UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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APPLE INC.,
Petitioner,

v.

TELEFONAKTIEBOLAGET LM ERICSSON,
Patent Owner.

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IPR2022-00339
Patent 10,492,179 B2

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Before GEORGIANNA W. BRADEN, SHARON FENICK, and
STEPHEN E. BELISLE, *Administrative Patent Judges*.

FENICK, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314, 37 C.F.R. § 42.4

I. INTRODUCTION

A. Background and Summary

Apple Inc. ("Petitioner") filed a petition for *inter partes* review challenging claims 1–18 ("challenged claims") of U.S. Patent 10,492,179 B2 (Ex. 1001 ("'179 patent")). Paper 2 ("Pet." or "Petition"). Telefonaktiebolaget LM Ericsson ("Patent Owner") timely filed a Preliminary Response. Paper 6 ("Prelim. Resp."). The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides as follows:

> (a) THRESHOLD.—The Director may not authorize an inter partes review to be instituted unless the Director determines that the information presented in the petition filed under section 311 and any response filed under section 313 shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.

35 U.S.C. § 314(a).

Petitioner challenges claims 1–18 as unpatentable under 35 U.S.C. § 103. Pet. 1. Patent Owner argues that the Petition should be denied. *See generally* Prelim. Resp. Based on our review of the record, we conclude that Petitioner is reasonably likely to prevail in demonstrating that at least one of the challenged claims is not patentable.

Our findings of fact and conclusions discussed below are based on the evidentiary record developed thus far. This Decision to institute trial is not a final decision as to the patentability of any challenged claim. Any final decision will be based on the full record developed during trial.

B. Real Parties in Interest

Patent Owner states that Telefonaktiebolaget LM Ericsson and Ericsson Inc. are real parties in interest. Paper 4 (Patent Owner's Mandatory Notices), 2.

Petitioner identifies only itself as a real party in interest. Pet. 83.

C. Related Matters

Patent Owner and Petitioner indicate the '179 Patent was challenged previously in a petition filed in IPR2021-00587, now terminated. Pet. 83; Paper 4, 2. Petitioner notes that the petition was dismissed prior to institution and before a preliminary response was filed. Pet. 83.

D. The '179 Patent

The '179 patent is titled "Resource Signaling for PUCCH [Physical Uplink Control CHannel]" and generally relates to user equipment (UE) in a radio access network transmitting acknowledgement signaling pertaining to downlink data received from a network node. Ex. 1001, codes (54), (57), 1:38–57, 15:63. The '179 patent describes that a UE receives downlink data including one or more downlink data elements. *Id.* at code (57), 1:39–42, 1:48–62. The UE transmits, in uplink, acknowledgement signaling, for example, according to an ARQ (Automatic Repeat reQuest) or HARQ (Hybrid Automatic Repeat reQuest) process, which represents an acknowledgement or non-acknowledgement of correct reception of a corresponding downlink data element. *Id.* at 1:59–66, 3:30–47, 7:5–22.

The acknowledgement signaling may have a format comprising one or more acknowledgement substructures, each of which carries acknowledgement information pertaining to a downlink data element. *Id.* at code (57), 1:62–66, 4:31–35. The mapping of acknowledgement substructure to downlink data element is based on information

(acknowledgement position indication) provided in downlink control signaling received by the UE. *Id.* at code (57), 1:46–49, 1:66–2:3, 4:15–18. The acknowledgement position indication may include a resource selection indication, which indicates a resource for transmitting an acknowledgment indication, selected from a number of possible resources, e.g., on a PUCCH uplink channel. *Id.* at 4:36–42, 4:44–49. Additionally, the acknowledgment position indication may comprise a timing indication, indicating a timing (e.g., a time interval like a slot) for transmitting the acknowledgment signaling, as well as indicating to which acknowledgment substructure of a resource a data element is mapped. *Id.* at 4:50–55, 5:6–8.

