

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Nokia of America Corp., Ericsson Inc., AT&T Services, Inc., Cellco Partnership  
d/b/a Verizon Wireless, T-Mobile, USA, Inc.,  
Petitioners

v.

Wireless Alliance, LLC,  
Patent Owner

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Case No. IPR2024-00619  
Patent. No. 10,045,383

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**PETITION FOR *INTER PARTES* REVIEW  
OF U.S. PATENT NO. 10,045,383**

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## LIST OF EXHIBITS

| <b>Ex. Number</b> | <b>Title</b>                                                                                                                                                                                             |
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| <b>1001</b>       | U.S. Patent No. 10,045,383 to Lee et al.                                                                                                                                                                 |
| <b>1002</b>       | Prosecution History of U.S. Patent No. 10,045,383                                                                                                                                                        |
| <b>1003</b>       | U.S. Patent Application Publication No. 2011/0223900 to Yu et al.                                                                                                                                        |
| <b>1004</b>       | U.S. Patent Application Publication No. 2013/0089034 to Acharya et al.                                                                                                                                   |
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| <b>1008</b>       | Damnjanovic et al., <i>A Survey of 3GPP Heterogeneous Networks</i> , IEEE Wireless Communications (June 2011)                                                                                            |
| <b>1009</b>       | 3GPP TS 36.214 version 9.1.0 Release 9 (2010-04)                                                                                                                                                         |
| <b>1010</b>       | Ye, Q. et al., <i>User Association for Load Balancing in Heterogeneous Cellular Networks</i> , arXiv e-prints (2012)                                                                                     |
| <b>1011</b>       | Oh, J., et al., <i>Cell Selection for Range Expansion with Almost Blank Subframe in Heterogeneous Networks</i> , IEEE International Symposium on Personal, Outdoor and Mobile Radio Communication (2012) |
| <b>1012</b>       | Docket Control Order in <i>Wireless Alliance, LLC v. AT&amp;T Mobility LLC, et al.</i> No. 2:23-cv-00095-RWS-RSP (E.D. Tex.) (Dkt. No. 29)                                                               |
| <b>1013</b>       | Katherine K. Vidal, <i>Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation</i> (June 21, 2022)                                             |

## LISTING OF CHALLENGED CLAIMS

| Cl. No.  | Elem. | Claim Language                                                                                                                                                                                                            |
|----------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1</b> | [1.0] | An operating method of a network comprising at least a base station, the method comprising:                                                                                                                               |
|          | [1.1] | transmitting, performed by each of base stations, a downlink reference signal to a terminal;                                                                                                                              |
|          | [1.2] | receiving, performed by a first base station, a strength of the downlink reference signal from the terminal;                                                                                                              |
|          | [1.3] | establishing, performed by the first base station, a downlink cell association with the terminal;                                                                                                                         |
|          | [1.4] | determining, performed by the first base station, an identifier of a second base station providing an uplink control channel;                                                                                             |
|          | [1.5] | transmitting, performed by the first base station, the identifier of a second base station through the downlink cell association; and                                                                                     |
|          | [1.6] | establishing, performed by the second base station, an uplink cell association with the terminal.                                                                                                                         |
| <b>2</b> | [2]   | The method of claim 1, wherein the strength of the downlink reference signal is measured by the terminal.                                                                                                                 |
| <b>3</b> | [3]   | The method of claim 1, wherein the base station candidate group is updated by the terminal based on the strength of the downlink reference signal.                                                                        |
| <b>4</b> | [4]   | The method of claim 1, further comprising: receiving, performed by the second base station, an uplink reference signal.                                                                                                   |
| <b>5</b> | [5]   | The method of claim 1, wherein the first base station is a macro base station and the second base station is a small base station.                                                                                        |
| <b>6</b> | [6.0] | A base station, comprising:                                                                                                                                                                                               |
|          | [6.1] | a networking unit configured to transmit a downlink reference signal to a terminal; and                                                                                                                                   |
|          | [6.2] | a processor configured to establish a downlink cell association with the terminal,                                                                                                                                        |
|          | [6.3] | wherein the processor further configured to determine an identifier of a second base station providing an uplink control channel, and                                                                                     |
|          | [6.4] | wherein the networking unit further configured to receive a strength of the downlink reference signal from the terminal, and to transmit the identifier of the second base station through the downlink cell association. |
| <b>7</b> | [7]   | The base station of claim 6, wherein the base station is a macro base station and the second base station is a small base station.                                                                                        |
| <b>8</b> | [8.0] | An operating method of a terminal performed by the terminal, the method comprising:                                                                                                                                       |
|          | [8.1] | receiving a downlink reference signal from each of base stations;                                                                                                                                                         |
|          | [8.2] | measuring a strength of the downlink reference signal;                                                                                                                                                                    |
|          | [8.3] | updating a base station candidate group by adding at least one base station among the base stations to the base station candidate group;                                                                                  |
|          | [8.4] | establishing a downlink cell association with a first base station;                                                                                                                                                       |

## ***Inter Partes* Review of U.S. Patent No. 10,045,383**

|  |       |                                                                                                                                                                                                                               |
|--|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | [8.5] | receiving an identifier of a second base station providing an uplink control channel from the first base station through the downlink cell association, wherein the second base station is selected by the first base station |
|  | [8.6] | establishing an uplink cell association with the second base station based on the identifier of the second base station.                                                                                                      |

## **I. INTRODUCTION**

Nokia of America Corporation, Ericsson Inc., AT&T Services, Inc., Cellco Partnership d/b/a Verizon Wireless, and T-Mobile USA, Inc., (“Petitioners”) petition for *inter partes* review of Claims 1, 2, 3, 4, 5, 6, 7, and 8 (“Challenged Claims”) of U.S. Patent No. 10,045,383 (“’383 patent”), which is owned by Wireless Alliance, LLC (“Patent Owner”).

The challenged claims of the ’383 patent are directed to a method and apparatus for establishing separate connections between a first and second base station and UE in the uplink and the downlink. According to the patent, this solves a purported problem of uplink-downlink imbalance based on the relative transmission power of base stations in heterogeneous networks. At the time of the priority date of the ’383 patent, however, the idea of using different base stations to communicate with a UE in the uplink and downlink was not new. The prior art references relied upon in this petition—Yu and Acharya—solved the same problem in the same way years earlier: both Yu and Acharya describe that a first base station can be used for transmission in a first direction, such as the downlink, and a second base station can be used for transmission in a second direction, such as the uplink.

As a result, Yu and Acharya render the challenged claims of the ’383 patent obvious.

## II. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8

### **REAL PARTIES IN INTEREST:**

The real parties in interest are Nokia of America Corporation, Ericsson Inc., AT&T Services, Inc., AT&T Corp., AT&T Mobility LLC, Cellco Partnership d/b/a Verizon Wireless, and T-Mobile USA, Inc. 37 C.F.R. § 42.8(b)(1).

### **RELATED MATTERS:**

Pursuant to 37 C.F.R. § 42.8(b)(2), Petitioners are aware of the following pending patent infringement lawsuits or related matters involving the '383 patent:

- *Wireless Alliance, LLC v. AT&T Mobility LLC et al*, No. 2:23-cv-00095 (E.D. Tex.) filed March 7, 2023;
- *Wireless Alliance, LLC v. T-Mobile US, Inc. et al*, No. 2:23-cv-00096 (E.D. Tex.) filed March 7, 2023; and
- *Wireless Alliance, LLC v. Verizon Communications, Inc. et al*, No. 2:23-cv-00097 (E.D. Tex.) filed March 7, 2023.

### **LEAD AND BACKUP COUNSEL:**

Petitioners provide the following designation and service information for lead and back-up counsel. 37 C.F.R. § 42.8(b)(3) and (b)(4).

| PETITIONERS' LEAD AND BACK-UP COUNSEL |                                                                                                                                 |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Lead Counsel                          | John D. Haynes (Reg. No. 44,754)<br>Alston & Bird LLP<br>One Atlantic Center<br>1201 West Peachtree Street<br>Atlanta, GA 30309 |

***Inter Partes* Review of U.S. Patent No. 10,045,383**

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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**SERVICE INFORMATION:**

Petitioners consent to electronic service by email at the email address: WA-Alston@alston.com.

**III. STANDING UNDER 37 C.F.R. §42.104(A)**

Petitioners certify that the Challenged Claims are available for *inter partes* review. Petitioners also certify that they are not barred or estopped from requesting this *inter partes* review on the grounds identified herein. Neither Petitioners, nor any party in privity with Petitioners: (i) have filed a civil action challenging the validity of Claims 1-8 of the '383 patent; (ii) have been served a complaint alleging infringement of the '383 patent more than one year prior to the present date; or (iii) are estopped from challenging the claims on the grounds identified in the Petition. Claims 1-8 of the '383 patent also have not been the subject of a prior IPR or a finally concluded district court litigation.

**IV. STATEMENT OF RELIEF REQUESTED**

Under 35 U.S.C. § 311, Petitioners request *inter partes* review and cancellation of Challenged Claims 1, 2, 3, 4, 5, 6, 7, and 8 of the '383 patent based on the detailed statements presented below.

**V. PAYMENT OF FEES UNDER 37 C.F.R. § 42.103**

Petitioners authorize Account No. 16-0605 to be charged for any fee set forth in 37 C.F.R. § 42.15(a) and for any additional fees.

**VI. IDENTIFICATION OF CHALLENGE**

Petitioners request *inter partes* review on the below grounds. Per 37 C.F.R. § 42.6(c), copies of the references are filed with this petition. This Petition is supported by the Declaration of Dr. Joseph Camp ("Dr. Camp Decl.") (Ex. 1005).

**Inter Partes Review of U.S. Patent No. 10,045,383**

| <b>Ground</b> | <b>Reference(s)</b>                                                                                                                                                                                                                 | <b>Challenged Claims</b>   |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| 1             | Obvious in view of U.S. Patent Application Publication No. 2011/0223900 to Yu et al. (“Yu”, Ex. 1003) in view of U.S. Patent Application Publication No. 2013/0089034 to Acharya et al. (“Acharya”, Ex. 1004) under 35 U.S.C. § 103 | 1, 2, 3, 4, 5, 6, 7, and 8 |

As stated on its face, the application that issued as the ’383 patent was filed on March 26, 2017, and claims priority to Korean Patent Application No. 10-2013-0033568, which was filed on March 28, 2013. Thus, the earliest priority date of the ’383 patent is March 28, 2013. Each of the relied upon references is prior art for the reasons stated below.

