

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MEDIATEK INC. and
NXP USA, INC.
Petitioner,

v.

BELL NORTHERN RESEARCH, LLC,
Patent Owner.

IPR2023-01414
Patent 8,416,862 B2

Before JEFFREY W. ABRAHAM, JOHN D. HAMANN, and
RUSSELL E. CASS, *Administrative Patent Judges*.

ABRAHAM, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. *Background and Summary*

Mediatek Inc. and NXP USA, Inc. (collectively “Petitioner”) filed a Petition for an *inter partes* review (Paper 1 (“Pet.”)) challenging claims 1–4 and 9–12 of U.S. Patent No. 8,416,862 B2 (Ex. 1001 (“the ’862 Patent”)). Bell Northern Research, LLC (“Patent Owner”) elected to waive its Preliminary Response. Paper 8.

We have authority to determine whether to institute an *inter partes* review. 35 U.S.C. § 314 (2018); 37 C.F.R. § 42.4(a) (2023). The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted “unless the Director determines . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.”

For the reasons set forth below, we determine the information presented in the Petition establishes a reasonable likelihood that Petitioner would prevail with respect to at least one of the challenged claims. Accordingly, we institute an *inter partes* review.

B. *Related Matters*

The parties identify several judicial proceedings in which the ’862 patent was or is at issue, including the following proceedings involving Petitioner: *Bell Northern Research, LLC v. Qualcomm Inc.*, Case No. 8-23-cv-01065 (C.D. Cal.); *Bell Northern Research, LLC v. NXP Semiconductors, N.V.*, Case No. 1-23-cv-00633 (W.D. Tex.); and *Electronic Devices and Semiconductor Devices Having Wireless Communication Capabilities and Components Thereof*, Inv. No. 337-TA-1367 (USITC). Pet. 2–4; Paper 6; Paper 9.

C. The '862 Patent (Ex. 1001)

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.” Ex. 1001, 2:67–3:4. The '862 patent explains that, “[i]n order for a transmitter to properly implement beamforming (i.e., determine the beamforming matrix [V]), it needs to know properties of the channel over which the wireless communication is conveyed.” Ex. 1001, 3:14–17. For example, the receiver may “determine the channel response (H)” and “provide it as the feedback information” to the transmitter. Ex. 1001, 3:19–22.

The '862 patent explains that one issue with this feedback approach is 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.” Ex. 1001, 3:22–25. To reduce the size of the feedback packet, “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.” Ex. 1001, 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 (MIMO)] wireless communication.” Ex. 1001, 3:33–35. Therefore, according to the '862 patent, a need exists “for reducing beamforming feedback information for wireless communications.” Ex. 1001, 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. Ex. 1001, 13:25–27.

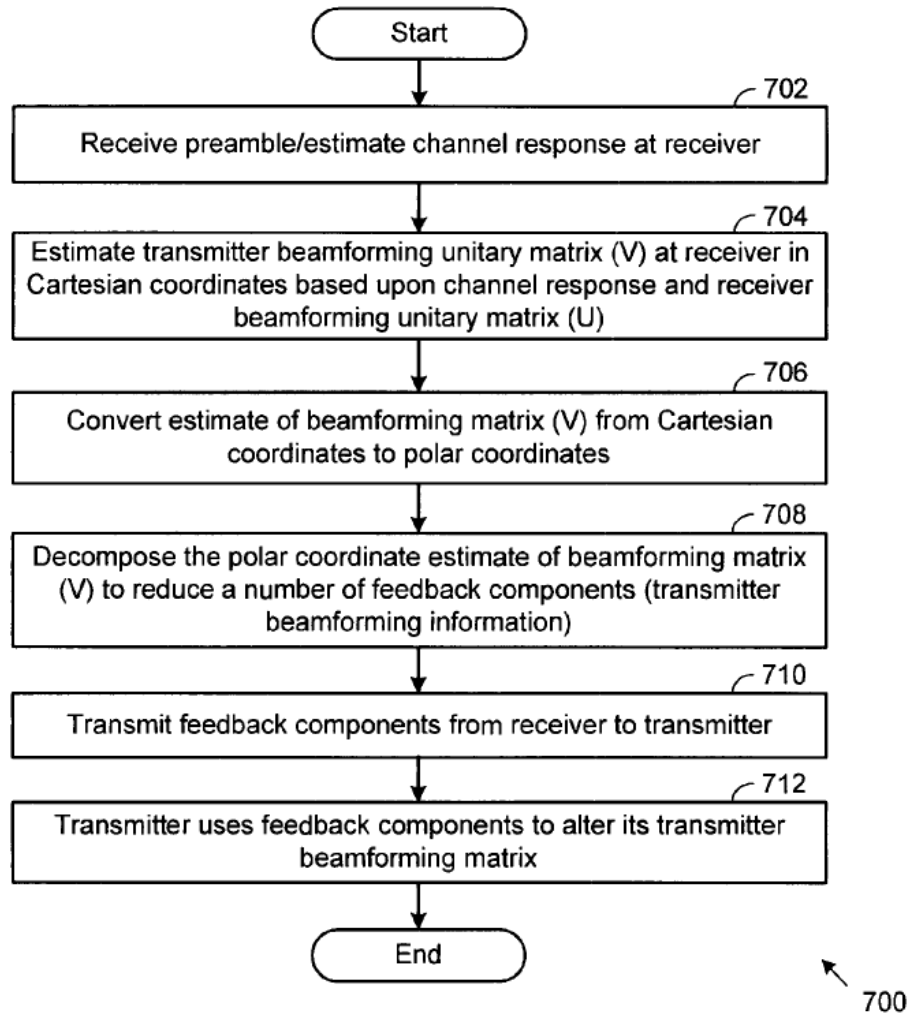


FIG. 7

Figure 7 illustrates a method of providing beamforming feedback information for MIMO wireless communication systems. Ex. 1001, 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 and estimates a channel response (H) from the preamble sequence using “any number of techniques that are known in the art.” Ex. 1001, 13:43–44. Next,

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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). Ex. 1001, 13:44–47. The '862 patent explains that the channel response (H), the estimated transmitter beamforming unitary matrix (V), and known receiver beamforming unitary matrix (U) are related by the equation $H=UDV^*$, where D is a diagonal matrix. Ex. 1001, 13:47–51.

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). Ex. 1001, 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). Ex. 1001, 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). Ex. 1001, 14:9–13.

The '862 patent discloses that, according to one embodiment, the decomposition operations of step 708 employ a Givens Rotation operation. Ex. 1001, 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.” Ex. 1001, 13:65–14:3.

D. Illustrative Claim

Among the challenged claims (claims 1–4 and 9–12), claims 1 and 9 are independent. Claim 9 is illustrative of the subject matter of the challenged claims and is reproduced below:

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