Figure 3 of the '179 patent, reproduced below, is an illustration showing a mapping of signaling to PUCCH resources. *Id.* at 8:63–64, 10:1–3.
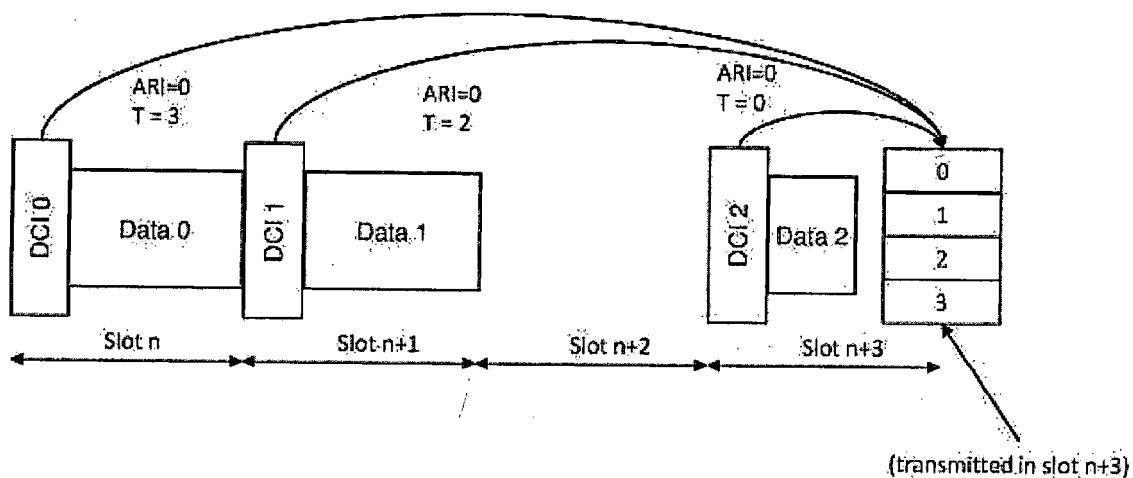

Fig. 3

As seen in Figure 3, in slot n, the downlink transmission contains DCI (downlink control information) 0. *Id.* at 9:16–18, 10:1–5. The ACK/NACK

timing indicator (T) in DCI 0 is 3, indicating that feedback is requested three timeslots later, in slot n+3. *Id.* at 3:59–63, 9:16–20, 10:22–25, 10:38–44, Fig. 3. Similarly, the timing indication T in the DCI of slot n+1 (T=2) and slot n+3 (T=0) indicates that feedback for each of these downlink transmissions is also requested in slot n+3. *Id.* Thus, as shown by arrows, each DCI points to the same slot for transmitting feedback.

In each DCI, an ACK/NACK Resource Indicator (ARI) is a resource selection indicator and indicates a PUCCH resource to be used to transit HARQ feedback. *Id.* at 4:36–49, 9:21–22, 9:27–30, 9:42–44. As can be seen in Figure 3, each ARI in the DCI for each downlink transmission points to the same PUCCH resource (resource 0). *Id.* at 10:3–5, 10:48–51, Fig. 3. "The PUCCH format must be capable to carry multiple bits in different substructures. Accordingly, HARQ feedback of multiple DL transmissions is transmitted on a single PUCCH transmission/message, respectively is jointly encoded/modulated (PUCCH is completely transmitted in slot n+3)." *Id.* at 10:5–10.

As the timing indicator T and the ARI in each DCI indicates the same time slot and PUCCH resource, the timing indicators T may also be used for a second purpose – to indicate which substructure within the PUCCH resource should be used for transmitting the feedback. *Id.* at 4:50–55, 10:22–29, 10:56–62, Fig. 4. Thus, for a one-bit HARQ feedback, PUCCH resource 0 of slot n+3 could have the HARQ feedback for slot n in bit field 3, for slot n+1 in bit field 2, and for slot n+3 in bit field 0. *Id.* at 10:56–60. Bit field 1, which would correspond to a downlink transmission in slot n+2, not present in the examples presented, would be set to NACK. *Id.* at 10:60–65, 11:17–18. More generally, feedback may be more than one bit, and the timing indicator T points to the PUCCH sub-resource within the

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