**Yu (Ex. 1003):** U.S. Patent Application Publication No. 2011/0223900 to Yu et al. (“Yu”), titled “Supplemental node transmission assistance in a wireless communications network,” was filed on March 12, 2010, and published on September 15, 2011. Ex. 1003 at cover. Thus, Yu is prior art under at least 35 U.S.C. § 102(a)(1) (AIA).

**Acharya (Ex. 1004):** U.S. Patent Application Publication No. 2013/0089034 to Acharya et al. (“Acharya”), titled “Separate associations of a mobile to different base stations in uplink and downlink,” was filed on October 5, 2011 and published on April 11, 2013. Ex. 1004 at cover. Thus, Acharya is prior art under at least 35 U.S.C. § 102(a)(1) (AIA).

## **VII. BACKGROUND**

### **A. Person of Ordinary Skill in the Art**

A person of ordinary skill in the art (“POSITA”) at the time of the alleged invention would have a Bachelor’s degree in electrical engineering, computer engineering, computer science, or a related field, and at least two years of experience working in the field. Relevant working experience would include experience with telecommunications and networking, radio-access networking, and/or service provisioning in wireless networks. Ex. 1005, ¶30. This description is approximate, and a higher level of education might make up for less experience and *vice versa*. *Id.*

### **B. Heterogeneous 3GPP Networks**

At the time the ’383 patent was filed, a POSITA would have known that cellular network operators had deployed a well-known network architecture known as a heterogeneous network. Ex. 1005, ¶32. Prior to the ’383 patent, heterogeneous networks were known and included deploying high power nodes such as macro base stations with lower-power nodes, such as relays, pico-cells, femto-cells. Ex. 1008 at 1. This network architecture provides a flexible way to eliminate and fill coverage holes in macro-cells and improve the system capacity. Ex. 8 at 19-20. An example of a known heterogeneous network configuration is shown in the figure below.

**Ex. 1009 (Holma), Figure 16.19**

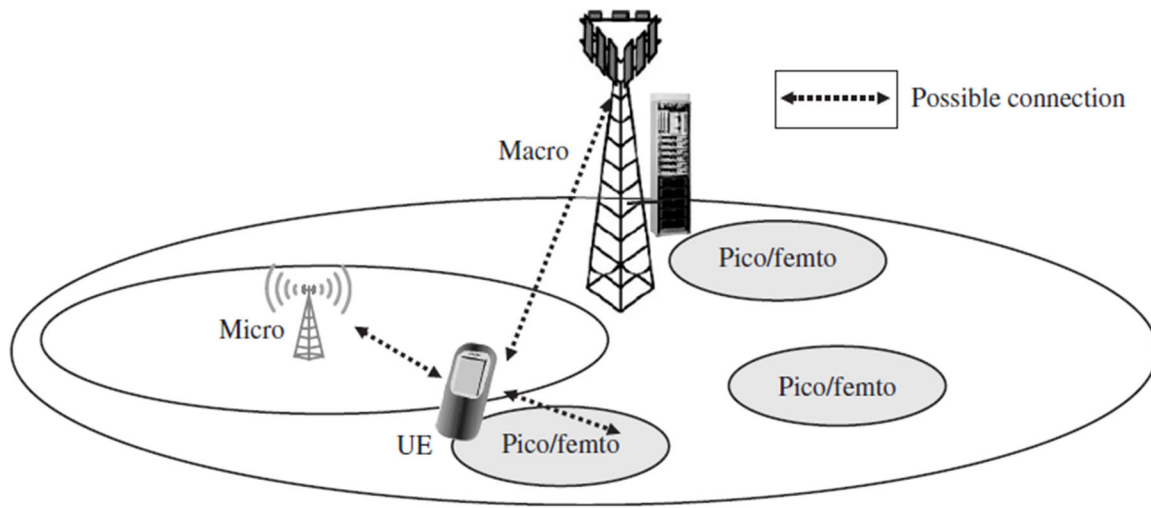


**Figure 16.19** Heterogeneous deployment

Before the filing date of the '383 patent, the disparity between the transmit power levels of macro and small cell base stations, such as pico nodes, was a known problem. Ex. 1008 at 1; Ex. 1005, ¶33. Moreover, it was well-known that the introduction of low-power nodes in a macro network created imbalance between coverage in the uplink and downlink direction. Ex. 1008 at 11; Ex. 1005, ¶33. For example, due to the larger transmit power of the macro base station, the coverage boundary is shifted geographically closer to the low-power node, which creates uplink interference problems because the UEs served by macro base stations create strong interference to the low-power nodes. Ex. 1005, ¶33. The result is under-utilization of the low-power nodes due to geographic changes in data traffic. Ex. 1005, ¶33. A high-level solution to these problems in heterogeneous networks that

was deployed prior to the '383 patent is resource coordination for data and control transmissions among base stations. Ex. 1008 at 17; Ex. 1005, ¶33.

One aspect of the coordination known prior to the '383 patent to mitigate interference and load balancing problems in heterogeneous networks were biasing methods. Biasing was a known way to intentionally push UEs onto lower power nodes that were lightly loaded, even if the lower power nodes had relatively lower instantaneous channel quality when compared to macrocell base stations. Ex. 1010 at 1; Ex. 1005, ¶34. Biasing approaches known prior to the '383 patent included multiplying the signal-to-interference-plus noise ratio of the lower power node by a bias factor so that the lower power node looks like it has higher channel quality, and is thus more attractive for connection with the UE than the heavily-loaded macrocell. Ex. 1010 at 1; Ex. 1005, ¶34. Other biasing factor algorithms were also known as solutions to these load-balancing problems. Ex. 1010 at 1; Ex. 1005, ¶34.

### **C. Cell-Specific Measurements in LTE**

Prior to the filing date of the '383 patent, there were several well-known UE measurements that were used to provide the UE with information about the cells to which they may connect. Ex. 1008 at 13. One of those measurements was “reference signal received power” (RSRP), which was (and is) a well-known UE measurement in LTE and LTE-A that measured the linear average of the downlink cell-specific reference signals. Ex. 1009 at § 5.1.1; Ex. 1005, ¶35. The UE may measure the

absolute or relative RSRP between two cells. Ex. 1008 at 13. Knowledge of RSRP provides the UE with essential information about the signal power from different base stations in a network, and the relative RSRP is used in multi-cell scenarios. Ex. 1008 at 13; Ex. 1005, ¶35.

In heterogeneous networks, mobility procedures such as cell selection are based on RSRP. Ex. 1005, ¶36. Specifically, during the cell selection procedure, it was known that the UE could determine the best cell that could be used to establish a connection, and the UE could select a cell based on the RSRP calculated from measurements performed on the cell-specific reference signals. Ex. 1012 at 654.

#### **D. The '383 Patent**

The '383 patent describes a technique for establishing separate uplink and downlink connections for a terminal (*e.g.*, a user equipment) in a wireless network. Ex. 1001, 1:22-25; Ex. 1005, ¶37. In particular, the '383 patent discloses a process that is applicable to various standards for a cellular network, which includes a wideband code division multiple access (WCDMA), 3GPP LTE, and LTE-A. Ex. 1001, 12:10-15; Ex. 1005, ¶37. The '383 patent explains that, in a heterogeneous cellular network, different types of base stations (*e.g.*, macrocell base stations and femtocell base stations) provide different levels of transmission power, which leads to a difference in coverage area. Ex. 1001, 1:29-41; Ex. 1005, ¶37. The '383 patent explains that the difference in transmission power and coverage area may result in a

greater number of terminals connecting to a particular base station (*e.g.*, a macrocell base station), which results in load balancing issues and a disproportionate number of terminals being connected to each of the base stations. Ex. 1001, 1:44-49; Ex. 1005, ¶37.

The '383 patent further explains that differences in transmission power and coverage area also affects when a terminal will associate with a base station. Ex. 1001, 1:50-52, 1:55-58; Ex. 1005, ¶38. The '383 patent explains that typically, a terminal performs a cell association with a base station based on a downlink signal strength, however, this base station may not be an optimal base station in terms of uplink signal strength, which can result in a loss in the SINR or unfairness between the SINR of the downlink and the SINR of the uplink. Ex. 1001, 1:55-62; Ex. 1005, ¶38.

To address the issues associated with differences in transmission power and coverage areas of base stations, the '383 patent discloses a process for performing separate connections for a downlink and an uplink connection between a terminal and one or more base stations. Ex. 1001, 2:3-5; Ex. 1005, ¶39. The process disclosed by the '383 patent generally involves a terminal transmitting an uplink reference signal to a set of candidate uplink base stations, where each candidate base station provides feedback information on a measured strength for the uplink reference signal to a downlink base station that is associated with the terminal. Ex. 1001, 2:27-35;

Ex. 1005, ¶39. This process further involves the downlink base station collecting the feedback information from the candidate uplink base stations and then providing information, based on the feedback information, to the terminal for establishing an uplink connection with one of the candidate uplink base stations. Ex. 1001, 1:38-43; Ex. 1005, ¶39.

Figure 3 of the '383 patent, shown below, provides an example of the process disclosed by the '383 patent for establishing separate downlink and uplink connections. Ex. 1001, 5:48-50; Ex. 1005, ¶40. In this example, a terminal transmits an uplink reference signal to a set of uplink base station candidates. Ex. 1001, 5:52-55, 5:58-62; Ex. 1005, ¶40. The uplink reference signal includes an identifier of a downlink base station that is associated with the terminal. Ex. 1001, 5:63-6:5; Ex. 1005, ¶40. Each candidate uplink base station measures a signal strength of the uplink reference signal and transmits the measured signal strength to the downlink base station that is associated with the terminal. Ex. 1001, 6:11-18; Ex. 1005, ¶40. The signal strength information from the candidate uplink base stations is sent to the downlink base station, which then provides the terminal with information, based on the collected signal strength information, for establishing an uplink connection with one of the candidate uplink base stations. Ex. 1001, 6:21-26; Ex. 1005, ¶40.

