

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

TELEFONAKTIEBOLAGET LM ERICSSON,
Patent Owner.

IPR2022-00457
Patent 9,509,440 B2

Before SALLY C. MEDLEY, GEORGIANNA W. BRADEN, and
NATHAN A. ENGELS, *Administrative Patent Judges*.

MEDLEY, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Apple Inc. (“Petitioner”) filed a Petition for *inter partes* review of claims 1–9, 11–19, 21, 23, 25, and 27 of U.S. Patent No. 9,509,440 B2 (Ex. 1001, “the ’440 patent”). Paper 1 (“Pet.”). Telefonaktiebolaget LM Ericsson (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). Institution of an *inter partes* review is authorized by statute when “the information presented in the petition . . . and any response . . . 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) (2018). Upon consideration of the Petition, the Preliminary Response, and the evidence of record, we determine that Petitioner has established a reasonable likelihood of prevailing with respect to the unpatentability of at least one claim of the ’440 patent. Accordingly, for the reasons that follow, we institute an *inter partes* review of all challenged claims of the ’440 patent.

A. Real Parties in Interest

Petitioner lists Apple Inc. as the real party-in-interest. Pet. 72.

Patent Owner lists Telefonaktiebolaget LM Ericsson and Ericsson Inc. as the real parties-in-interest. Paper 3 (“Patent Owner’s Mandatory Notices”), 2.

B. Related Matters

The parties indicate that the ’440 patent was the subject of *Samsung Electronics Co., Ltd. v. Telefonaktiebolaget LM Ericsson*, IPR2021-00509, which has been terminated. Pet. 70–71; Prelim. Resp. 1.

C. The '440 Patent

The '440 patent relates to “a radio node of a cellular network, a User Equipment, UE and methods therein, for enabling use of a high order modulation when communicating radio signals.” Ex. 1001, 1:9–12. Link adaptation in systems according to Long Term Evolution (LTE) is based on adaptive modulation and coding, “which controls data rate by adaptively adjusting the modulation scheme and/or channel coding rate according to the radio-link conditions.” *Id.* at 1:32–36. The Modulation and Coding Scheme (MCS) for Physical Downlink Shared Channel (PDSCH) transmission is indicated in the downlink MCS signaling by the serving radio node (base station) to the UE. *Id.* at 1:23–24, 1:36–40. Through uplink signaling, the UE informs the radio node about the channel quality through Channel Quality Indicator (CQI) signaling, including sending CQI reports to the radio node. *Id.* at 1:40–43. However, the “formats or protocols of today do not support any modulation with higher order than six bits per symbol, as in 64QAM [Quadrature Amplitude Modulation].” *Id.* at 2:16–20.

The '440 patent describes enabling higher-order modulation in a radio communication with a UE. *Id.* at code (57). A first table configuration comprises a first MCS table and a first CQI table that supports a certain maximum modulation order. *Id.* When the radio node detects that a modulation order higher than the maximum modulation order is potentially possible to use, the radio node instructs the UE to apply a second table configuration which comprises a second MCS table and a second CQI table. *Id.* At least one modulation order entry from the first MCS table is maintained in the second MCS table as a fallback in case it is desirable to use the modulation order entry from the first MCS table when the second MCS table is applied. *Id.* In one embodiment, “the lowest MCS entry with

MCS index 0, in the MCS table and/or at least one CQI entry, e.g. the lowest CQI entry for the lowest coding rate of the lowest modulation order with CQI index 1, in the CQI table is preserved or maintained from the basic MCS and/or CQI table.” *Id.* at 6:58–63. Thus a “fallback is provided in case it is only possible or desirable to use a modulation order lower than the higher modulation order, e.g. the lowest modulation order, when the second table configuration is applied.” *Id.* at 6:65–7:2.

D. Illustrative Claim

Petitioner challenges claims 1–9, 11–19, 21, 23, 25, and 27 of the ’440 patent. Claim 1, reproduced below with bracketed numbering added,¹ is illustrative.

1. [Preamble] A method performed by a radio node of a cellular network,

[1.1] the radio node being operable to apply a first table configuration in radio communications with User Equipments (UEs), the first table configuration comprising at least one of a first Modulation and Coding Scheme (MCS) table and a first Channel Quality Indicator (CQI) table,

[1.2] wherein the at least one of the first MCS table and the first CQI table support a certain maximum modulation order, the method comprising:

[1.3] detecting that a higher modulation order, which is higher than the maximum modulation order of the first table configuration, is potentially possible to use in a radio communication between the radio node and a first UE; and

[1.4] instructing the first UE to apply a second table configuration in the radio communication, the second table configuration comprising at least one of a second MCS table and a second CQI table, wherein the at least one of the second MCS

¹ For ease of reference, we adopt the bracketed numbering Petitioner uses in the Petition. *See* Pet. 20–37, 74–75.

table and the second CQI table support the higher modulation order,

[1.5] wherein at least one entry for at least one modulation order in the at least one of the first MCS table and the first CQI table is maintained in the at least one of the second MCS table and the second CQI table as a fallback in case it is desirable to use the at least one modulation order in the at least one of the first MCS table and the first CQI table when the second table configuration is applied; and

[1.6] wherein the at least one modulation order in the at least one of the first MCS table and the first CQI table comprises a lowest modulation order of the first table configuration, and

[1.7] wherein the first entry for the lowest modulation order in the first MCS table is maintained in the second MCS table as the fallback, and an entry for the lowest coding rate of the lowest modulation order in the first CQI table is maintained in the second CQI table as the fallback.

Ex. 1001, 15:50–16:21.

E. Asserted Challenges to Patentability

Petitioner asserts that claims 1–9, 11–19, 21, 23, 25, and 27 would have been unpatentable on the following basis (Pet. 5):

Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1–7, 9, 11–17, 19, 21, 23, 25, 27	103(a) ²	Lahetkangas ³

² The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended several provisions of 35 U.S.C., including § 103. Because the ’440 patent has an effective filing date after the effective date of the applicable AIA amendments, we refer to the post-AIA version of 35 U.S.C. § 103.

³ Patent Cooperation Treaty (PCT) Patent Application Publication No. WO 2013/123961 A1, published Aug. 29, 2013 (Ex. 1011, “Lahetkangas”).

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