '372 patent, except that Tenny does not explicitly teach the delegate CC to be selected based on any of the five conditions listed in limitation [1.b]. Instead, Tenny's delegate CC is selected based on multiple alternative methods, such as using a hash function, a pseudorandom function, a time-based function, etc. EX1004, ¶¶61-62; EX1005, ¶¶36, 39; EX1003, ¶102.

Tenny and Huawei are analogous art in the same field as the '372 patent, which relates to performing random access in a multicarrier wireless communication system, which is well known in the industry. EX1001, 1:15-19; EX1016, pp. 12-16 (Secs. 5.1.1 to 5.1.6); *see also* Sections VII.A and VII.B. Tenny and Huawei both disclose grouping multiple CCs into timing groups according to the TA value of these CCs, and the timing for each group is separately maintained. EX1004, ¶57, FIG. 3; EX1005, Appx. A (1:24-2:6, Fig. 1); EX1006, 4 (§2.2.4); EX1003, ¶103. Further, both Tenny and Huawei teach the notion of updating the timing for the group of CCs based on a TA command. EX1005, ¶37, Fig. 3, Appx. A (3:26-4:8, claim 1); EX1006, 4 (§2.3); EX1003, ¶103.

Given the similarity between Tenny and Huawei, the proposed modification is nothing more than a simple substitution of one known element (delegate CC

selection mechanism in Tenny) with another (delegate CC selection mechanism in Huawei) to obtain predictable results—consistency in the delegate CC selection process to minimize the overhead of signaling. EX1003, ¶104.

Thus, a POSITA would have been motivated to implement Huawei’s delegate CC selection method to Tenny’s carrier candidate selection by selecting a CC having a lowest center frequency from a UL timing group as the carrier candidate for acquiring timing updates for the entire group. EX1003, ¶105.

2. A POSITA would also have a reasonable expectation of success in combining Tenny and Huawei.

A POSITA would also have a reasonable expectation of success in combining Tenny and Huawei as the proposed combination would yield predictable results.

As previously discussed, both Tenny and Huawei relate to performing random access in a multicarrier wireless communication system. *See* Sections VII.A and VII.B. They are both pertinent to the problem addressed by the ’372 patent, *i.e.*, synchronization between a UE and an eNB in such a multicarrier system. EX1001, 1:21-35; EX1004, ¶¶3, 9; EX1005, Appx. A (1:1-3, 1:9-14); EX1006, 3 (§2.2.3); EX1003, ¶107. Moreover, both Tenny and Huawei use delegate CC (or carrier candidate) to update TA values in the timing group represented by the delegate CC. EX1004, ¶57, FIG. 3; EX1005, Appx. A (1:24-2:6, Fig. 1); EX1006, 4 (§2.2.4); EX1003, ¶107.

Thus, a POSITA would have found it routine, straightforward, and advantageous to substitute Huawei's delegate CC selection mechanism (selecting a CC having a lowest center frequency) in place of Tenny's (using a hash function, a pseudorandom function, a time-based function, etc.). EX1003, ¶108. It is notable that Huawei called its CC selection the "simplest way" in the inter-band aggregated CCs with identical TA value. EX1006, 4 (§2.2.4). This further indicates that a POSITA would have known such a modification would predictably work and provide the expected successful result. EX1003, ¶108.

3. The teaching, suggestion, and motivation in Tenny and Huawei would have led a POSITA to modify Tenny's delegate CC selection mechanism to choose a CC with lowest center frequency.

Tenny recognizes that in a multicarrier environment, timing synchronization for UE is more complex than that in a single-carrier environment. EX1004, ¶9; EX1005, Appx. (1:24-29). As a result, Tenny proposes to group multiple carriers into "timing groups" with the similar timing information (within a tolerance). EX1004, ¶34; EX1005, Appx. (1:17-19). To avoid performing unnecessary timing updates through random process procedures, Tenny discloses certain embodiments directed towards selecting one carrier of each timing group, so that the timing update through that selected carrier would lead to the timing updates of all carriers in the timing group. EX1004, ¶58; EX1005, Appx. (2:8-13); EX1003, ¶109.

A POSITA would have been motivated by the above teaching from Tenny to explore designs that could efficiently perform timing updates on the timing groups in a multicarrier environment, each of which may be represented by a selected carrier. EX1003, ¶110.

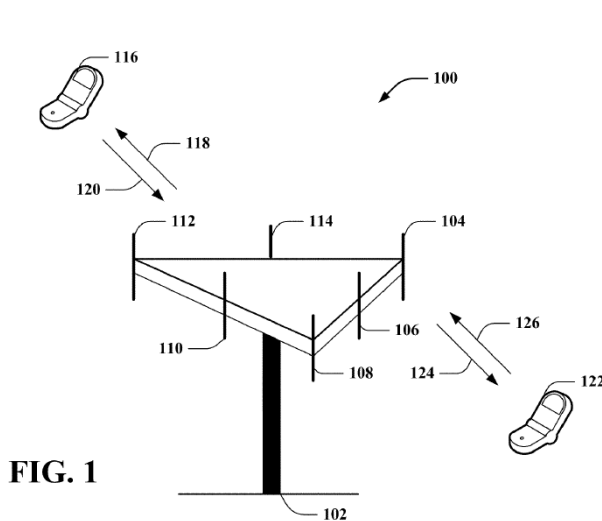
Huawei also aims to address the same problem—TA maintenance for UL aggregated CCs could cause a lot of unnecessary RACH and maintenance overhead. EX1006, 2 (§2.1). Huawei explicitly states that “if the inter-band aggregated CCs can share identical TA,” RACH can be performed via a CC “with lowest frequency.” EX1006, 4 (§2.2.4). A POSITA would have understood that Huawei presents an alternative mechanism for delegate CC selection, a key component in the improvement of the multicarrier system also taught and suggested by Tenny. EX1004, ¶58; EX1005, Appx. (2:8-13); EX1003, ¶111.

Further, as discussed above, a POSITA would have had a reasonable expectation of success in modifying Tenny with Huawei. Section VII.C.2. In sum, a POSITA would have been motivated to combine Tenny’s disclosure with Huawei’s delegate CC selection mechanism to arrive at the claimed invention in the ’372 patent. *See DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1360 (Fed. Cir. 2006); EX1003, ¶112.

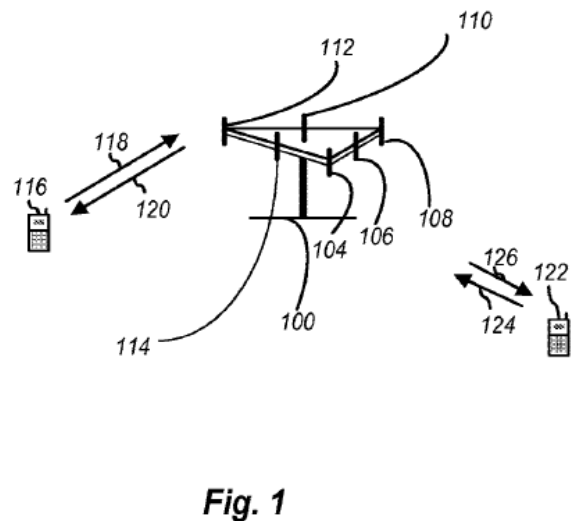
D. Independent Claim 1

1. Tenny discloses “[a] method of performing random access in a wireless communication system, the method comprising” [1.pre].

Tenny discloses a method of performing a random access procedure (“a method of performing random access”) by an access terminal (also known as “user equipment (UE)”) in a wireless communication system (“wireless communication system”). EX1004, ¶¶41-42, 58-61, FIGs. 1, 3; EX1005, ¶13, Fig. 1, Appx. A (2:8-9, Fig. 1);⁵ EX1003, ¶114.



Tenny '116, Fig. 1



Tenny-Prov, Fig. 1

EX1003 — FIG. K

⁵ Dual citations to Tenny '116 (EX1004) and Tenny-Prov (EX1005) are provided to demonstrate that the specific disclosures identified and relied upon in this Petition from Tenny '116 are supported by the written description in Tenny-Prov. To the extent it becomes necessary to rely on the filing date of Tenny-Prov as the U.S. effective filing date of Tenny '116 under 35 U.S.C. § 102(e), the requisite written description support is established by the dual citations. See Section IV.

Both FIG. 1 of Tenny '116 and Fig. 1 of Tenny-Prov disclose a wireless communication system comprising a base station and UEs. EX1004, ¶¶41-42; EX1005, ¶13; EX1003, ¶115. Tenny further discloses a method of performing random access procedure by the access terminals. EX1004, ¶¶41-42; EX1005, Appx. A (2:8-9); EX1003, ¶115.

Thus, Tenny discloses [1.pre].

2. Tenny discloses *“configuring a[n] uplink (UL) timing group including at least one of CCs having a difference in center frequencies within a threshold range, CCs having the same beamforming scheme, CCs having the same timing advance (TA) value, and CCs having the same reference downlink (DL) CC for obtaining a TA value, from among a plurality of CCs” [1.a].*

Claim limitation [1.a] requires *“at least one of”* the following four conditions:

[i] *“component carriers (CCs) having a difference in center frequencies within a threshold range,”* [ii] *“CCs having the same beamforming scheme,”* [iii] *“CCs having the same timing advance (TA) value,”* and [iv] *“CCs having the same reference downlink (DL) CC to be used for obtaining a TA value,”* meaning that satisfying any one of the four conditions meets the requirement of [8.a]. Tenny discloses [1.a] by disclosing condition [iii]: *“configuring a[n] uplink (UL) timing group including CCs having the same timing advance (TA) value.”* EX1003, ¶116.

Tenny discloses that CCs with the same or similar uplink timings (“timings

that are the same to within some tolerance” or “within a threshold difference”) are grouped into the same “timing group.” EX1004, ¶55; EX1005, ¶¶33-34, Appx. A (5:18-22); EX1003, ¶118. If “timing offsets” or “timing differences” of a set of CCs are within a threshold range, which means that the uplink timings of the CCs in each group are “close enough,” the set of CCs can be configured into the same “timing group” that shares “a single timing advance value.” EX1004, ¶¶65, 70; EX1005, Appx. A (5:3-5); EX1017, 34 (§6.1.3.5) and 38 (§6.2.3) (each timing advance command indicating a timing advance value); EX1003, ¶¶118-119.

Such an understanding is also confirmed by Huawei. For example, Huawei states that “[i]f all UL CCs in the different bands are out of synchronization, eNB can send the PDCCH order for **each CC group with the identical TA value**, and UE can perform the contention-free RACH simultaneously,” and “[i]f identical TA cannot be shared among the inter-band aggregated CCs, RACH should be performed separately at least for **each group of CCs with identical TA value**.” EX1006, 3-4 (§§2.2.3 and 2.2.4); EX1003, ¶120.

Thus, Tenny discloses [1.a].

3. Tenny in view of Huawei renders obvious *“setting a CC satisfying at least one of a CC having a lowest center frequency value, a CC having a center frequency value that is closest to a mean value, a CC having a highest center frequency value, a CC having a broadest frequency band, and a CC in which a radio link monitoring (RLM) is defined, in the configured UL timing group as a delegate CC”* [1.b].

Claim limitation [1.b] requires *“at least one of”* the following five conditions:

[i] *“a CC having a lowest center frequency value,”* [ii] *“a CC having a center frequency value that is closest to a mean value,”* [iii] *“a CC having a highest center frequency,”* and [iv] *“a CC having a broadest frequency band,”* and [v] *“a CC in which a radio link monitoring (RLM) is defined,”* meaning that satisfying any one of the five conditions meets the requirement of [1.b]. Tenny in view of Huawei renders obvious [1.b] by rendering obvious condition [i]: *“setting a CC satisfying a CC having a lowest center frequency value in the configured UL timing group as a delegate CC.”* EX1003, ¶121.

Tenny discloses selecting a carrier candidate from a timing group (*“to set a CC ... in the configured UL timing group as a delegate CC”*) for acquiring timing updates for the entire group, and further discloses that the selection can be based on multiple methods, such as using a hash function, a pseudorandom function, a time-based function, etc. EX1004, ¶¶61-62; EX1005, ¶¶36, 39; EX1003, ¶123.

Huawei discloses a similar selection method—choosing one CC with a lowest

frequency from a group of CCs sharing identical TA value as the one uplink CC (UL CC) for Random Access Channel (RACH). EX1006, 4 (§2.2.4); EX1003, ¶123. A POSITA would have understood that for inter-band CCs, picking the lowest band frequency would mean picking the lowest center frequency, because the center frequency represents the band frequency. EX1017, 14 (defining “Carrier frequency” as “center frequency of the cell”); EX1003, ¶¶124-128.

As discussed in Section VII.C, *supra*, a POSITA would have been motivated to implement Huawei’s delegate CC selection method to Tenny’s carrier candidate selection by selecting a CC having a lowest center frequency from a UL timing group as the carrier candidate for acquiring timing updates for the entire group.

Thus, Tenny in view of Huawei renders obvious [1.b].

4. Tenny discloses “*obtaining a TA value to be used for obtaining a UL timing through the delegate CC*” [1.c] and “*updating a TA value of the corresponding UL timing group based on the obtained TA value*” [1.d].

Tenny discloses “*obtaining a TA value to be used for obtaining a UL timing through the delegate CC*” and “*updating a TA value of the corresponding UL timing group based on the obtained TA value*” by obtaining a timing message including a timing offset (also known as “timing advance”) used for determining the uplink timing through the carrier candidate of a group, and updating the uplink timing for the group based on the obtained timing offset. EX1003, ¶129.

Both Tenny '116 and Tenny-Prov disclose that for each timing group, a timing message encoded with a timing offset of the carrier candidate of the timing group can be acquired by performing a random access procedure, and the uplink timing is determined. EX1004, ¶¶58, 77, 81; EX1005, ¶¶34-37, Fig. 3; EX1003, ¶130. More specifically, both Tenny '116 and Tenny-Prov disclose that the timing message is a timing advance command, and only a single timing advance command is used to update the TA value for all carriers in the group. EX1004, ¶¶70, 77; EX1005, Appx. A (5:3-5, 7:3); EX1003, ¶130.

The exact same teaching is also confirmed by Huawei. For example, Huawei states that “the UE adjusts its uplink time alignment based on Timing Advance Command MAC PDU. From UE point of view, one timing advance command for the CCs with identical TA is [sic] enough.” EX1006, 4 (§2.3); EX1003, ¶131.

Thus, Tenny discloses [1.c] and [1.d].

From the foregoing, Tenny in view of Huawei renders obvious claim 1.

E. Independent Claim 8

- 1. Tenny discloses “*an apparatus for performing random access in a wireless communication system, the apparatus comprising*” [8.pre].**

As discussed in Section VII.D.1, Tenny discloses that the wireless communication system includes an access terminal (“*an apparatus... in a wireless communication system*”) that performs the random access procedure (“*for*

performing random access”). EX1004, ¶¶41-42, 58-61, FIGs. 1, 3; EX1005, ¶13, Fig. 1, Appx. A (2:8-9, Fig. 1); EX1003, ¶135.

Thus, Tenny discloses [8.pre].

2. Tenny discloses ***“a[n] uplink timing group configuring unit to configure a[n] uplink (UL) timing group including at least one of component carriers (CCs) having a difference in center frequencies within a threshold range, CCs having the same beamforming scheme, CCs having the same timing advance (TA) value, and CCs having the same reference downlink (DL) CC to be used for obtaining a TA value, from among a plurality of CCs”*** [8.a].

As discussed in Section VII.D.2, Tenny discloses *“configuring a[n] uplink (UL) timing group including at least one of CCs having a difference in center frequencies within a threshold range, CCs having the same beamforming scheme, CCs having the same timing advance (TA) value, and CCs having the same reference downlink (DL) CC for obtaining a TA value, from among a plurality of CCs.”*

FIG. 3 of Tenny-Prov (reproduced below) further discloses that wireless device 302 includes a carrier grouping component 304 (*“uplink timing group configuring unit”*) configured to perform the function of grouping CCs. EX1005, ¶34; EX1004, ¶¶13, 16, 93-94, 120-121, 123; EX1003, ¶136. Thus, this limitation is disclosed by Tenny under the Patent Owner’s construction of plain and ordinary meaning. *See* Section VI (Claim Constructions).