Ex.1001, Figure 3

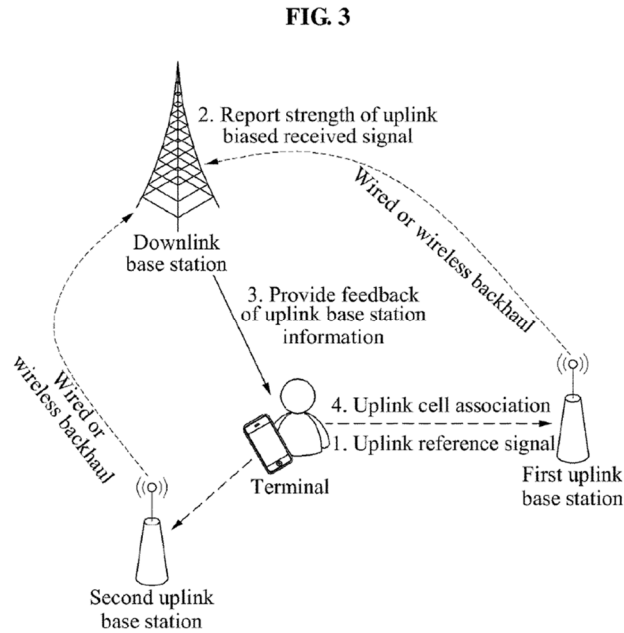
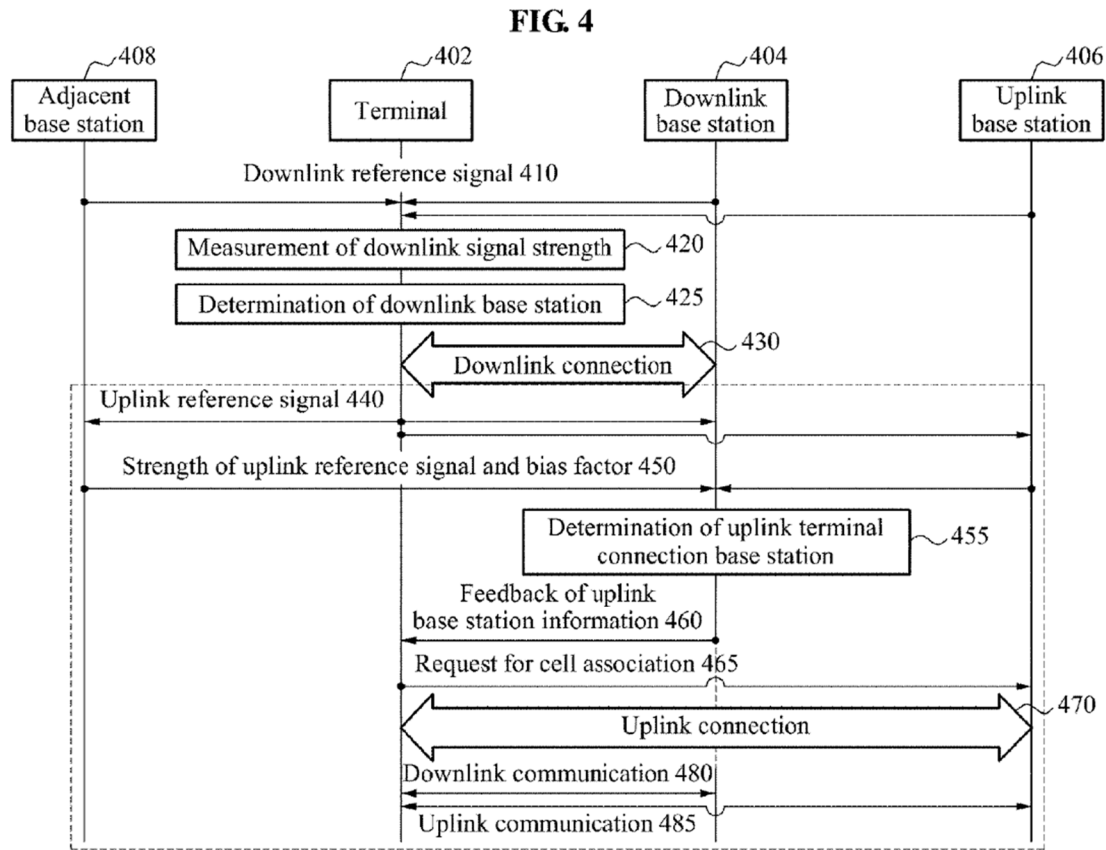


Figure 4 of the '383 patent, shown below, provides an example of a signal flow of the process disclosed by the '383 patent for establishing separate downlink and uplink connections. Ex. 1001, 6:31-33; Ex. 1005, ¶41.

Ex.1001, Fig. 4



In this example, the '383 patent explains that establishing a downlink involves the base stations in a network transmitting a downlink reference signal to a terminal and the terminal measuring the signal strength of the downlink reference signals and selecting a downlink base station, shown in step 420 of Figure 5, to establish a downlink connection with a base station based on the measured signal strengths of

the downlink reference signals, which is shown in step 425 of Figure 5. Ex. 1001, 6:54-56, 7:1-20, Fig. 5; Ex. 1005, ¶41.

After establishing a downlink connection, establishing the uplink involves the terminal transmitting an uplink reference signal to a set of candidate base stations that could be used for uplink. Ex. 1001, 7:27-33, 7:41-49; Ex. 1005, ¶42. When the candidate base stations receive the uplink reference signal, each candidate base station measures the signal strength of the uplink reference signal and transmits the signal strength information to the downlink base station that is already connected with the terminal. Ex. 1001, 7:61-67, 8:5-11; Ex. 1005, ¶42. The downlink base station receives the signal strength information from the uplink base station candidates and then identifies which of the uplink base stations has the greatest signal strength of the uplink reference signal. Ex. 1001, 7:67-8-2, 8:12-22; Ex. 1005, ¶¶42. The downlink base station then sends uplink base station information for the identified uplink base station to the terminal. Ex. 1001, 8:41-45; Ex. 1005, ¶42.

The '383 patent discloses that, after the terminal receives the uplink base station information, the terminal then establishes an uplink connection between the terminal and the identified uplink base station. Ex. 1001, 8:45-52, 8:55-59; Ex. 1005, ¶43. After establishing the uplink connection, the terminal may begin communicating using the established uplink and downlink connections. Ex. 1001, 8:60-9:2; Ex. 1005, ¶43.

## VIII. THE PRIOR ART

### A. Yu (Ex. 1003)

Yu discloses a process for establishing and improving uplink and downlink connections within a wireless network (*e.g.*, LTE or LTE-A). Ex. 1003, ¶¶[0001], [0004], [0023]; Ex. 1005, ¶46. More specifically, Yu, like the '383 patent, is directed to solving problems related to selecting the base station, referred to as network node, due to transmission power differences in heterogenous cellular networks. Ex. 1003, ¶¶[0004], [0005], [0022], [0023], [0025]; Ex. 1005, ¶46. Dr. Camp confirms that both the '383 patent and Yu are directed to addressing the same types of issues within the same types of wireless communication networks. Ex. 1005, ¶46.

Yu discloses a process for establishing uplink and downlink connections in a certain communication network environment. Ex. 1005, ¶47. Figure 1 of Yu, shown below, illustrates an example of a wireless communication system where Yu's process can be applied. Ex. 1003, ¶[0025]. Yu's wireless communication system includes a wireless network, for example an LTE network, a UMTS network, and a Global Systems for Mobile (GSM) network. Ex. 1003, ¶[0025]; Ex. 1005, ¶47. The wireless network is configured to provide wireless communications between user equipment and a node of the wireless network. Ex. 1003, ¶¶[0026], [0027]. The user equipment and network node in Yu correspond with the terminal and base station in

the '383 patent, respectively. Ex. 1003, ¶¶[0026], [0031], [0032], [0033]; Ex. 1005, ¶47.

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**Ex. 1003, Fig. 1**

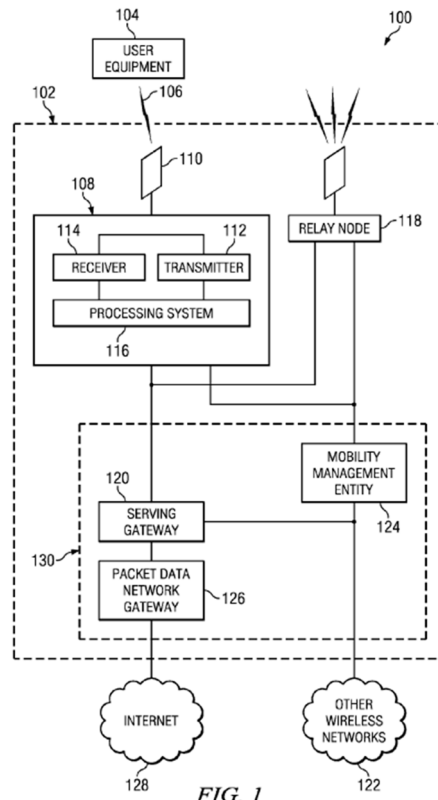
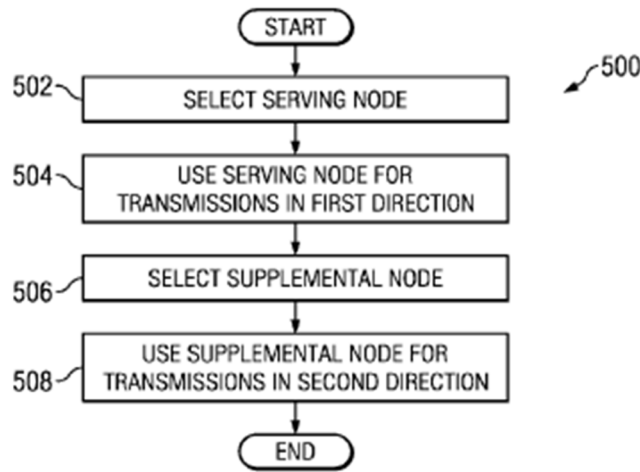


FIG. 1

Together, Figures 5-7 of Yu illustrate an example of implementing Yu's process for establishing uplink and downlink connections between a user equipment and nodes in a network. Ex. 1003, Figs. 5, 6, 7; Ex. 1005, ¶48.

First, Figure 5 is a flow chart of Yu's process for establishing an uplink and a downlink for a user equipment. Ex. 1003, Fig. 5.

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Ex. 1003, Fig. 5*FIG. 5*

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The first step (502) of Yu includes “select[ing] the network node from which the user equipment receives the strongest reference signal receive power, RSRP, to be the serving node.” Ex. 1003, ¶[0079]. In this embodiment, Yu discloses that the serving node is the downlink base station, but Yu discloses that the serving node could also be used for uplink communications as well. Ex. 1003, ¶[0079]; Ex. 1005, ¶50.

In step 506, Yu discloses selecting a supplemental node, wherein the user equipment establishes a second connection with another network node, referred to as a supplemental node, and then uses the selected network node for transmissions in a different direction than the first selected node. Ex. 1003, ¶[0080]; Ex. 1005, ¶51. In one example, the node is used is a supplemental uplink node.

Additional details for the supplemental uplink node selection process are discussed below with respect to Figure 6 of Yu and additional details for the supplemental node transmission process (i.e., step 508) are discussed below with respect to Figure 7 of Yu.

Figure 6 of Yu illustrates an example of a message flow for the user equipment when selecting an uplink supplemental node in Figure 5 of Yu. Ex. 1003, ¶[0084]; Ex. 1005, ¶52.

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**Ex. 1003, Fig. 6**

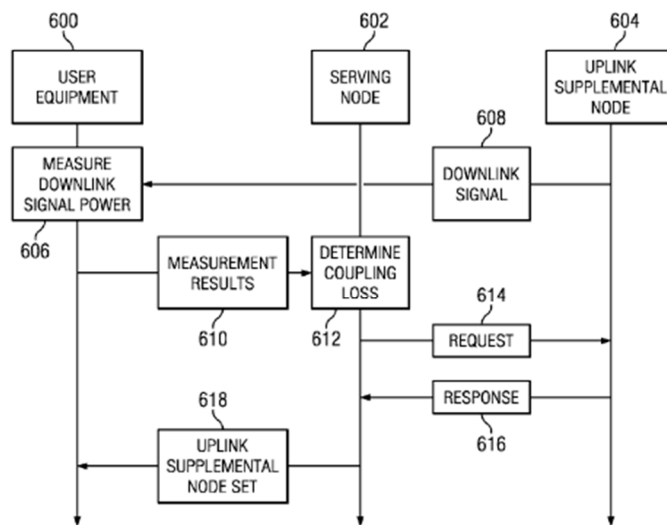


**FIG. 6**

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In Figure 6, “user equipment 600 in communication with serving node 602 measures the downlink signal power 606 in downlink signal 608 received from network nodes that may be considered for operations as uplink supplemental node 604.” Ex. 1003, ¶[0085]. Under the guidance of the serving node, user equipment 600 measures downlink signal power received from the candidate supplemental

nodes for a certain time period or until a measurement threshold is satisfied. Ex. 1003, ¶[0085]. Once the measurement threshold is satisfied or the specified measurement period expires, user equipment 600 reports the measurement results regarding the downlink signal power of the candidate supplemental nodes to the serving node. Ex. 1003, ¶[0086]. After the serving node receives the measurement result information from the user equipment, the serving node may identify an uplink supplemental node for the user equipment based on the determined coupling losses and/or transmission power of the uplink supplemental node candidates. Ex. 1003, ¶¶[0088], [0106]; Ex. 1005, ¶53; *see also* Ex. 1003, ¶¶[0091], [0092]. After the serving node identifies an uplink supplemental node candidate, the serving node in step 618 transmits information associated with the identified supplement node candidate to the user equipment and an uplink connection between the UE and the identified uplink supplemental node may be established. Ex. 1003, ¶¶[0093], [0100]; Ex. 1005, ¶53.

**B. Acharya (Ex. 1004)**

Like Yu and the '383 patent, Acharya is directed to improving uplink and downlink connections between base stations and user equipment. Ex. 1005, ¶57. Acharya discloses a process by which a UE can associate with different base stations for uplink and downlink communications. Ex. 1004, Abstract. The result of Acharya's disclosed methodologies is to associate an appropriate base station to

handle the downlink for a UE and associate an appropriate base station to handle the uplink for a UE. According to Acharya, this solution avoids interference problems associated with conventional systems for selecting and associating base stations for uplink and downlink transmissions of data and control information. Ex. 1004, ¶[0048]. In particular, Acharya discloses that the base station handling the downlink may be different from the base station handling the uplink in order to improve gain and lessen interference. Ex. 1004, ¶[0048]. The selection mechanism for a UE associating with the appropriate base station for UL and DL in Acharya is based on RSRP. Ex. 1004, ¶¶[0014]-[0015]; Ex. 1005, ¶57.

As background, Acharya describes that, in prior art systems, the base station and UE form an association, and the base station is then responsible for “[t]ransmission of control information to the UE,” “[t]ransmission of data to the UE,” [r]eception of control information from the UE,” and “[r]eception of data from the UE. Ex. 1004, ¶¶[0008]-[0012]. Figure 2 of Acharya provides an example illustrating control and data transmission between a base station and UEs.

Ex. 1004, Fig. 2

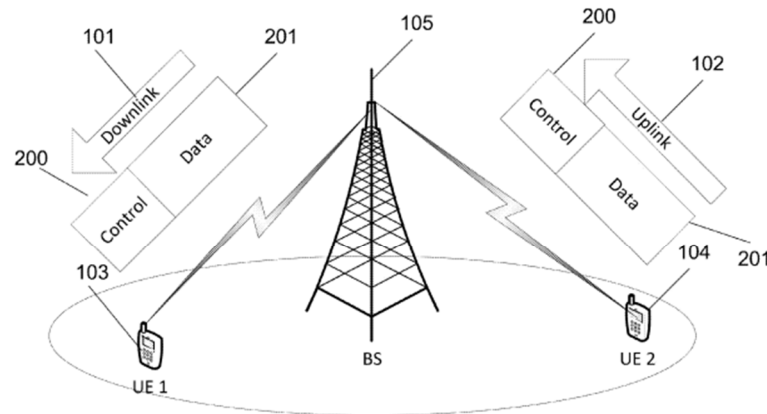
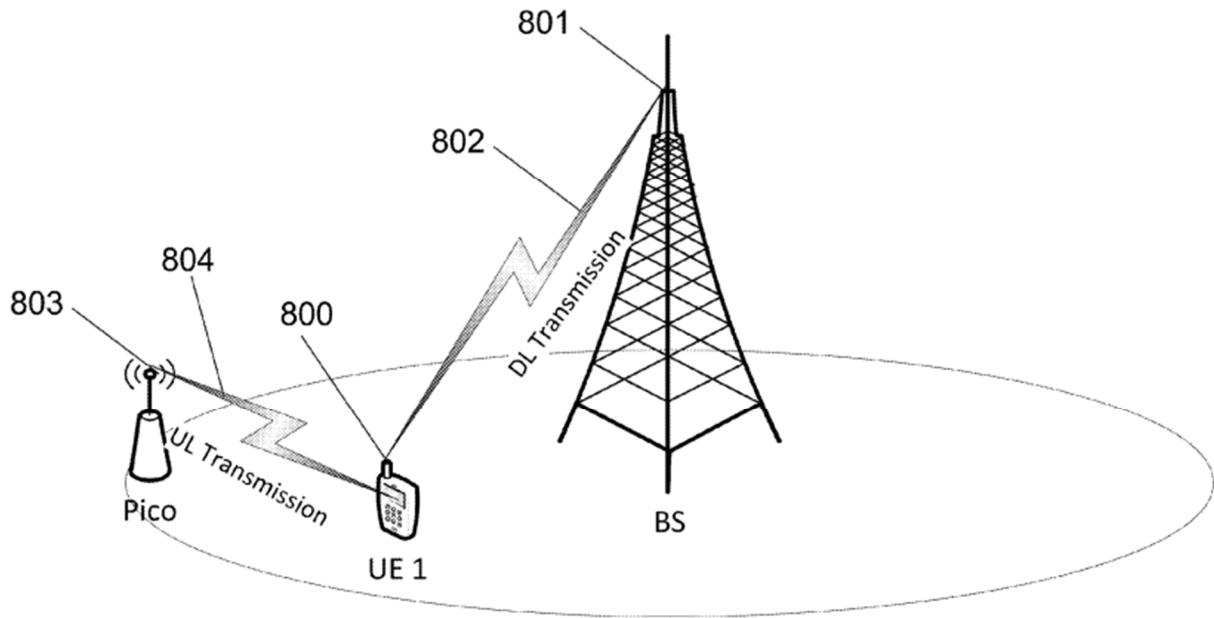


Figure 2

Figure 2 shows channels for transmitting uplink and downlink control information, such as control channels 200 and channel for transmitting uplink and downlink data, such as data channels 201, between one base station and multiple UEs. Ex. 1004, Fig. 2, ¶[0013]. Acharya explains how, in conventional systems, base stations would conduct transmission decisions for their associated UEs without coordinating with the transmissions from different base stations, which can lead to increased interference. Ex. 1004, ¶[0061]; Ex. 1005, ¶59.

Figure 8 of Acharya shows the concept of a UE being connected to different base stations for UL and DL transmissions. Ex. 1004, ¶[0065]; Fig. 8. Specifically, UE 800 is associated with BS 801 for DL transmission and is separately associated with Pico BS 803 for UL transmission.

Ex. 1004, Fig. 8



Acharya discloses “detailed signaling procedures between the two” base stations shown in exemplary Figure 8 to provide the ability for the separate association for UL and DL transmission. Ex. 1004, ¶[0067]. Based on the disclosure of Figure 2 above, the communication between a base station and a UE includes the transmission and reception of both data and control information. Ex. 1005, ¶61. The signaling procedures disclosed in Acharya allow for control information for uplink transmission to be handled by one base station, such as  $BS_{UL}$ . When this is the case, the control information handled and processed by  $BS_{UL}$  must be communicated to the UE, and embodiments of Acharya provide that this communication may be performed by a separate base station,  $BS_{DL}$ , which handles the DL transmission to the UE, which is not done by  $BS_{UL}$ . Ex. 1004, ¶¶[0067]-[0068]. Thus, the control

information is communicated from  $BS_{UL}$  to  $BS_{DL}$  so that the control information will be passed to the UE. *Id.*

In Tables 1 and 2, Acharya lists the known UL and DL channels used in 3GPP LTE, and whether backhaul communication support is needed for those channels. Ex. 1004, ¶[0069]; Tbl 1. Acharya explains that the DL channels shown in Table 1 are transmitted to the UE and contain DL data, and control for both UL and DL transmissions. Table 2, on the other hand, discloses the UL channels are received from the UE and contain UL data and control for both UL and DL transmissions. Ex. 1004, ¶[0069]. The description of the information sent on each channel is also included in Tables 1 and 2. For example, in Table 2, the information on the PUCCH (CQI/PMI/RI, HARQ) is “[c]ontrol information for DL data (PDSCH transmission).” Ex. 1004, Table 2.

Ex. 1004, Table 2

| TABLE 2                                                                                                              |                                                      |             |                    |                        |
|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-------------|--------------------|------------------------|
| Types of UL channels and if backhaul communication is needed amongst BS so that the relevant BS gets the information |                                                      |             |                    |                        |
| UL Channel                                                                                                           | Description of Content                               | Received by | Intended Recipient | Backhaul Communication |
| PUSCH                                                                                                                | UL Data (UE to BSUL)                                 | BSUL        | BSUL               | None                   |
| PUCCH (SR)                                                                                                           | UE requests BSUL for opportunity to transmit UL data | BSUL        | BSUL               | None                   |
| SRS                                                                                                                  | UL channel quality measurements                      | BSUL        | BSUL,              | None                   |
| PRACH                                                                                                                | Timing alignment, initial access of UE to network    | BSUL        | BSUL, BSDL         | BSUL -> BSDL           |
| PUCCH (CQI/PMI/RI, HARQ)                                                                                             | Control information for DL data (PDSCH transmission) | BSUL        | BSDL               | BSUL -> BSDL           |

## IX. CLAIM CONSTRUCTIONS

For the purpose of this proceeding, terms not expressly construed herein should be given their ordinary and customary meaning as of the filing date of the '383 patent. 37 C.F.R. § 42.100(b); *see also Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (*en banc*).

For purposes of this Petition, it is important to consider Patent Owner's apparent interpretation of at least the term "uplink control channel" in the co-pending district court litigations. Pursuant to 35 U.S.C. §301(a)(2) and per §301(d), the Office may consider the positions of the Patent Owner regarding infringement to determine the proper meaning of patent claims in IPR proceedings under §314. *See 10x Genomics, Inc. v. Bio-Rad Labs., Inc.*, IPR2020-00086, Paper 8 at 17-22 (PTAB Apr. 27, 2020) ("Under the circumstances of this case, the rule does not prohibit Petitioner from submitting a claim construction it believes is incorrect and relying on that construction to show how the claim is unpatentable" and "we disagree with

Patent Owner’s assertion that the applicable rules and guidance prohibit Petitioner from relying on a claim construction that it believes is incorrect, namely a claim construction relied upon by Patent Owner to assert infringement in the related district court action”); *Donnelly Distribution LLC v. Russo Trading Co., Inc.*, IPR2019-00761, Paper 8, 17-18 (PTAB Sept. 6, 2019).

Here, the challenged claims recite an “uplink control channel.” *See* Ex. 1001 at cl. 1-8. A POSITA would understand that an uplink control channel is sent in the uplink direction, consistent with its plain and ordinary meaning. Ex. 1005, ¶94. This means that information sent on the uplink control channel is sent from the UE to the base station, whether the base station is the serving node, the supplemental node, or any other node in the network. The meaning of uplink control channel is further supported by Patent Owner’s identification of a Physical Uplink Control Channel (PUCCH)—which is an uplink channel containing information sent from a UE to a base station—as satisfying the claim limitations requiring an “uplink control channel” in its infringement contentions. Ex. 1007, at 10.

## **X. GROUND 1: YU IN VIEW OF ACHARYA**

### **A. Motivation to Combine**

As discussed herein, a POSITA would have been motivated to combine Yu’s supplemental uplink node selection and operation process with Acharya’s disclosure

of a separate base station for uplink transmissions providing an uplink control channel.

A POSITA would have been motivated to combine Yu with Acharya with a reasonable expectation of success. Ex. 1005, ¶64. Yu discloses a supplemental uplink node selection and operation procedure in which a UE is associated with one base station for downlink transmissions and separately associated with another supplemental base station for uplink transmissions. Ex. 1003, ¶[0075]; Ex. 1005, ¶65. Yu discloses the well-known concept that uplink and downlink transmissions could include transmissions of uplink and downlink control information and data. Ex. 1003, ¶¶[0028]-[0029] (explaining that data and control information are sent on certain channels in LTE); Ex. 1005, ¶65. For example, Yu explicitly discloses certain LTE channels for transmission of uplink control information, such as the PUCCH. *Id.* Yu does not, however, disclose the details of the use of these known channels implemented in its supplemental uplink node addition procedure. Because Yu describes its methods and systems in the context of an LTE network, a POSITA would have been motivated to look to other LTE references directed to solving UL-DL problems in heterogeneous networks for additional details of implementation. Ex. 1005, ¶65. A POSITA would have expected to succeed in such a combination because, while Yu mentions that control information may be transmitted on a PUCCH, Yu does not explicitly describe the details of the control information

transmissions on the PUCCH needed for implementation. On the other hand, Acharya describes the known information sent on the PUCCH, the receiving base station, and the backhaul support needed to implement a PUCCH in a system where uplink and downlink are split between two base stations. Ex. 1003, ¶[0029]; Ex. 1004, Table 2; Ex. 1005, ¶65. Thus, a POSITA would have a reasonable expectation of success in combining Yu's concept that control information may be transmitted on a PUCCH with the greater implementation details to implement transmitting control information on the PUCCH in a heterogeneous network with split uplink and downlink described in Acharya. Ex. 1005, ¶65.

A POSITA would be motivated to combine Yu and Acharya for several additional reasons. First, Acharya describes known LTE channels for uplink and downlink transmissions of different types of data and control information. Yu's supplemental uplink node selection and operation procedure could be implemented for supplemental node transmission assistance in either the uplink or downlink direction, and not limited to either control information or data. Thus, a POSITA would have looked to Acharya for different types of uplink and downlink channels provided by either the serving or supplemental nodes disclosed in Yu. Ex. 1005, ¶66.

Second, Yu and Acharya are analogous art to the '383 patent. As noted above, all three references are directed to solving the same problem: transmission power

imbalances for uplink and downlink transmissions in heterogeneous networks. Ex. 1005, ¶67.

Therefore, a POSITA would have been motivated to implement Yu's supplemental uplink node procedure using the details of the uplink control channel of the supplemental uplink node provided by Acharya. Ex. 1005, ¶68.

Additional motivation to combine are discussed in the limitations below.

**B. Independent Claim 1**

**[1.0] Yu discloses and/or renders obvious “An operating method of a network comprising at least a base station, the method comprising:**

To the extent the preamble is limiting, Yu discloses “[a]n operating method of a network comprising at least a base station.” Ex. 1005, ¶70.

Yu is specifically related to “the use of supplemental wireless communication network nodes to improve uplink and downlink wireless transmissions between the network and wireless user equipment.” Ex. 1003, ¶[0001]. Yu explains that there were known wireless communication networks with different types of network nodes for providing wireless communications with wireless user equipment. Ex. 1003, ¶[0004]. For example, Yu describes a heterogeneous Long Term Evolution Advanced (LTE-A) network employing “regular nodes,” such as “conventional evolved Universal Mobile Telecommunications System, UMTS, Terrestrial Radio Access Network, E-UTRAN, Node B nodes,” as well as “relay nodes.” Ex. 1004, ¶[0004]. It was well known that the regular nodes and relay nodes in the exemplary

heterogeneous network described by Yu could also be referred to as base stations, as recited in Claim 1. Ex. 1005, ¶70. Thus, Yu discloses this limitation.

**[1.1] Yu discloses and/or renders obvious “transmitting, performed by each of base stations, a downlink reference signal to a terminal;”**

Yu discloses and/or renders obvious “transmitting, performed by each of base stations, a downlink reference signal to a terminal.” Ex. 1005, ¶71.

Yu discloses that the system selects both the initial “serving node” and the subsequent “supplemental node” by measuring downlink reference signals sent by both base stations. As described above, Yu’s method takes place according to the steps of Figure 5.

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**Ex. 1003, Fig. 5**

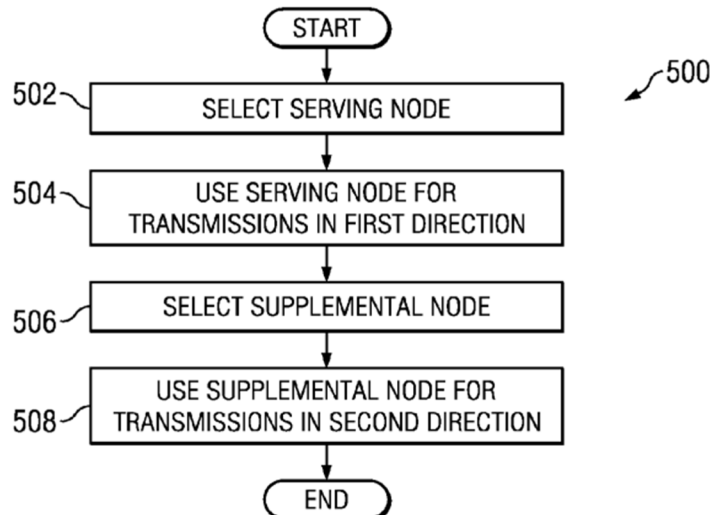


**FIG. 5**

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At step 502, the system selects the serving node. To select the serving node, Yu states the “user equipment may select the network node from which the user

equipment *receives the strongest reference signal* receive power, RSRP, to be the serving node.” Ex. 1003, ¶[0079]; *see also* ¶[0082] (disclosing a UE selecting “a serving node based on downlink signal strength, such as *reference signal* receive power”). As explained by Dr. Camp and above in Section VII.C, reference signal receive power (RSRP) is a well-known measurement in LTE and LTE-A performed by the UE that reports signal strength based on received downlink cell-specific reference signals. Ex. 1005, ¶73. Thus, the fact that Yu discloses the step of selecting amongst various network nodes based upon their RSRP necessarily means that each of those network nodes is transmitting a downlink reference signal. Ex. 1005, ¶73.

This is shown in more detail in Figure 6. Figure 6 “is a diagram illustrating message flows in a method for selecting an uplink supplemental node.” Ex. 1003, ¶[0084].

Ex. 1003, Fig. 6 (annotated); Ex. 1005, ¶74.

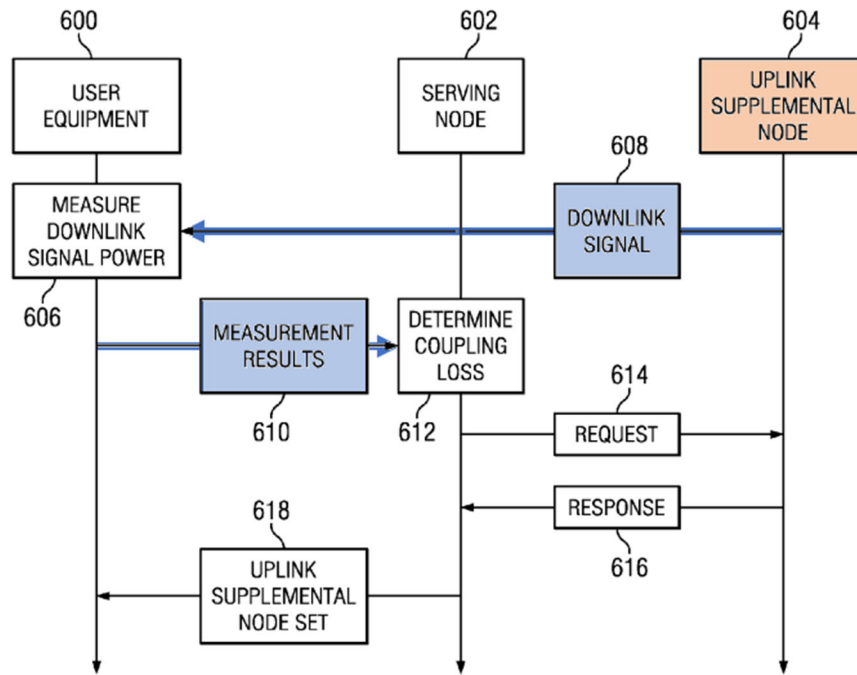


FIG. 6

Prior to selecting the Uplink Supplemental Node (604), User Equipment (600) measures the downlink signal power received in downlink signals transmitted from nodes in the network that may be considered for operation as the Uplink Supplemental Node. Ex. 1003, ¶[0085]. This is shown for one of the nodes that is eventually selected as the Uplink Supplemental Node (604) in step 608, where Uplink Supplemental Node (604, in orange) sends a “downlink signal” which includes the downlink reference signal. Ex. 1003, Fig. 6. Yu discloses that User Equipment 600 could perform these measurements for a specified period of time or until a measurement threshold is met. Ex. 1003, ¶[0085]. Once the measurement period has expired or the measurement threshold is met, , the User Equipment (600)

returns “measurement results” (labeled 610) for the candidate supplemental nodes. *Id.* Yu states “measurement results 610 may include *the reference signal receive power.*” Ex. 1003, ¶[0086]. As with above, a POSITA would have understood that for the UE to measure the reference signal receive power, the base station (*e.g.*, uplink supplemental node 604, in orange) must have sent the downlink reference signal to be measured in the downlink signal. Ex. 1005, ¶76.

Thus, Yu discloses both base stations (*e.g.*, the serving node and the uplink supplemental node) sending downlink reference signals thereby rendering this claim limitation obvious. Ex. 1005, ¶77.

**[1.2] Yu discloses and/or renders obvious “receiving, performed by a first base station, a strength of the downlink reference signal from the terminal;”**

Yu discloses and/or renders obvious “receiving, performed by a first base station, a strength of the downlink reference signal from the terminal.” Ex. 1005, ¶78.

As discussed above with respect to element [1.1], in connection with Figure 6, Yu states “measurement results 610 may include *the reference signal receive power.*” Ex. 1003, ¶[0086]. Figure 6 confirms that the reference signal receive power is sent to the serving node, or the first base station of the claim (shown below in green).

Ex. 1003, Fig. 6 (annotated); Ex. 1005, ¶79.

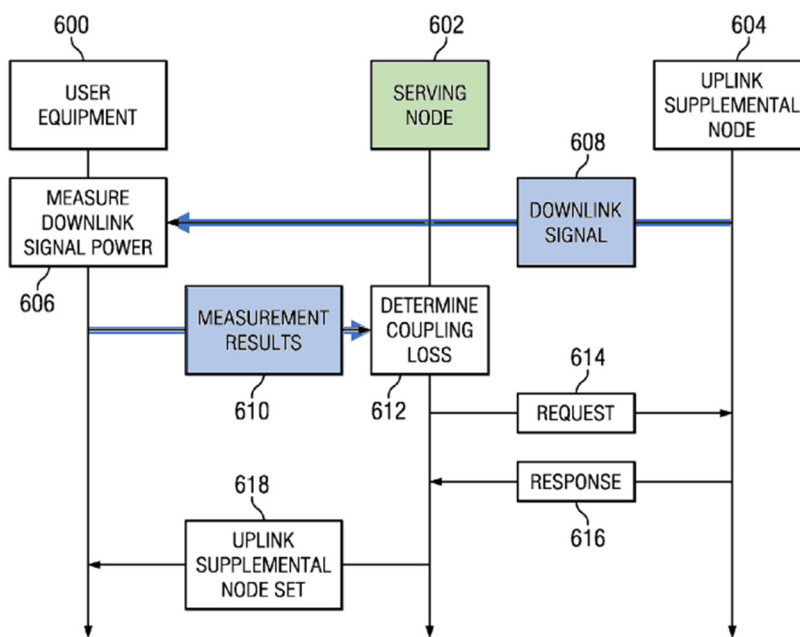


FIG. 6

Yu likewise confirms these measurement results are sent “for a number of nodes,” not just to the uplink supplemental node. Ex. 1003, ¶[0086]; Ex. 1005, ¶80. This aspect is confirmed again in Figure 8. Ex. 1003, ¶[0105]. In connection with Figure 8, Yu discloses “[d]ownlink signal power measurements *for one or more nodes* are received by the serving node from the user equipment (step 802). “ Ex. 1003, ¶[0106].

Notably, the ’383 patent discloses nearly identical steps for selection of the first downlink base station, which corresponds to the serving node disclosed in Yu. Ex. 1005, ¶81. For example, the ’383 patent states that, in its operating method shown in Figure 4, the terminal may measure a strength of the signals received from

a set of base stations, and as a result, may determine the downlink base station as the base station transmitting with the greatest signal strength of the set of base stations. The '383 patent discloses that a downlink cell association with the downlink base station is then established. Ex. 1001, 7:6-26. Yu contains the same disclosure: “Serving node 412 may be selected as the one of network nodes 410 having the strongest detected signal strength in one transmission direction with user equipment 404. For example, user equipment 404 may select serving node 412 as the one of network nodes 410 providing the strongest received downlink signal at user equipment 404. In accordance with an illustrative embodiment, serving node 414 is used for transmission in a first direction, i.e., on downlink[.]” Ex. 1003, ¶¶[0071]-[0072]; Ex. 1005, ¶81.

Thus, Yu discloses “receiving, performed by a first base station, a strength of the downlink reference signal from the terminal,” as recited in Claim 1.

**[1.3] Yu discloses and/or renders obvious “establishing, performed by the first base station, a downlink cell association with the terminal;”**

Yu discloses and/or renders obvious “establishing, performed by the first base station, a downlink cell association with the terminal.” Ex. 1005, ¶83.

Yu discloses that the serving node (*e.g.*, the first base station) establishes a downlink cell association with the terminal. Yu describes that node 108 is the serving node and that “[s]uch a node performs many functions, including radio resource management, admission control, scheduling, enforcement of negotiated uplink

quality of service, cell information broadcast, ciphering and deciphering of user and control data, and compression and decompression of downlink and uplink user packet headers.” Ex. 1003, ¶[0032]. A POSITA would recognize that functions such as radio resource management are used to establish downlink cell association because the radio resource control (RRC) protocol is the higher-layer signaling in LTE that performs the control plane procedures, including connection management, between the base station and the UE. Ex. 1005, ¶84. Likewise, admission control and scheduling are used to establish a connection (or cell association) with the terminal. Ex. 1005, ¶84. Yu finally discloses that the selected serving node is used “for transmissions in a first direction, i.e., downlink transmissions.” Ex. 1003, ¶[0079].

Thus, a POSITA would understand that Yu discloses “establishing, performed by the first base station, a downlink cell association with the terminal,” as recited in Claim 1.

**[1.4] Yu in view of Acharya renders obvious “determining, performed by the first base station, an identifier of a second base station providing an uplink control channel;”**

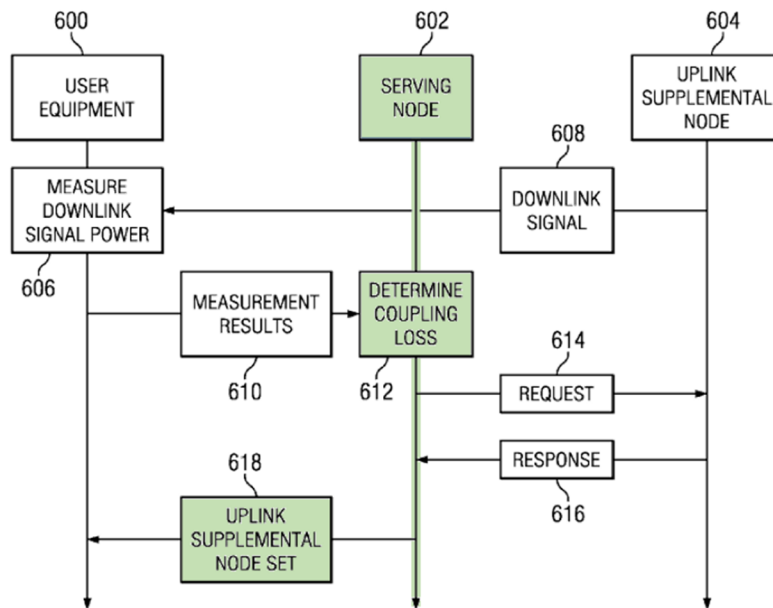
Yu in view of Acharya renders obvious “determining, performed by the first base station, an identifier of a second base station providing an uplink control channel.” Ex. 1005, ¶86. This step can be broken down into two parts, which are addressed in turn.

**a) “determining, performed by the first base station, an identifier of a second base station”**

First, Yu discloses an exemplary embodiment in which the serving node with a downlink cell association with the UE identifies and selects the supplemental uplink node(s) to serve the same UE. Ex. 1003, ¶[0074]; Ex. 1005, ¶87.

In Yu, the supplemental node is determined by the serving (“first”) base station. Specifically, Yu states “serving node 412 selects supplemental node 418 for transmission assistance in order to provide the best available downlink transmissions on downlink channel 406 and uplink transmissions on uplink channel 408 between network 402 and user equipment 404.” Ex. 1003, ¶[0085]. Thus, the determination and selection of the supplemental node providing the channel for uplink transmissions with the UE is done in Yu by the serving node, or the “first base station.” Ex. 1005, ¶88.

A POSITA would recognize that the assignment and identification of the correct base station must be communicated to the UE, which is shown in Figure 6. In Figure 6, UE 600 has already selected the serving node and then measures the downlink signal power of the downlink signals received from the possible network nodes that could provide supplemental uplink transmission. Ex. 1003, ¶[0085]; Ex. 1005, ¶89. UE 600 then reports the measurement results of the downlink signal power of the possible uplink supplemental nodes to the serving node in step 610. Ex. 1003, ¶[0086].

**Ex. 1003, Fig. 6 (annotated); Ex. 1005, ¶89****FIG. 6**

Based on the results, the serving node identifies the candidate uplink supplemental nodes for UE 600 and sends them in step 618 shown above. The uplink supplemental node set 618 “includes each candidate node that was determined to be appropriate for operation as an uplink supplemental node for user equipment 600.” Ex. 1003, ¶[0092]. Yu discloses that, as a result of this determination, there may be only one candidate uplink supplemental nodes selected by the serving base station for the UE. Ex. 1003, ¶¶[0074]-[0075]; [0088]. Thus, uplink supplemental node set 618 is an identifier of a second base station providing a channel for uplink transmission, as is recited in claim 1. Ex. 1003, ¶[0088]; Ex. 1005, ¶90.

Acharya likewise discloses this limitation. Ex. 1005, ¶91. Acharya discloses “a first base station that . . . [includes] a selection module *that assigns a second base*

*station* selected from a group of neighboring base stations on the basis of a highest signal strength value from the plurality of reception signal strength values to handle uplink traffic for the UE.” Ex. 1004, ¶[0043].

To the extent Patent Owner argues that this limitation is not obvious, the ’383 patent has a nearly identical disclosure for selecting the second base station based on the highest signal strength as is described in Acharya. Ex. 1005, ¶92. For example, like Acharya, the ’383 patent explains that each base station in a candidate group measures the strength of an uplink received signal and transmits the measurements to the downlink base station. Ex. 1001, 6:11-18. The downlink base station then determines the uplink base station from the group based on the strength of the uplink reference signal. Ex. 1001, 8:12-15.

Thus, a POSITA would understand that this limitation is disclosed and/or rendered obvious based on Yu and Acharya. Ex. 1005, ¶92

**b) “a second base station providing an uplink control channel”**

Second, Yu discloses or at least renders obvious an uplink control channel for the supplemental node. Ex. 1003, ¶[0072]; Ex. 1005, ¶93.

Figure 4 illustrates why it would be obvious for a POSITA to utilize an uplink control channel in Yu. Ex. 1005, ¶95-96. In Figure 4, the serving node is in yellow and the supplemental node is in blue:

Ex. 1003, Fig. 4 (annotated); Ex. 1005, ¶95

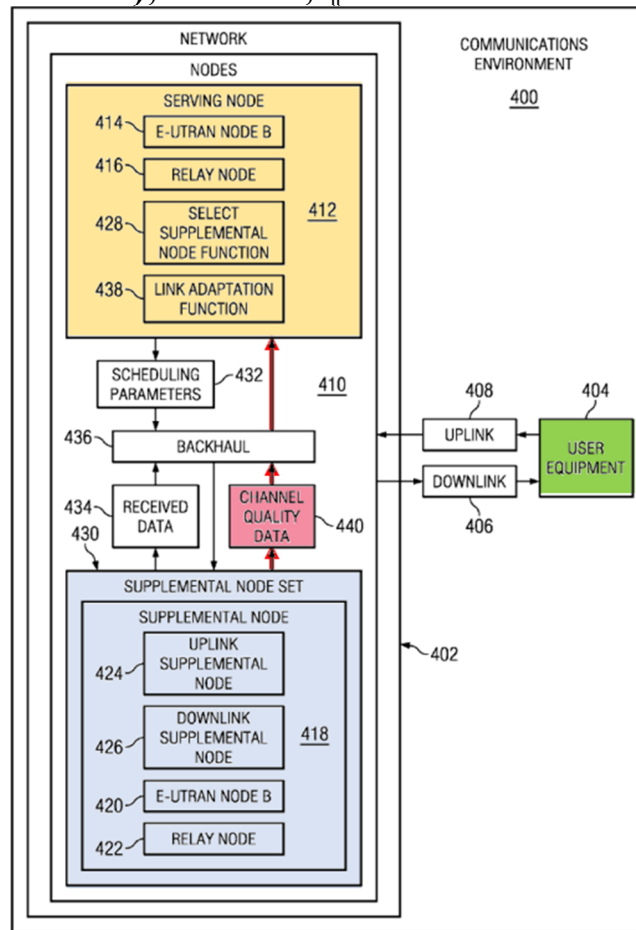


FIG. 4

The channel quality data in red is control information sent by the UE to the supplemental node and then passed by the supplemental node to the serving node in the backhaul. Ex. 1003, Fig. 4; Ex. 1005, ¶96. As shown in Figure 4, “channel quality data” 440 is provided “by supplemental node 418 to serving node 412 over backhaul 436 in order to adapt the modulation and coding scheme, power, or other parameters of transmission on the channel to match changing channel conditions.” Ex. 1004, ¶[0076].

Likewise, Yu specifically discloses that the uplink channel from the UE to the base station include the PUCCH, which is typically used to transmit uplink control information such as channel quality data. Ex. 1003, ¶[0029]. A POSITA would have understood that one way for the supplemental node to acquire channel quality data is through UE measurements, which would be sent to the supplemental node by the UE through an uplink control channel such as the disclosed PUCCH. Ex. 1005, ¶97. Thus, a POSITA reading Yu would have understood that an uplink control channel would have been obviously established between the UE and supplemental base station. Ex. 1005, ¶93, 97.

To the extent Patent Owner argues that Yu does not render obvious an uplink control channel, a POSITA looking to deploy the serving and supplemental nodes of Yu would look to Acharya for implementation details regarding the possible channels for data and control information transmission on the uplink and downlink. Ex. 1005, ¶98

For example, Acharya discloses the signaling procedures for data or control information to be handled by separate base stations for UL and DL transmission. Ex. 1004, ¶¶[0067]-[0069]; Ex. 1005, ¶99. In one exemplary embodiment, Acharya describes how it is “possible for some control information for uplink transmission to be handled by a separate BS, BSUL.” Ex. 1004, ¶[0067]. More specifically, Acharya even explains how the “UE may want to pass some control information to BSDL

(such as measured DL channel quality) but since it can transmit only to BSUL, BSUL has to in turn pass the control information to BSDL.” Ex. 1004, [0068]. In other words, Acharya discloses that the “channel quality” control information (e.g., like the channel quality information in Yu) should be passed on the uplink through the UL base station. Ex. 1005, ¶99.

Moreover, Acharya explicitly provides a list of the uplink channels used in LTE.

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**Ex. 1004, Table 2; Ex. 1005, ¶100**

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| TABLE 2                                                                                                              |                                                      |             |                    |                        |
|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-------------|--------------------|------------------------|
| Types of UL channels and if backhaul communication is needed amongst BS so that the relevant BS gets the information |                                                      |             |                    |                        |
| UL Channel                                                                                                           | Description of Content                               | Received by | Intended Recipient | Backhaul Communication |
| PUSCH                                                                                                                | UL Data (UE to BSUL)                                 | BSUL        | BSUL               | None                   |
| PUCCH (SR)                                                                                                           | UE requests BSUL for opportunity to transmit UL data | BSUL        | BSUL               | None                   |
| SRS                                                                                                                  | UL channel quality measurements                      | BSUL        | BSUL,              | None                   |
| PRACH                                                                                                                | Timing alignment, initial access of UE to network    | BSUL        | BSUL, BSDL         | BSUL → BSDL            |
| PUCCH (CQI/PMR), HARQ                                                                                                | Control information for DL data (PDSCH transmission) | BSUL        | BSDL               | BSUL → BSDL            |

---

Table 2 of Acharya specifically lists the PUCCH, or physical uplink control channel, as one of the LTE channels that would be used to transmit control information (e.g., channel quality information) between the UE and “BSUL” (the uplink base station) in a system implemented with Acharya’s signaling procedures enabling a UE to have an association with a base station for uplink and a separate

association with another base station for downlink. Ex. 1004, ¶¶[0066]-[0069]. A POSITA would understand that the “Received by” column in Table 2 for the highlighted PUCCH indicates that the BSUL provides the PUCCH. Ex. 1005, ¶100. Not only does Yu disclose the PUCCH as described above, but Yu also teaches the same type of system taught by Acharya with separate associations between a UE and multiple base stations for transmissions on uplink and downlink. Ex. 1005, ¶101. Thus, a POSITA looking for further implementation details for the types of channels to be used with the disclosure of Yu would be motivated to combine Yu with Acharya to determine the use of LTE channels between the node serving the downlink transmissions and the node for uplink transmission and would arrive at the claimed limitation “a second base station providing an uplink control channel.” Ex. 1005, ¶101. A POSITA would understand that the second base station providing an uplink control channel, or BSUL in Acharya, could be included in the supplemental uplink node set determined for the UE by the serving node in Yu. Ex. 1005, ¶101.

Thus, Yu in view of Acharya renders obvious “determining, performed by the first base station, an identifier of a second base station providing an uplink control channel,” as recited in Claim 1. Ex. 1005, ¶102.

**[1.5] Yu discloses and/or renders obvious “transmitting, performed by the first base station, the identifier of a second base station through the downlink cell association; and”**

Yu discloses “transmitting, performed by the first base station, the identifier of a second base station through the downlink cell association.” Ex. 1005, ¶103.

As explained above, the message flows for the uplink supplemental node selection taught by Yu is shown in Figure 6. Also, as described above, after the serving node determines the candidate uplink supplemental nodes, the serving node and candidate uplink supplemental node set perform the query-response procedure, and an uplink supplemental node set shown in 618 in Figure 6 is determined at the conclusion of this procedure. Ex. 1003, ¶[0091]. Yu discloses that the uplink supplemental node set for UE 600 “includes each candidate node that was determined to be appropriate for operation as an uplink supplemental node for user equipment 600.” Ex. 1003, ¶[0091]. Importantly, Yu discloses that in the next step, the “*uplink supplemental node set 618 may . . . be transmitted to UE 600.*” Ex. 1003, ¶[0093] (emphasis added). As explained above, Yu discloses that the “uplink supplemental node set 618” does not have to be a set of multiple nodes. Rather, Yu discloses an example in typical wireless network including “Type-I relay nodes,” where the uplink supplemental node set would include only one uplink supplemental node. Ex. 1003, ¶[0092].

Further, transmitting the uplink supplemental node set 618 includes the use of “dedicated radio resource control, RRC, signaling” to inform UE 600 of the identity of the uplink supplemental node. Ex. 1003, ¶[0093]. A POSITA would understand that RRC signaling is a function of the downlink cell association established between the serving node and the UE. Ex. 1005, ¶105. The transmission of the identity of the uplink supplemental node from the serving node to the UE using RRC signaling is illustrated as the last step of the message flow in Figure 6 below. Ex. 1005, ¶105.

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**Ex. 1003, Fig. 6 (annotated); Ex. 1005, ¶105**

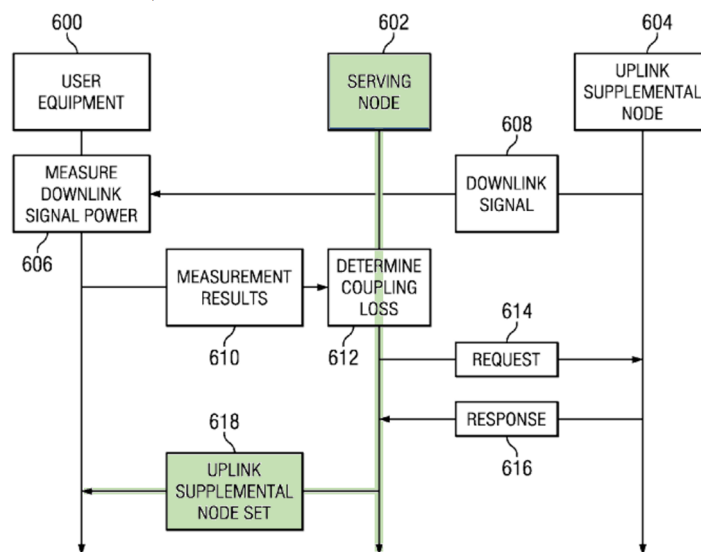


**FIG. 6**

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Thus, Yu discloses “establishing, performed by the second base station, an uplink cell association with the terminal,” as recited in Claim 1. Ex. 1005, ¶106.

**[1.6] Yu discloses and/or renders obvious “establishing, performed by the second base station, an uplink cell association with the terminal.”**

Yu discloses “establishing, performed by the second base station, an uplink cell association with the terminal.” Ex. 1005, ¶107.

Yu discloses that, after the selection of the uplink supplemental node described above, use of the supplemental node for uplink transmission is initiated. Ex. 1003, ¶¶[0093]-[0095]. The message flows for establishing an uplink connection between the UE and the uplink supplemental node are shown in Figure 7 of Yu.

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**Ex. 1003, Fig. 7 (annotated); Ex. 1005, ¶108**

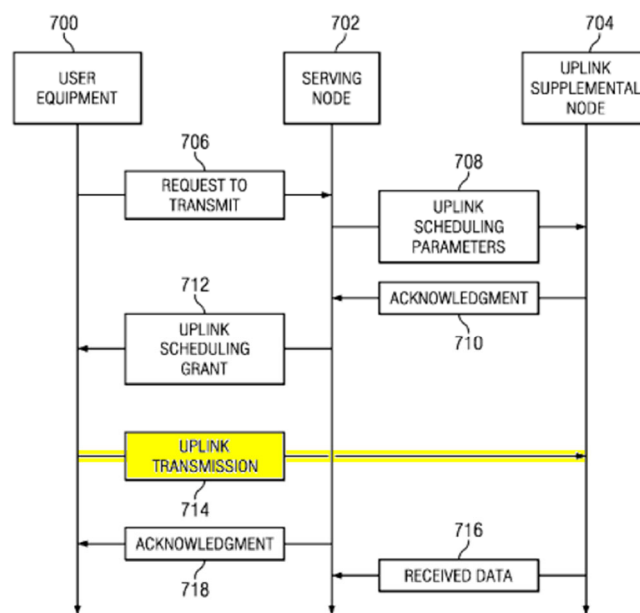


*FIG. 7*

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The supplemental uplink node is prepared to receive an uplink transmission, and the serving node (downlink node) sends an uplink scheduling grant to the user

equipment. Then, the UE performs an uplink transmission shown as 714 in Figure 7. Reception of an uplink transmission and the successful decoding of that transmission would indicate an uplink cell association to a POSITA. Ex. 1005, ¶109.

Thus, Yu discloses “establishing, performed by the second base station, an uplink cell association with the terminal,” as recited in Claim 1.

### **C. Dependent Claim 2**

**[2] The method of claim 1, wherein the strength of the downlink reference signal is measured by the terminal.**

Yu renders obvious this limitation. Claim 2 depends from Claim 1, and thus the discussion above with respect to Claim 1 is incorporated by reference. Yu also discloses the additional limitation of Claim 2: “wherein the strength of the downlink reference signal is measured by the terminal.” Ex. 1005, ¶111.

In particular, Yu discloses that, prior to selecting the serving node, the user equipment “may select the network node from which the user equipment receives the *strongest reference signal receive power, RSRP*, to be the serving node.” Ex. 1003, ¶[0079]. Thus, the UE is measuring and determining the strongest RSRP, based on downlink reference signals sent by candidate base stations. Ex. 1005, ¶112. As described in detail above, RSRP is a known UE-determined measure of signal strength of different cells. Ex. 1005, ¶112. Yu also discloses that, after the selection of the serving node, but before the selection of the supplemental uplink node by the serving node, the user equipment 600, shown in Figure 6, in communication with

serving node “measures the downlink signal power in downlink signal 608 received from candidate nodes.” Ex. 1003, ¶[0085]. In this measurement report, Yu also discloses that the measurement results may include the RSRP for a number of nodes. Ex. 1003, ¶[0086]. Thus, Yu discloses “wherein the strength of the downlink reference signal is measured by the terminal,” as recited in Claim 2.

**D. Dependent Claim 3**

**[3] The method of claim 1, wherein the base station candidate group is updated by the terminal based on the strength of the downlink reference signal.**

Yu renders obvious this limitation. Claim 3 depends from Claim 1, and thus the discussion above with respect to Claim 1 is incorporated by reference. Yu also renders obvious the additional limitation of Claim 3: wherein the base station candidate group is updated by the terminal based on the strength of the downlink reference signal. Ex. 1005, ¶114.

In the supplemental node selection process disclosed in Yu, “user equipment 600 . . . measures the downlink signal power 606 in downlink signal 608 received from network nodes that may be considered for operations as uplink supplemental node 602.” Ex. 1003, ¶[0085]. As described above in claim 1, a POSITA would understand that the claimed “strength of the downlink reference signal” in claim 3 is the same as measuring the downlink signal power 606 in downlink signal 608 disclosed in Yu. Ex. 1005, ¶115. Further, Yu discloses that the downlink signal

strength measurement could be performed by the UE until a certain measurement threshold event occurs, or a configured time interval expires. Once the event is satisfied, Yu discloses that the UE reports the measurement results it obtains to the serving node for supplemental node selection. Ex. 1003, ¶¶[0085]-[0086]. Based on this disclosure, it would have been obvious to a POSITA that a UE is “updating” the base station candidate group by measurement of the downlink signal strength of possible supplemental nodes until a certain threshold or for a certain period of time, and subsequently reporting those results to the serving node. Ex. 1005, ¶115. Thus, Yu renders claim 3 obvious.

**E. Dependent Claim 4**

**[4] The method of claim 1, further comprising: receiving, performed by the second base station, an uplink reference signal.**

Yu renders obvious this limitation. Claim 4 depends from Claim 1, and thus the discussion above with respect to Claim 1 is incorporated by reference. Yu also discloses the additional limitation of Claim 4: further comprising: receiving, performed by the second base station, an uplink reference signal.” Ex. 1005, ¶117.

Yu discloses that, in its supplemental uplink node operation procedure, “an uplink supplemental node may measure the condition of the uplink channel between the uplink supplemental node and the user equipment.” Ex. 1003, ¶[0112]. Yu discloses that one way to achieve the channel quality data is to measure “sounding reference signal transmissions from the user equipment.” Ex. 1003, ¶[0113]. A

POSITA would have recognized that a Sounding Reference Signals (SRS) described in Yu is a type of reference standardized in LTE. As a result, the supplemental uplink node operation in Yu requires that the uplink node receive an uplink reference signal from the UE. Ex. 1005, ¶118.

This limitation is also disclosed in Acharya. Specifically, Acharya discloses the selection of a second uplink base station wherein the UE sends an uplink reference signal to a group of base stations. Ex. 1004, ¶[0070]; Ex. 1005, ¶119.

Thus, Yu discloses “further comprising: receiving, performed by the second base station, an uplink reference signal,” as recited in Claim 4.

#### **F. Dependent Claim 5**

**[5] The method of claim 1, wherein the first base station is a macro base station and the second base station is a small base station.**

Yu discloses and/or renders obvious this limitation. