UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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LG ELECTRONICS, INC.,
Petitioner,

v.

BELL NORTHERN RESEARCH, LLC,
Patent Owner.

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IPR2020-00108
Patent 8,416,862 B2

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Before BRYAN F. MOORE, MELISSA A. HAAPALA, and
STACY B. MARGOLIES, *Administrative Patent Judges*.

MARGOLIES, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314, 37 C.F.R. § 42.4
Denying Motion for Joinder
35 U.S.C. § 315(c), 37 C.F.R. § 42.122

I. INTRODUCTION

LG Electronics, Inc. ("Petitioner") filed a petition for *inter partes* review of claims 9–12 of U.S. Patent No. 8,416,862 B2 (Ex. 1001, "the '862 patent"). Paper 2 ("Pet."). Bell Northern Research, LLC ("Patent Owner") filed a Preliminary Response. Paper 9 ("Prelim. Resp."). Pursuant to our authorization, Petitioner filed a Preliminary Reply ("Prelim. Reply," Paper 11) and Patent Owner filed a Preliminary Sur-Reply ("Prelim. Sur-Reply," Paper 12).

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); *see* 37 C.F.R. § 42.108. Upon consideration of the Petition, the Preliminary Response, the Preliminary Reply, and the Preliminary Sur-Reply, we conclude that the information presented shows that there is a reasonable likelihood that Petitioner would prevail in establishing the unpatentability of claims 9–12 of the '862 patent.

Petitioner also filed a motion for joinder, seeking to join as a party to IPR2019-01439. Paper 3 ("Joinder Mot."). As explained below, IPR2019-01439 terminated on December 23, 2019 and is no longer pending. *See Huawei Techs. Co. v. Bell Northern Research, LLC*, IPR2019-01439, Paper 9 (PTAB Dec. 13, 2019). We therefore deny Petitioner's motion for joinder.

A. Related Matters

The parties collectively identify the following judicial proceedings in which the '862 patent is or was asserted and which may affect, or be affected by, a decision in this proceeding: *Bell Northern Research, LLC v. LG Elecs.*

Co., Case No. 3:18-cv-02864 (S.D. Cal.) ("the LG district court litigation");
Bell Northern Research, LLC v. Coolpad Techs., Inc., Case No. 3:18-cv-01783 (S.D. Cal.); *Bell Northern Research, LLC v. Huawei Device (Dongguan) Co.*, Case No. 3:18-cv-01784 (S.D. Cal.); *Bell Northern Research, LLC v. Kyocera Corp.*, Case No. 3:18-cv-01785 (S.D. Cal.); *Bell Northern Research, LLC v. ZTE Corp.*, Case No. 3:18-cv-01786 (S.D. Cal.); and *Bell Northern Research, LLC v. Samsung Elecs. Co.*, Case No. 2:19-cv-00286 (E.D. Tex.). Pet. 1–2; Paper 5, 1; *see* 37 C.F.R. § 42.8(b)(2).

B. The '862 Patent

The '862 patent relates to wireless communications using beamforming. Ex. 1001, 1:20–22. The '862 patent describes that, "[i]n general, beamforming is a processing technique to create a focused antenna beam by shifting a signal in time or in phase to provide gain of the signal in a desired direction and to attenuate the signal in other directions." *Id.* at 2:67–3:4. The '862 patent explains that, "[i]n order for a transmitter to properly implement beamforming," the transmitter "needs to know properties of the channel over which the wireless communication is conveyed." *Id.* at 3:14–17. For example, the receiver may "determine the channel response (H)" and "provide it as the feedback information." *Id.* at 3:19–22. The '862 patent explains that the size of the feedback packet "may be so large that, during the time it takes to send it to the transmitter, the response of the channel has changed." *Id.* at 3:22–25. To reduce the size of the feedback, "the receiver may decompose the channel using singular value decomposition (SVD) and send information relating only to a calculated value of the transmitter's beamforming matrix (V) as the feedback information." *Id.* at 3:26–30. According to the '862 patent, "[w]hile this

approach reduces the size of the feedback information, its size is still an issue for a [multiple-input-multiple-output] wireless communication." *Id.* at 3:33–35. Therefore, according to the '862 patent, a need exists "for reducing beamforming feedback information for wireless communications." *Id.* at 3:49–51.

Figure 7 of the '862 patent, shown below, illustrates an embodiment of the invention for providing beamforming feedback information from a receiver to a transmitter. *Id.* at 13:25–27.
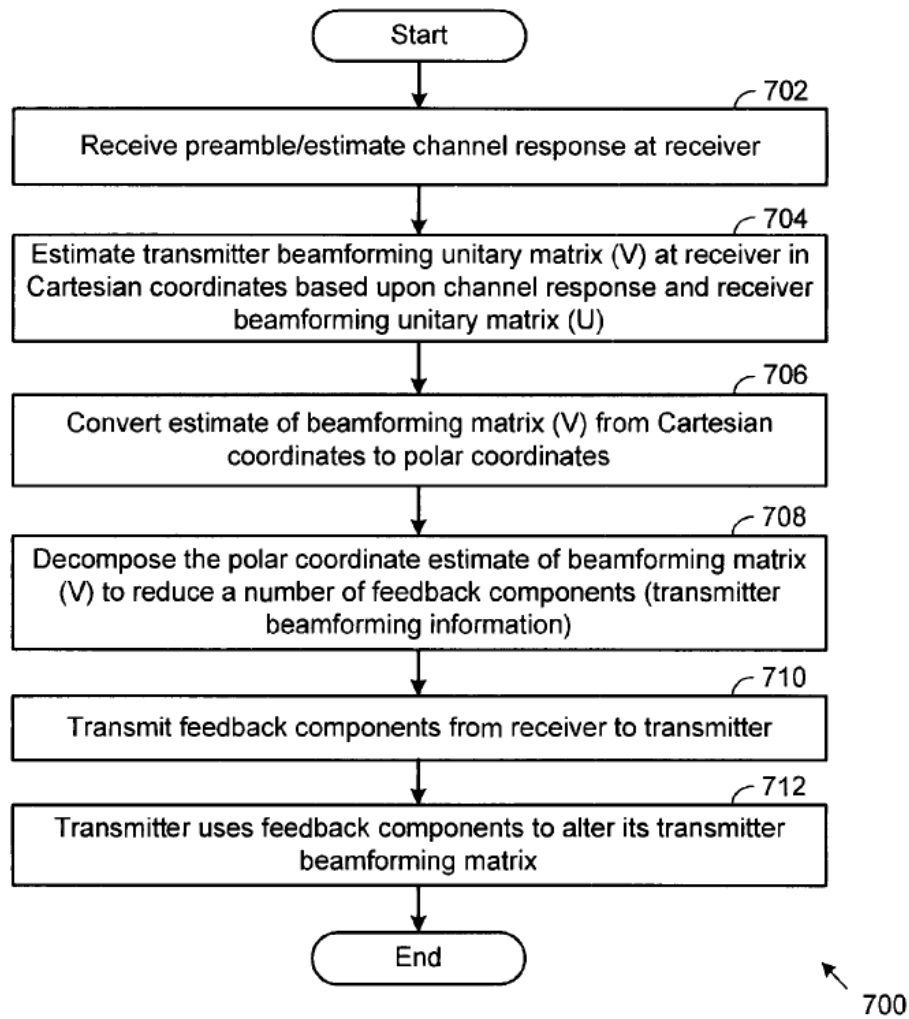
FIG. 7

Figure 7 above illustrates a method of providing beamforming feedback information for multiple-input multiple-output (MIMO) wireless communication systems. *Id.* at 2:33–35, 13:25–27, 13:31–32. At step 702, a wireless communication device receives a preamble sequence from a transmitting wireless device. *Id.* at 13:36–39. Next, at step 704, the receiving wireless device determines an estimated transmitter beamforming unitary matrix (V) based on the channel response and a known receiver beamforming unitary matrix (U). *Id.* at 13:44–47. In the embodiment shown in Figure 7, the receiving wireless device produces V in Cartesian coordinates and then converts V to polar coordinates (step 706). *Id.* at 13:54–58. The receiving wireless device then decomposes V to produce the transmitter beamforming information (step 708) and sends the beamforming information to the transmitting wireless device (step 710). *Id.* at 13:58–62, 14:4–6. The transmitting wireless device then uses the feedback components to generate a new beamforming matrix (V), which the device uses for subsequent transmissions (step 712). *Id.* at 14:9–12.

The '862 patent discloses that, according to one embodiment, the decomposition operations of step 708 employ a Givens Rotation operation. *Id.* at 13:63–65. The '862 patent explains that the Givens Rotation relies on the observation that, for a particular condition, some of the angles "are redundant" and thus, "the set of angles fed back to the transmitting wireless device are reduced." *Id.* at 13:65–14:3.

C. Illustrative Claim

Among the challenged claims (claims 9–12), claim 9 is independent. Claim 9 is illustrative of the subject matter of the challenged claims and reads as follows:

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