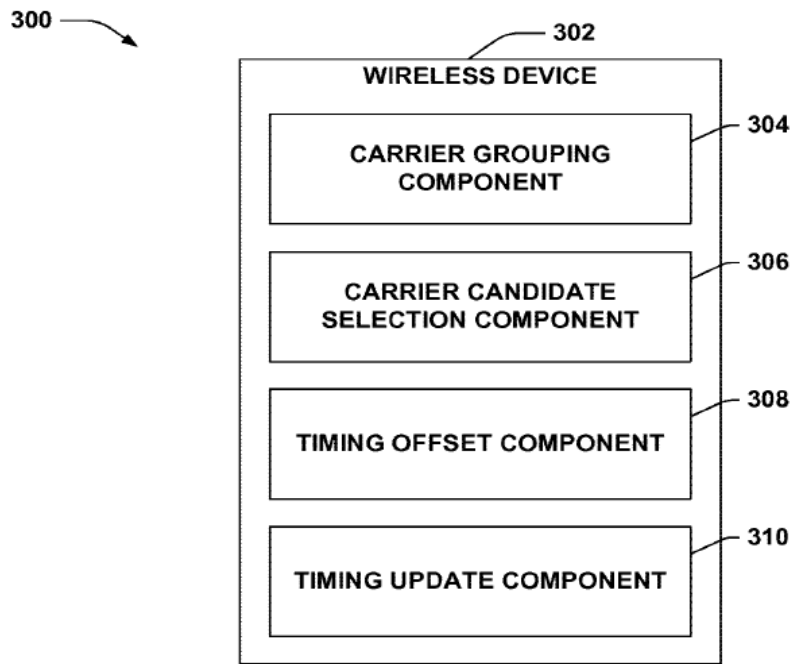


Fig. 3

EX1003 — FIG. L

Tenny also discloses this limitation under Petitioner’s proposal to construe this limitation as a means-plus-function term. *See* Section VI (Claim Constructions); EX1003, ¶138. Wireless device 302 in Tenny is equivalent to the UE in the ’372 patent; and carrier grouping component 304 configures an UL timing group including CCs with the same or similar uplink timings, which is also the function of the “*uplink timing group configuring unit*” of this limitation. *See* Section VII.D.2 ([1.a]); EX1003, ¶138. Further, the hardware of wireless device 302 that implements carrier grouping component 304 is also taught by Tenny, thereby disclosing the corresponding structure of this limitation as well. EX1004, ¶¶120-121, 123; EX1005, ¶¶44-47; EX1003, ¶138.

Thus, Tenny discloses [8.a].

3. **Tenny in view of Huawei renders obvious**
“a delegate CC setting unit to set a CC satisfying at least one of a CC having a lowest center frequency value, a CC having a center frequency value that is closest to a mean value, a CC having a highest center frequency, a CC having a broadest frequency band, a CC in which a radio link monitoring (RLM) is defined, in the configured UL timing group as a delegate CC”
[8.b].

As discussed in Section VII.D.3, Tenny in view of Huawei renders obvious
“set[ting] a CC satisfying at least one of a CC having a lowest center frequency value, a CC having a center frequency value that is closest to a mean value, a CC having a highest center frequency⁶, a CC having a broadest frequency band, and a CC in which a radio link monitoring (RLM) is defined, in the configured UL timing group as a delegate CC.”

FIG. 3 of Tenny-Prov (reproduced above) further discloses that wireless device 302 includes a carrier candidate selection component 306 (*“delegate CC setting unit”*) configured to perform the function of selecting a carrier candidate of a timing group. EX1005, ¶36; EX1004, ¶¶13, 16, 93-94, 120-121, 123; EX1003, ¶141. Thus, this limitation is rendered obvious by Tenny in view of Huawei under

⁶ The lack of “value” in claim 8 as compared to claim 1 does not alter the analysis.

the Patent Owner’s construction of plain and ordinary meaning. *See* Section VI (Claim Constructions); EX1003, ¶142.

Tenny in view of Huawei still renders obvious this limitation under Petitioner’s proposal to construe this limitation to be a means-plus-function term. *See* Section VI (Claim Constructions); EX1003, ¶143. Wireless device 302 in Tenny is equivalent to the UE in the ’372 patent; and Huawei’s disclosure of choosing one CC with a lowest frequency from a group of CCs as the UL CC for RACH is also the function of the “*delegate CC setting unit*” of this limitation. *See* Section VII.D.3 ([1.b]); EX1003, ¶144. Further, the hardware of wireless device 302 that implements carrier candidate selection component 306 is also taught by Tenny, thereby disclosing the corresponding structure of this limitation as well. EX1004, ¶¶120-121, 123; EX1005, ¶¶44-47; EX1003, ¶144.

Thus, Tenny in view of Huawei renders obvious [8.b].

4. Tenny discloses “*a TA value obtaining unit to obtain a TA value to be used for obtaining a UL timing through the delegate CC*” [8.c] and “*a TA value updating unit to update a TA value of the corresponding UL timing group based on the obtained TA value*” [8.d].

As discussed in Section VII.D.4, Tenny discloses “*obtaining a TA value to be used for obtaining a UL timing through the delegate CC,*” and “*updating a TA value of the corresponding UL timing group based on the obtained TA value.*”

FIG. 3 of Tenny-Prov (reproduced above) further discloses that wireless device 302 includes a timing offset component 308 (“*TA value obtaining unit*”) and a timing update component 310 (“*TA value updating unit*”) configured to perform the functions of obtaining a TA value of the carrier candidate of the group and updating the TA value of the group, respectively. EX1005, ¶¶34, 37, Fig. 3; EX1004, ¶¶13, 16, 93-94, 120-121, 123; EX1003, ¶147.

Therefore, Tenny discloses [8.c] and [8.d].

From the foregoing, Tenny in view of Huawei renders obvious claim 8.

VIII. GROUND 2: TENNY IN VIEW OF HUAWEI AND FURTHER IN VIEW OF ZHANG RENDERS OBVIOUS CLAIMS 2 AND 9

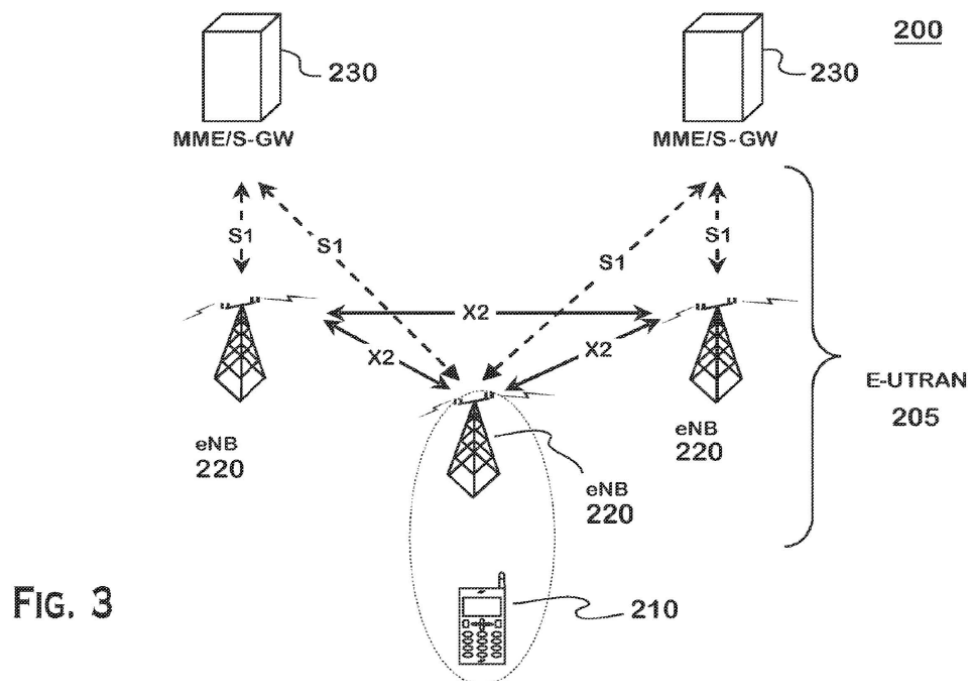
As discussed in Section VII, *supra*, Tenny in view of Huawei renders obvious claims 1 and 8. Claims 2 and 9 depend on independent claims 1 and 8, respectively, and additionally require limitations that are disclosed by Zhang.

A. Overview of Zhang

Similar to Tenny and Huawei, Zhang is related to wireless communication. EX1007, ¶2. Zhang identifies a problem in the conventional LTE handover procedure where the measurements defined to support a single-carrier system are insufficient to support handover in a multicarrier system. EX1007, ¶21. In response, Zhang proposes a component carrier-specific (CC-specific) reconfiguration mechanism that allows a wireless transmit/receive unit (WTRU), which includes a

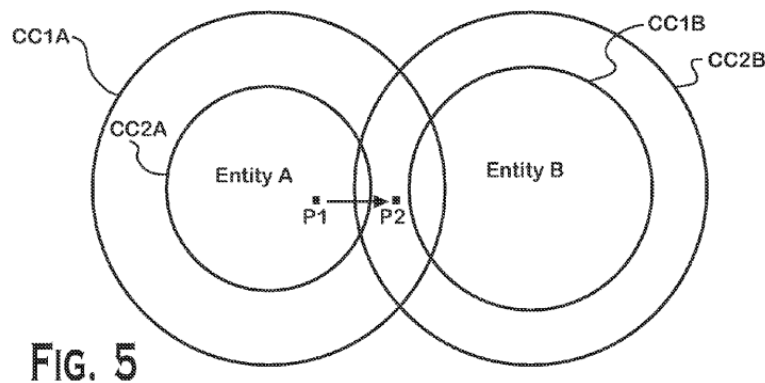
user equipment (UE), a mobile station, a cellular phone, *etc.*, to add, remove, or replace one or more CCs. EX1007, ¶¶22, 40; EX1003, ¶88.

For example, FIG. 3 of Zhang (reproduced below) shows an LTE wireless communication system/access network 200 that includes several eNBs 220 and a WTRU 210, which is in communication with one eNB 220. EX1007, ¶46, FIG. 3. Each eNB 220 “interfaces with a Mobility Management Entity (MME)/Serving GateWay (S-GW) 230 through an S1 interface.” *Id.* “The WTRU 210, the eNB 220, and the MWE/S-GW 230 are configured to perform” a CC-specific reconfiguration, which includes “adding, removing, or replacing a component carrier on a component carrier basis.” EX1007, ¶¶47, 49; EX1003, ¶89.



EX1003 — FIG. G

FIG. 5 of Zhang (reproduced below) further illustrates an example of CC reconfiguration. EX1007, ¶¶49-50, FIG. 5. When a WTRU moves from position P1 to position P2, thus leaving the boundary of CC2A and entering into the boundary of CC2B, it may remove CC2A and add CC2B to have better overall achievable data rates. EX1007, ¶50; EX1003, ¶90. Such a mechanism of changing a subset of CC(s) while maintaining a connection for at least one CC is referred to by Zhang as CC-specific reconfiguration. *Id*; EX1003, ¶90.



EX1003 — FIG. H

The CC-specific reconfiguration may be performed for unlink (UL) and downlink (DL) independently, and may or may not comprise a handover procedure. EX1007, ¶52, FIGs. 7A-7B; EX1003, ¶91. When the CC-specific reconfiguration is performed during a handover, the WTRU can perform a random access on one or several of UL CCs in the target cell while continuing its normal operation in the source cell. EX1007, ¶80; EX1003, ¶91. The WTRU may receive a radio source

control (RRC) Connection Reconfiguration message from the target cell to reconfigure the CCs that are still configured with the source cell, which may not be performed through a RACH procedure. EX1007, ¶84; EX1003, ¶91. The WTRU in Zhang may maintain subsets of CCs, each configured with different cells. EX1007, ¶85; EX1003, ¶91.

B. Reasons to Combine Tenny and Huawei with Zhang

The reasons to combine Tenny and Huawei have been discussed extensively in Section VII.C, and thus will not be repeated here. The following explains why a POSITA would have been motivated to combine Tenny and Huawei's random access performance in a wireless communication system with Zhang's timing group reconfiguration scheme.

First, Zhang, Tenny, and Huawei are analogous art in the same field as the '372 patent, which relates to multicarrier wireless communication. EX1001, 1:15-19; EX1004, ¶3; EX1005, Appx. A (1:1-3); EX1006, 1 (§1); EX1007, ¶¶2, 42. In particular, Zhang identifies a problem in the conventional LTE handover procedure where the measurements defined to support a single-carrier system are insufficient to support handover in a multicarrier system. EX1007, ¶21. This handover difficulty is also explored by Huawei; that is, to support multiple TA, one RACH per CC could cause a lot of system complexity and burden. EX1006, 3 (§2.2.2); EX1003, ¶151. Tenny also suggests that the complexity in the multicarrier

system arises along with a hard handover where multiple timing groups each have independent timing. EX1004, ¶56; EX1003, ¶151.

Moreover, while Tenny and Huawei are largely silent on the solution to the above difficulty, Zhang has proposed a CC-specific configuration scheme that allows a WTRU to add, remove, or replace one or more CCs. EX1007, ¶¶22, 40. A POSITA, with the suggestion of Tenny and Huawei, would be motivated to find solutions to the issues identified therein by, for example, consulting the proposal by Zhang. EX1003, ¶152. A POSITA would have been motivated to implement Zhang's teaching of CC-specific configuration scheme to the performance of random access in a wireless communication system disclosed by Tenny and Huawei, because it directly resolves the problem by increasing the data rate and spectrum efficiency of the system, which is a predictable result of the implementation. EX1007, ¶2; EX1003, ¶152.

A POSITA would have had a reasonable expectation of success in applying these teachings in Zhang, given that Tenny and Huawei's systems were designed to provide solutions to several issues arising in an LTE-A system, and doing so would have been straightforward and would have required minimal disruption to the existing LTE infrastructure. EX1003, ¶153.

C. Dependent Claim 2

Claim 2 depends on independent claim 1, and additionally requires limitations

of “determining whether a CC that is added or removed exists: and reconfiguring the UL timing group based on the determined CC.” EX1001, 34:40-44. As discussed above in Section VII.D, Tenny in view of Huawei renders obvious claim 1. The additional limitations of claim 2 are also disclosed by Huawei and Zhang as follows.

1. Huawei in view of Zhang discloses “determining whether a CC that is added or removed exists” [2.a].

As shown in Fig. 3 below, Huawei discloses that, during an inter-eNB handover, multiple CCs for the target cell requiring different TAs are added by performing RACH on those CCs to acquire their respective TAs (“determine whether a CC that is added exists”). EX1006, 3 (§2.2.2). The subsequent performance of RACH on the newly added CCs indicates that the addition of the CCs is determined; otherwise, no RACH needs to be carried out, and the UE can simply use the CCs from the source cell. EX1003, ¶156.

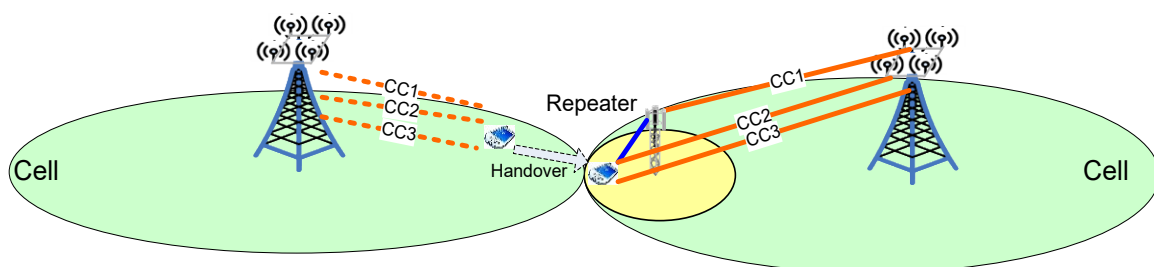
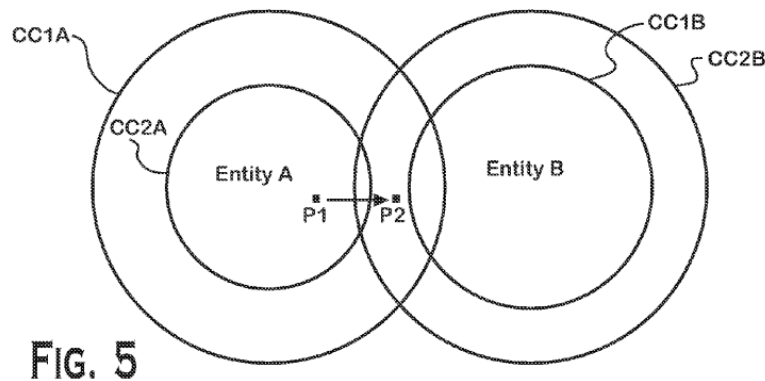


Fig.3 Multiple TA impact in the case of handover

EX1003 — FIG. M

To the extent that Huawei does not explicitly teach the determination of both the addition and removal of the CC, Zhang does so. As discussed above in Section

VIII.A, Zhang proposes a CC-specific reconfiguration mechanism that allows addition, removal, or replacement of one or more CCs in a multicarrier wireless communication system. EX1007, ¶22; EX1003, ¶158. An example of Zhang's CC-specific reconfiguration is illustrated in FIG. 5 (reproduced below). EX1003, ¶158.



EX1003 — FIG. N

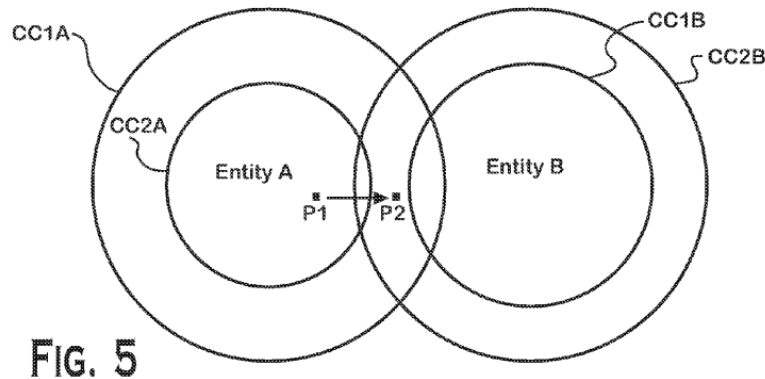
When a WTRU moves from position P1 to position P2, thus leaving the boundary of CC2A and entering into the boundary of CC2B, it may remove CC2A and add CC2B to have better overall achievable data rates. EX1007, ¶50; EX1003, ¶159. In other words, the WTRU has reconfigured its CCs from a group of CC1A and CC2A to a group of CC1A and CC2B. EX1003, ¶159. Thus, as a precursor step to such reconfiguration, determination of whether a CC is added or removed is necessary for the subsequent reconfiguration; otherwise, the system in Zhang would not recognize which group of CCs are reconfigured for UL and DL transmission. EX1003, ¶160.

Therefore, Huawei in view of Zhang discloses [2.a].

2. Zhang discloses “*reconfiguring the UL timing group based on the determined CC*” [2.b].

Huawei does not explicitly disclose that the UL timing group is reconfigured based on the added CC, but Zhang does. Zhang discloses that a carrier reconfiguration is performed (“*reconfiguring the UL timing group*”) after a WTRU determines that a CC is added or removed (“*based on the determined CC*”).

As discussed above in Section VIII.C.1, in one example of Zhang, the WTRU reconfigures its CCs from a group of CC1A and CC2A to a group of CC1A and CC2B, by determining the removal of CC2A and addition of CC2B, when the WTRU moves outside of the boundary of CC2A while entering into the boundary of CC2B. EX1007, ¶50; EX1003, ¶163. Since Zhang also discloses that the reconfiguration may be applicable to both UL and DL transmission, a POSITA would have understood from Zhang’s teaching that the CCs being reconfigured in the example above may constitute a UL timing group. EX1007, ¶52; EX1003, ¶163.



EX1003 — FIG. N

Thus, Zhang discloses [2.b].

As discussed above in Section VIII.B, a POSITA would have been motivated to implement Zhang’s teaching of CC-specific reconfiguration to the performance of random access in a wireless communication system disclosed by Tenny and Huawei. EX1003, ¶165.

Therefore, Tenny in view of Huawei and further in view of Zhang renders obvious claim 2.

D. Dependent Claim 9

Claim 9 depends on independent claim 8, and additionally requires limitations of “a determining unit to determine whether a CC that is added or removed exists; and a timing group reconfiguring unit to reconfigure the UL timing group based on the determined CC.” EX1001, 35:36-40. As discussed above in Section VII.E, Tenny in view of Huawei renders obvious claim 8. The additional limitations of claim 9 are

also disclosed by Zhang as follows.

1. Zhang discloses “a determining unit to determine whether a CC that is added or removed exists” [9.a].

As discussed in Section VIII.C.1, Zhang discloses [2.a]. The difference of [9.a] over [2.a] is a general-purpose hardware/software component (“a determining unit”) that carries out the determining step, which is also disclosed by Zhang. EX1003, ¶168.

Zhang discloses that the WTRU can be implemented by a processor in association with software. EX1007, ¶91. The features and elements described in Zhang, in conjunction with the WTRU, can also be implemented “in a computer program, software, or firmware incorporated in a computer-readable storage medium for execution by a general purpose computer or a processor.” EX1007, ¶89. Thus, a POSITA would have understood from Zhang’s teaching that a general-purpose hardware/software component is included in Zhang’s WTRU to perform the determining step. EX1003, ¶169.

Thus, Zhang discloses [9.a].

2. Zhang discloses “a timing group reconfiguring unit to reconfigure the UL timing group based on the determined CC” [9.b].

As discussed in Section VIII.C.2, Zhang discloses [2.b]. The difference of [9.b] over [2.b] is a general-purpose hardware/software component (“a timing group

reconfiguring unit”) that carries out the reconfiguring step, which is also disclosed by Zhang. EX1003, ¶170.

With Zhang’s teaching described above in Section VIII.C.2, a POSITA would have understood that a general-purpose hardware/software component is included in Zhang’s WTRU to perform the reconfiguring step. EX1003, ¶171.

Thus, Zhang discloses [9.b].

As discussed above in Section VIII.B, a POSITA would have been motivated to implement Zhang’s teaching of CC-specific reconfiguration to the performance of random access in a wireless communication system disclosed by Tenny and Huawei. EX1003, ¶173.

Therefore, Tenny in view of Huawei and further in view of Zhang renders obvious claim 9.

IX. GROUND 3: TENNY IN VIEW OF HUAWEI AND FURTHER IN VIEW OF WANG RENDERS OBVIOUS CLAIMS 3, 4, 10, AND 11

A. Overview of Wang

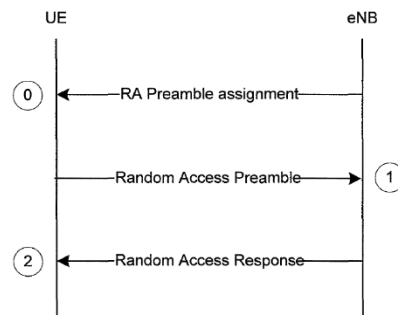
Wang, entitled “Method of Handling Uplink Synchronization and Related Communication Device,” describes a method and a mobile device for “handling uplink synchronization” in a wireless communication system with a plurality of component carriers (CCs). EX1008, Abstract; EX1009, 1-2 (Introduction). Like the ’372 patent, Wang identifies certain scenarios where different CCs from the same

eNB may have separate timing advances (TAs) that need to be synchronized. EX1008, 2:25-36; EX1009, 1-2; EX1003, ¶93.

Wang proposes three functions to be applied to the wireless communication system with multiple CCs and uplink (UL) timing advances. EX1008, 4:61-65; EX1009, 3. Regarding the first function of achieving UL timing synchronization on multiple CCs, Wang discloses various exemplary embodiments. For example, the UE in Wang may perform contention-based random access procedure on some CCs, and non-contention based random access procedure on some other CCs. EX1008, 7:8-29; EX1009, 5, 34 (Non-Contention Based Random Access Channel) (reproduced below); EX1003, ¶94.

Non-Contention based Random Access Channel

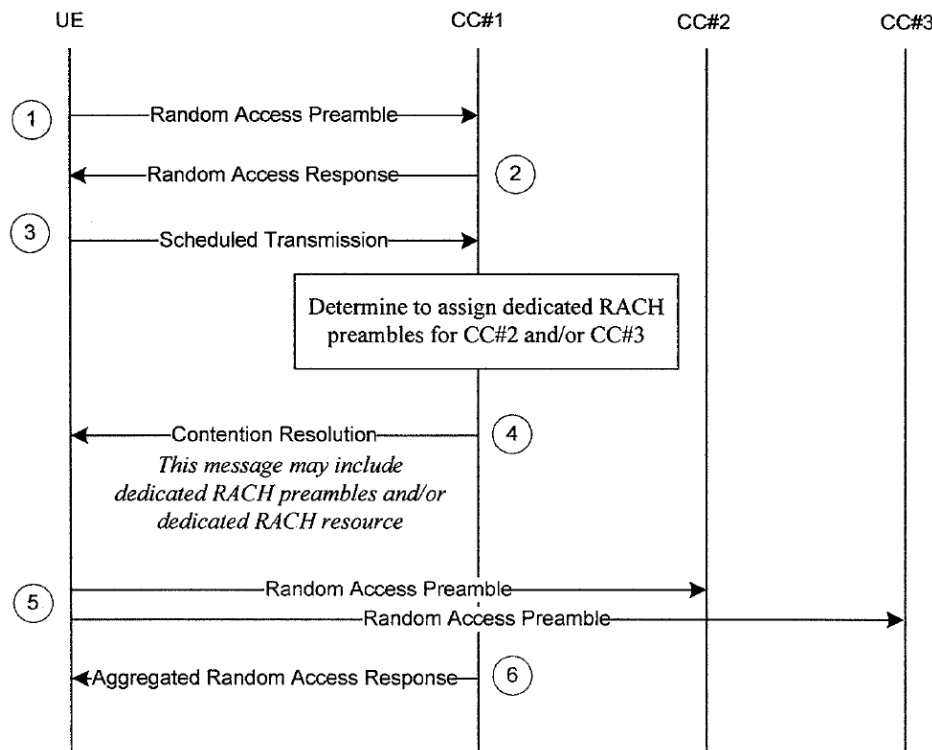
- Step 0: eNB may reserve some dedicated non-contention random access preamble, and assign to UE a non-contention Random Access Preamble.
- Step 1: UE may transmit the assigned non-contention Random Access Preamble.
- Step 2: The eNB may respond the Random Access Response message including the Timing Advance (TA) information.
 - ♦ It is optional that this message may include UL resource grant information.



Wang-Prov, p. 34 (Non-Contention based Random Access Channel)

EX1003 — FIG. 11

To increase the number of CCs, the network may send a message (*e.g.*, RRC Connection Reconfiguration message) to the UE. EX1008, 8:42-53; EX1009, 54. Upon the addition, the eNB “may transmit a message” that includes dedicated non-contention random access preamble (RAP). EX1008, 6:40-67, FIGs. 6-7; EX1009, 5-6 (Embodiment #2-1), 39-40 (Embodiment #2-1 and Procedure for the Embodiment #2-1). Subsequently, such dedicated non-contention RAP may be transmitted by the UE to the eNB, which replies “a message with the Timing Advance (TA) information” for the group of CCs based on the dedicated RAP associated with the CCs. *Id.* Wang also teaches that the RAP message may be replied from the eNB “through the same or different CCs, where the UE sends the [RAP],” including the CC via which the RRC message is transmitted. EX1009, 43 (Embodiment #2-4) (figure reproduced below); EX1003, ¶95.



Wang-Prov, p. 43 (Embodiment #2-4)

EX1003 — FIG. I2

Regarding the second function of maintaining Time Alignment Timer (TAT) validity, Wang describes three embodiments.

“1. **One TAT per UL CC:** A UE maintains one TAT per UL CC. The update of a TAT (start, restart or stop) follows LTE procedure.

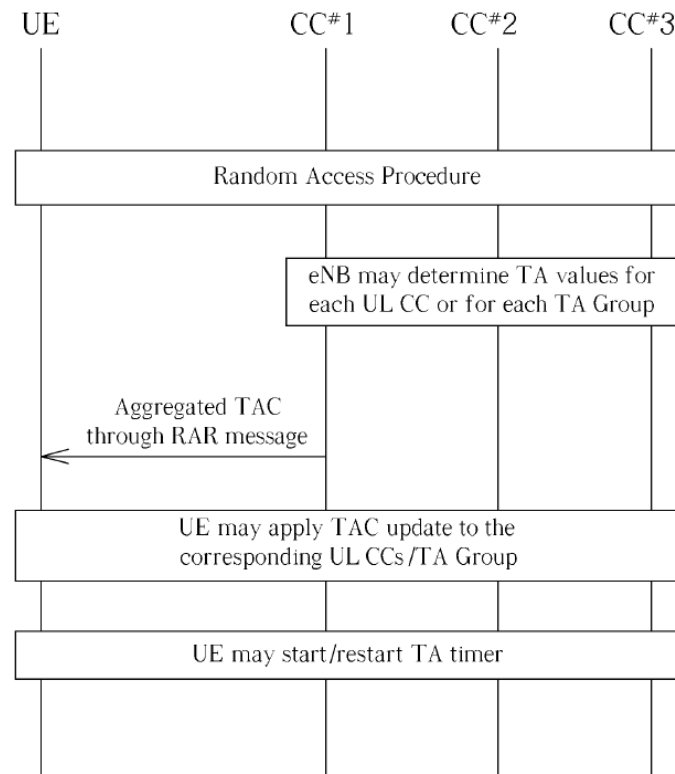
2. **One TAT per TA group:** A UE maintains one TAT per TA group, i.e., the UL CCs in the same TA group share the same TAT. The update of TAT in a TA group may follow LTE procedure.

3. **One common TAT:** All UL CCs share a common TAT.

The update of a TAT in LTE system could be triggered by Timing Advance Command received in Random Access Response (RAR) or in MAC Control Element (MAC CE).”

EX1009, 9, 59; EX1008, 9:59-10:3, 10:61-11:3. According to the second embodiment, applying a TA value of the delegate UL CC in a TA group can be an update for the TA values of all the UL CCs in that group. *Id*; EX1003, ¶96.

Regarding the third function of updating the TA, Wang discloses applying the Timing Advance Command (TAC) to the corresponding UL CCs or TA group, with the TA values determined by the eNB. EX1008, 11:44-60, FIG. 17; EX1009, 14 (figure reproduced below); EX1003, ¶97.



Wang '765, FIG. 17

EX1003 — FIG. J

Wang further describes that “[t]he UE adjusts the uplink timing of all the UL CCs in the same TA group according to the received TAC.” EX1009, 9, 12; EX1008,

FIGs. 18A-18C. In some cases, the RAR message transmitted from the eNB includes “UL resource grant information,” in addition to the TA information. EX1009, 15-16 (figures), 34; EX1008, FIGs. 18A-18C; EX1003, ¶98.

B. Reasons to Combine Tenny and Huawei with Wang

The reasons to combine Tenny and Huawei have been discussed extensively in Section VII.C, and thus will not be repeated here. The following explains why a POSITA would have been motivated to combine Tenny and Huawei’s random access performance in a wireless communication system with Wang’s teaching of (i) obtaining the TA value via an RAR message from the eNB (“TA acquirement element”); and (ii) updating the TA value in case a UE-specific TAT expires (“TA update element”). EX1003, ¶175.

First, Wang, Tenny, and Huawei are analogous art in the same field as the ’372 patent, which relates to multicarrier wireless communication. EX1001, 1:15-19; EX1004, ¶3; EX1005, Appx. A (1:1-3); EX1006, 1 (§1); EX1008, Abstract; EX1009, 1-2 (Introduction). In particular, Wang identifies certain scenarios where different CCs from the same eNB may have separate timing advances (TAs) that need to be synchronized. EX1008, 2:25-36; EX1009, 1-2. This synchronization issue is also recognized by Tenny and Huawei. EX1004, ¶9; EX1005, Appx. (1:24-29); EX1006, 3 (§2.2.3). To address this issue, Tenny proposes a timing alignment method for the multicarrier system that focuses on transmission of uplink group of

CCs within a threshold value of uplink timing. EX1004, Abstract, claim 1. Wang's improvement is similarly related to uplink CC synchronization, which performs two separate random access procedures on two CCs separately. EX1008, Abstract, 13:24-48 (claim 1).

Moreover, Tenny discloses or at least suggests the two claim features of the '372 patent that Wang improves upon. Regarding the TA acquirement element, Tenny states that updating the timing of a timing group is by "performing a random access procedure." EX1004, ¶58; EX1005, ¶37. Although Tenny does not explicitly describe the random access procedure, a POSITA, upon consideration of Tenny's disclosure, would be motivated to find further details as to the performance of the random access procedure. EX1003, ¶177. A POSITA would have relied on Wang, which identifies that the RAR message is part of the random access procedure and that the RAR message includes the TA value, to supplement Tenny, because Wang provides the relevant details. EX1008, 1:48-56, 9:20-29; EX1009, 9, 12, 33-34; EX1003, ¶177.

Similarly, regarding the TA update element, Tenny at least suggests one of the conditions that trigger the TA update—re-establishment of downlink (DL) CCs is needed when the uplink transmissions are not aligned with the received downlink timing, so that DL CC synchronization is regained. EX1004, ¶10; EX1003, ¶178. A POSITA would have understood that there are alternative ways to trigger the TA

update, especially in view of the five different conditions claimed in the '372 patent, and would search for a known, alternative method that would also trigger the TA update. EX1003, ¶178. Wang provides such an alternative method by relying on a case in which a UE-specific time alignment timer expires. EX1008, 1:32-47; EX1009, 9-10. Wang's method brings about the same predictable results as Tenny's, *i.e.*, updating the TA value during the random access procedure in a multicarrier wireless communication system. EX1003, ¶178.

C. Dependent Claim 3

Claim 3 depends on independent claim 1, and additionally requires limitations of *“obtaining of the time alignment timer value⁷ comprises: obtaining the time alignment timer value by receiving, from an evolved NodeB (eNB), a random access response message including the TA value to be used for the UL timing.”* EX1001, 34:45-50. As discussed above in Section VII.D, Tenny in view of Huawei renders obvious claim 1. The additional limitations of claim 3 are also disclosed by Tenny or Wang as follows.

Tenny discloses updating the timing of a timing group by “performing a

⁷ The term “time alignment timer value” in claim 3 lacks antecedent basis. For the purpose of this IPR, Petitioner considers this term to refer to “timing advance (TA) value” recited in claim 1. Petitioner reserves the right to challenge indefiniteness of this term in judicial proceedings should claim 3 be asserted against Petitioner in the future.

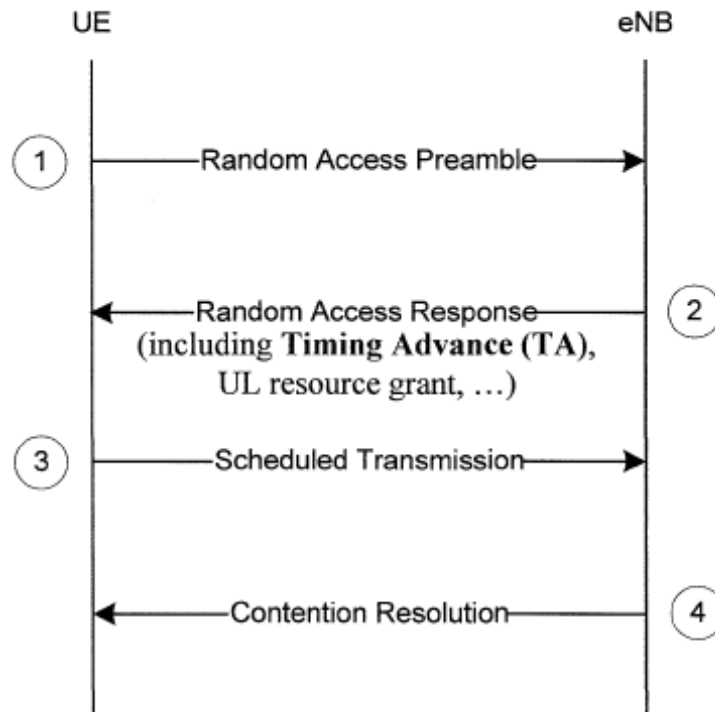
random access procedure.” EX1004, ¶58; EX1005, ¶37. A POSITA would have understood the random access procedure to include a random response message. EX1003, ¶181. In the network-based solution proposed by Tenny, the network (such as the eNB) assigns the UE to a particular group of CCs, and instructs the UE regarding which delegate CC to use for random access. EX1004, ¶60; EX1005, Appx. A (2:18-20). With the above teachings by Tenny, a POSITA would have understood that the timing advance value for update is received from the eNB in the form of a random response message. EX1003, ¶181.

Thus, Tenny discloses the additional limitations of claim 3.

To the extent that Tenny’s disclosure is found insufficient as to the feature that the TA value is included in an RAR message transmitted from the eNB, Wang provides such teaching. Wang discloses in the “Description of the Prior Art” section that an RAR message is used to transmit the TA value, via a timing alignment command (TAC), from the eNB to the UE. EX1008, 1:48-56, 9:20-29; EX1009, 9, 12, 33-34; ⁸ EX1003, ¶183. Additionally, as shown in the figure of Wang-Prov (reproduced below), step 2 teaches that the eNB transmits an RAR message to the

⁸ Dual citations to Wang ’765 (EX1008) and Wang-Prov (EX1009) are provided to demonstrate that the specific disclosures identified and relied upon in this Petition from Wang ’765 are supported by the written description in Wang-Prov. To the extent it becomes necessary to rely on the filing date of Wang-Prov as the U.S. effective filing date of Wang ’765 under 35 U.S.C. § 102(e), the requisite written description support is established by the dual citations. *See* Section IV.

UE, which includes the Timing Advance (TA) information. EX1009, 33; EX1003, ¶183.



EX1003 — FIG. O

Thus, Wang discloses the additional limitations of claim 3.

As discussed above in Section IX.B, a POSITA would have been motivated to implement Wang's teaching of obtaining the TA value via an RAR message from the eNB to the performance of random access in a wireless communication system disclosed by Tenny and Huawei. EX1003, ¶185.

Therefore, Tenny in view of Huawei and further in view of Wang renders obvious claim 3.

D. Dependent Claim 4

Claim 4 depends on independent claim 1, and additionally requires limitations of “*sensing occurrence of a condition for updating the TA value, wherein the condition for updating the TA value corresponds to at least one of: a case in which re-establishment of synchronization with respect to DL CCs is required; a case in which transmission of UL data is initialized; a case in which a UE-specific time alignment timer expires; and a case in which a time alignment timer set for each UL timing group expires.*” EX1001, 34:51-62. As discussed above in Section VII.D, Tenny in view of Huawei renders obvious claim 1. The additional limitations of claim 4 are also disclosed by Tenny and Wang as follows.

As an initial matter, it is noted that claim 4 requires “***at least one of***” the following four conditions: [i] “*a case in which re-establishment of synchronization with respect to DL CCs is required*”; [ii] “*a case in which transmission of UL data is initialized*”; [iii] “*a case in which a UE-specific time alignment timer expires*”; and [iv] “*a case in which a time alignment timer set for each UL timing group expires.*” Therefore, satisfying any one of the four conditions would disclose this entire limitation. EX1003, ¶188.

Tenny satisfies condition [i]. Specifically, Tenny discloses that, for maintaining timing synchronization in a single-carrier environment, the downlink offset needs to be updated to align its uplink transmissions in relation to the received

downlink timing. EX1004, ¶9; EX1005, Appx. A (1:5-8). The same would be true for such timing synchronization in a multicarrier environment where timing variation “make[s] separate timing offsets per carrier beneficial or even necessary.” EX1004, ¶10; EX1003, ¶189. Thus, a POSITA would have understood that, when the uplink transmissions are not aligned with the received downlink timing, the timing synchronization with respect to DL CCs in a multicarrier system needs to be re-established by updating the offset(s) of the DL CCs. EX1003, ¶189.

Thus, Tenny discloses the additional limitations of claim 4.

Alternatively, Wang satisfies condition [iii]. Specifically, Wang discloses that the UE maintains a time alignment timer (TAT) (“*UE-specific time alignment timer*”) indicating whether the UE is synchronized with the eNB on uplink timing, and when the TAT expires, the UE performs a random access procedure to update the TA value (“*sensing occurrence of a condition for updating the TA value, wherein the condition for updating the TA value corresponds to ... a case in which a UE-specific time alignment timer expires*”). EX1008, 1:32-47; EX1009, 9-10; EX1003, ¶190.

Thus, Wang discloses the additional limitations of claim 4.

As discussed above in Section IX.B, POSITA would have been motivated to implement Wang’s teaching of updating the TA value in case a UE-specific TAT expires to the performance of random access in a wireless communication system

disclosed by Tenny and Huawei. EX1003, ¶191.

Therefore, Tenny in view of Huawei and further in view of Wang renders obvious claim 4.

E. Dependent Claim 10

Claim 10 depends on independent claim 8, and additionally require limitations of “*wherein the TA value obtaining unit receives a random access response message including the TA value to be used for obtaining the UL timing, from an evolved NodeB (eNB).*” EX1001, 35:41-44. As discussed above in Section VII.E, Tenny in view of Huawei renders obvious claim 8. The additional limitations of claim 10 are also disclosed by Tenny or Wang as follows.

As discussed in Section IX.C, Tenny discloses claim 3. Moreover, as discussed in Section VII.E.4, Tenny discloses the TA value obtaining unit.

Thus, Tenny discloses the additional limitations of claim 10.

Alternatively, as discussed in Section IX.C, Wang discloses claim 3. The difference of claim 10 over claim 3 is a general-purpose hardware/software component (“*the TA value obtaining unit*”) that carries out the receiving step, which is already disclosed by Tenny. *See* Section VII.E.4; EX1003, ¶195.

Thus, Tenny in view of Wang discloses the additional limitations of claim 10.

As discussed above in Section IX.B, a POSITA would have been motivated to implement Wang’s teaching of obtaining the TA value via an RAR message from

the eNB to the performance of random access in a wireless communication system disclosed by Tenny and Huawei. EX1003, ¶196.

Therefore, Tenny in view of Huawei and further in view of Wang renders obvious claim 10.

F. Dependent Claim 11

Claim 11 depends on independent claim 8, and additionally requires limitations of “*a condition sensing unit to sense occurrence of a condition for updating the TA value, wherein the condition for updating the TA value corresponds to at least one of: a case in which re-establishment of synchronization with respect to DL CCs is required; a case in which transmission of UL data is initialized; a case in which a UE-specific time alignment timer expires; and a case in which a time alignment timer set for each UL timing group expires.*” EX1001, 35:45-57. As discussed above in Section VII.E, Tenny in view of Huawei renders obvious claim 8. The additional limitations of claim 11 are also disclosed by Tenny or Wang as follows.

As discussed in Section IX.D, Tenny discloses claim 4. The difference of claim 11 over claim 4 is a general-purpose hardware/software component (“*a condition sensing unit*”) that carries out the sensing step, which is also disclosed by Tenny. EX1003, ¶199.

Tenny discloses that software functions can be implemented with modules

(e.g., procedures, functions, and so on) that perform the functions, and hardware components can be implemented by, *e.g.*, processors, controllers, micro-controllers, microprocessors, other electronic units designed to perform the functions. EX1004, ¶¶122-123. Thus, a POSITA would have understood from Tenny's teaching that a general-purpose hardware/software component is included in Tenny's UE to perform the sensing step. EX1003, ¶200.

Thus, Tenny discloses the additional limitations of claim 11.

Alternatively, as discussed in Section IX.D, Wang discloses claim 4. The general-purpose hardware/software component ("*a condition sensing unit*") that carries out the sensing step, which is already disclosed by Tenny, as discussed immediately above. EX1003, ¶202.

Thus, Tenny in view of Wang discloses the additional limitations of claim 11.

As discussed above in Section IX.B, a POSITA would have been motivated to implement Wang's teaching of updating the TA value in case a UE-specific TAT expires to the performance of random access in a wireless communication system disclosed by Tenny and Huawei.

Therefore, Tenny in view of Huawei and further in view of Wang renders obvious claim 11.

X. GROUND 4: TENNY IN VIEW OF HUAWEI AND FURTHER IN VIEW OF NOKIA RENDERS OBVIOUS CLAIMS 7 AND 14

A. Overview of Nokia

Nokia proposes two options in response to the question of whether the UE should support multiple RACH procedures as a result of carrier aggregation (CA). EX1010, 2. One option is for the UE to “support a single RACH (per group of UL CCs that share a common timing advance).” EX1010, 3. The other option is for the UE to “support multiple RACH (per group of UL CCs that share a common timing advance).” *Id.* In either case, the RACH is “associated with the ‘special cell’ or primary carrier ... if the carrier is part of the group of CCs that apply the same timing advance.” *Id.*; EX1003, ¶99.

Nokia further proposes that if a UE operates with multiple timing advance groups, then it should have at least one RACH per group to enable correct timing alignment. EX1010, 1; EX1003, ¶100.

B. Reasons to Combine Tenny and Huawei with Nokia

The reasons to combine Tenny and Huawei have been discussed extensively in Section VII.C, and thus will not be repeated here. The following explains why a POSITA would have been motivated to combine Tenny and Huawei’s random access performance in a wireless communication system with Nokia’s delegate CC setting mechanism, which sets a CC corresponding to a primary cell in the UL timing group. EX1003, ¶204.

First, Nokia, Tenny, and Huawei are analogous art in the same field as the '372 patent, which relates to multicarrier wireless communication. EX1001, 1:15-19; EX1004, ¶3; EX1005, Appx. A (1:1-3); EX1006, 1 (§1); EX1010, 2; EX1003, ¶205. Notably, Nokia and Huawei are both 3GPP TSG-RAN WG2 proposals disclosed publicly around the same time (no later than January 12, 2010), discussed at the same working group meeting (Meeting #68bis held at Valencia, Spain on January 18-22, 2010), and presented in short order (Agenda Item #7.1.1 for Huawei and #7.1.8 for Nokia). EX1006, 1; EX1010, 1; EX1011, ¶68. This significantly increases the chance that a POSITA in the field will have access to and consult both references at about the same time. EX1011, ¶65; EX1011, ¶68; EX1003, ¶205.

Next, as discussed in Section VII.D.3, it would have been obvious to supplement Tenny with Huawei's delegate CC selection mechanism—selecting a CC having a lowest center frequency from a UL timing group as the carrier candidate. Similarly, a POSITA would have supplemented Tenny with Nokia's alternative CC selection mechanism—selecting a PCell CC for random access procedure. *See* Sections X.C and X.D, *infra*. Since it would have been obvious for a POSITA to substitute Tenny's delegate CC setting mechanism with Huawei's, as discussed in Section C, and given the proximity between Huawei and Nokia, as discussed above, it would be similarly obvious for a POSITA to substitute Tenny

and Huawei's delegate CC setting mechanism with Nokia's. EX1003, ¶206. The substitution would yield predictable results—primary CC being always activated, and thus having better coverage than secondary CC. EX1003, ¶206; *see* EX1001, 7:66-67.

C. Dependent Claim 7

Claim 7 depends on independent claim 1, and additionally requires limitations of “*wherein setting of the delegate CC comprises: setting a CC corresponding to a primary cell (PCell) in the UL timing group to be the delegate CC.*” EX1001, 35:10-13. As discussed above in Section VII.D, Tenny in view of Huawei renders obvious claim 1. The additional limitations of claim 7 are also disclosed by Nokia as follows.

As discussed above in Section X.A, in a multicarrier (*i.e.*, carrier aggregation) system, Nokia discloses two options for supporting RACH procedures, and under either option, the RACH is “associated with the ‘special cell’ or primary carrier ... if the carrier is part of the group of CCs that apply the same timing advance.” EX1010, 2-3; EX1003, ¶208; *see also* EX1015, 3 (teaching that “[t]he PCC corresponds to the ‘special’ cell” which “conveys SR, offers a RACH and governs RLF”). Nokia further proposes that at least one RACH per timing advance group is needed to enable correct timing alignment. EX1010, 1; EX1003, ¶208. With such teaching, a POSITA would have understood that the RACH uses a CC selected from

the group of CCs, which corresponds to the primary servicing cell. EX1010, 1; EX1003, ¶208.

As discussed above in Section X.B, a POSITA would have been motivated to implement Nokia's teaching of setting a CC corresponding to the primary service cell to the performance of random access in a wireless communication system disclosed by Tenny and Huawei. EX1003, ¶¶209-210.

Therefore, Tenny in view of Huawei and further in view of Nokia renders obvious claim 7.

D. Dependent Claim 14

Claim 14 depends on independent claim 8, and additionally requires limitations of "*wherein the delegate CC setting unit sets a CC corresponding to a primary service cell (PCell) in the UL timing group to be the delegate CC.*" EX1001, 36:11-14. As discussed above in Section VII.E, Tenny in view of Huawei renders obvious claim 8. The additional limitations of claim 14 are also disclosed by Nokia as follows.

As discussed in Section X.C, Nokia discloses claim 7. Moreover, as discussed in Section VII.E.3, Tenny discloses the delegate CC setting unit.

Thus, Tenny in view of Nokia discloses the additional limitations of claim 14.

As discussed above in Section X.B, a POSITA would have been motivated to implement Nokia's teaching of setting a CC corresponding to the primary service

cell to the performance of random access in a wireless communication system disclosed by Tenny and Huawei. EX1003, ¶214.

Therefore, Tenny in view of Huawei and further in view of Nokia renders obvious claim 14.

XI. DISCRETIONARY DENIAL

Pursuant to the Memorandum issued to all PTAB Judges by the Acting Director of the USPTO on March 26, 2025, titled “Interim Process for PTAB Workload Management,” Petitioner will respond to any discretionary denial arguments Patent Owner may raise through the Board’s bifurcated briefing process.

Nevertheless, to simplify the *Fintiv* analysis, and following the precedential *Sotera* decision, Petitioner stipulates that, if this IPR is instituted, Petitioner will not pursue in the EDTX case any ground that Petitioner raised or reasonably could have raised against the challenged claims during the instituted IPR. *See Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 19 (PTAB Dec. 1, 2020) (precedential).

XII. CONCLUSION

Based on the grounds specified above, IPR of all challenged claims is respectfully requested.

Respectfully submitted,

BAYES PLLC

/Zhiwei Zou/

Zhiwei (Wayne) Zou

Registration No. 66,041

Lead Counsel for Petitioner

Date: May 6, 2025

8260 Greensboro Drive, Suite 625

McLean, VA 22102

(703) 995-9887

CERTIFICATION UNDER 37 C.F.R. § 42.24(d)

This Petition complies with the requirements of 37 C.F.R. § 42.24. As calculated by the word count feature of Microsoft Word, it contains 13,906 words, excluding the words contained in the following: Table of Contents, Table of Authorities, List of Exhibits, Mandatory Notices, Certification Under § 42.24(d), and Certificate of Service.

/Zhiwei Zou/

Zhiwei (Wayne) Zou

Registration No. 66,041

Lead Counsel for Petitioner

CERTIFICATE OF SERVICE

The undersigned certifies that the foregoing **Petition for *Inter Partes* Review**, **the associated Power of Attorney, and Exhibits 1001-1019** are being served on May 6, 2025, by U.S. Priority Express Mail at the following address of record for the subject patent.

58027 – H.C. Park & Associates, PLC
1894 Preston White Drive
Reston, VA 20191

A courtesy copy was also sent via electronic mail to Patent Owner's litigation counsel at the following addresses:

Geoffrey Culbertson
Kelly Tidwell
gpc@texarkanalaw.com
kbt@texarkanalaw.com
**PATTON TIDWELL & CULBERTSON,
LLP**

James A. Fussell, III
jfussell@mayerbrown.com
pantech-oneplus-service@mayerbrown.com
MAYER BROWN LLP

/Ashley F. Cheung/
Ashley F. Cheung
Paralegal for Petitioner's Counsel