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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC., HTC CORPORATION, HTC AMERICA, INC.,
ZTE CORPORATION, and ZTE (USA), INC.,
Petitioner,

v.

CELLULAR COMMUNICATIONS EQUIPMENT LLC,
Patent Owner.

Case IPR2016-01480[1]
Patent 8,867,472 B2

Before BRYAN F. MOORE, GREGG I. ANDERSON,
And JOHN A. HUDALLA, *Administrative Patent Judges*.

ANDERSON, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) AND 37 C.F.R. § 42.73

[1] HTC Corporation, HTC America, Inc., ZTE Corporation, and ZTE (USA), Inc. filed a petition in (now terminated) IPR2017-00982 ("'982 IPR"), and have been joined to the instant proceeding. Subsequently, Apple, Inc. was terminated from the proceeding. *See infra* Section I, n.3.

I. INTRODUCTION

Apple Inc. ("Apple") filed a Petition (Paper 1, "Pet.") pursuant to 35 U.S.C. §§ 311–319 to institute an *inter partes* review of claims 1, 10, 11, 14, 28, 37, 38, and 41 ("the challenged claims") of U.S. Patent No. 8,867,472 B2 ("the '472 patent," Exhibit 1001), filed March 25, 2010. HTC Corporation, HTC America, Inc., ZTE Corporation, and ZTE (USA), Inc. (collectively "HTC et al." or "Petitioner") were joined in this proceeding. (*See* Paper 14, n.1; '982 IPR, Paper 8).

The Petition is supported by the Declaration of Zygmunt J. Haas, Ph.D. ("Haas Declaration," Ex. 1003). Dr. Haas was deposed by Patent Owner ("Haas Deposition," "Haas Dep.," Ex. 2004). Cellular Communications Equipment LLC ("Patent Owner") filed a Preliminary Response (Paper 6, "Prelim. Resp.").[2]

We instituted an *inter partes* review of the challenged claims (Paper 9, "Institution Decision" or "Inst. Dec."). Patent Owner filed a Response ("PO Resp.," Paper 12) and Petitioner filed a Reply ("Pet. Reply," Paper 16). Patent Owner's Response is supported by the Declaration of Jay P. Kesan, Ph.D. ("Kesan Declaration," Ex. 2002). Dr. Kesan was deposed by Petitioner ("Kesan Deposition," "Kesan Dep.," Ex. 1013). The Board filed a transcription of a Final Hearing held on August 30, 2017 ("Tr.," Paper 23). Subsequent to the hearing, Apple was terminated from this proceeding,

[2] In its Preliminary Response, Patent Owner argued Dr. Haas was not shown to be a "qualified as an expert by knowledge, skill, experience, training or education." Prelim. Resp. 15–17. We found Dr. Haas was sufficiently qualified to provide testimony. Inst. Dec. 13–14. Patent Owner does not raise that issue again in its Response, so we deem the argument waived. *See* Scheduling Order, 3 (Paper 8).

reaching a settlement with Patent Owner. Paper 26, 3.[3]

The Board has jurisdiction under 35 U.S.C. § 6. This Final Written Decision issues pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 10, 11, 14, 28, 37, 38, and 41 are unpatentable.

A. Related Proceedings

Petitioner advises us that the '472 patent has been asserted in *Cellular Communications Equipment LLC v. AT&T Inc., et al.*, 2:15-cv-00576 (E.D. Tex. 2015) (consolidated lead case) (the "District Court" or the "District Court Lawsuit"). Pet. 2. Including the lawsuit identified by Petitioner, Patent Owner advises us that there are four separate lawsuits filed by Patent Owner against various parties in the U.S. District Court for the Eastern District of Texas. Paper 3, 2–3. In addition, there are two *inter partes* review proceedings asserting unpatentability of claims of the '472 patent: *Telefonaktiebolaget LM Ericsson and Ericsson Inc. v. Cellular Communications Equipment LLC*, Case IPR2016-01485 ("'1485 IPR");[4] and *HTC Corporation and HTC America, Inc. v. Cellular Communications Equipment LLC*, Case IPR2016-01504 ("'1504 IPR").[5] *Id.*

[3] As a result of the termination, from now forward, HTC et al. are authorized to take the active role with respect to this proceeding. *See* Paper 14, 7 (restricting HTC et al. from an active role pending authorization of the Board).
[4] Terminated by settlement. '1485 IPR, Paper 13.
[5] Institution denied. '1504 IPR, Paper 7.

B. Technology and the '472 Patent (Ex. 1001)

The '472 patent describes an apparatus and method for sending and receiving aperiodic channel state information ("CSI") for a selected downlink component carrier of a plurality of component carriers ("CCs"). Ex. 1001, Abstract, 1:15, 1:19.

1. LTE Wireless Communication Systems

The '472 patent relates generally to 3rd Generation Partnership Project (3GPP) LTE ("Long term evolution") wireless communication systems.[6] Ex. 1001, 1:26, 1:42–47; *see* Ex. 1003 ¶ 20. A base station sends user equipment ("UE") a request to "force the UE to send an aperiodic CSI [("Channel State information")] report." Ex. 1001, 1:19–20, 1:40, 3:4–11. The CSI can include channel quality indicators ("CQI"), precoding matrix indicators ("PMI"), rank indicators, channel frequency, impulse response, and/or channel covariance matrix. *Id.* at 2:1–10. CSI reports may also include identification information concerning the component carrier or sub-band to which the CSI report relates. *Id.*

The UE of the '472 patent provides feedback on CSI using carrier aggregation. Ex. 1001, 1:41–47. Generally, carrier aggregation groups are multiple component carriers used to increase the overall system bandwidth available to a UE. *Id.* at 1:54–61. Figure 3 from the '472 patent is reproduced below.

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[6] Petitioner provides a copy of one of the LTE standard documents as Exhibit 1011: 3GPP TS 36.201 V8.3.0 (2009-03) TECHNICAL SPECIFICATION-3RD GENERATION PARTNERSHIP PROJECT; TECHNICAL SPECIFICATION GROUP RADIO ACCESS NETWORK; EVOLVED UNIVERSAL TERRESTRIAL RADIO ACCESS (E-ULTRA); LTE PHYSICAL LAYER-GENERAL DESCRIPTION (Release 8) (3GPP Organizational Partners 2009).

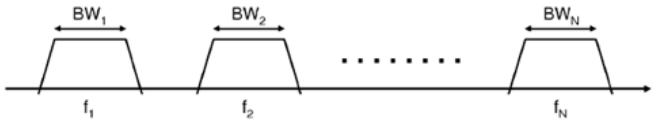

Fig. 3

Figure 3 shows an example of carrier aggregation. *Id.* at 2:57. Figure 3 illustrates "component carrier aggregation (or channel bonding), where the total system bandwidth consists of [a] set of component carriers." *Id.* at 1:55–57. In the example of Figure 3, carrier aggregation occurs with non-contiguous bands, in which "the total system bandwidth contains a set of component carriers BW_1, BW_2, . . . , BW_N, having carrier frequencies f_1, f_2, . . . , f_N." *Id.* at 1:58–61.

2. The '472 Patent

The "ongoing standardization of LTE-Advanced in 3GPP" uses carrier aggregation to form bandwidths of up to 100MHz by aggregating up to five component carriers of 20 MHz each. Ex. 1001, 1:62–65. The problem with using multiple component carriers is the creation of large CSI reports, resulting in high overhead, which in turn limits uplink capacity. *Id.* at 2:20–22, 3:20–29.

The '472 patent describes a solution to the problem where a request is made for an aperiodic channel information (e.g., CSI) report for a specific downlink ("DL") component carrier, which may include "some coarse wideband CSI for other CCs." *Id.* at 3:35–40. The UE sends CSI reports to the eNode-B ("base station") upon a request from the base station ("BS") for a particular channel, thus, greatly reducing the costs of reporting within the UE and BS system. *Id.* at 1:24, 2:66–3:3, 3:30–40, Fig. 1.

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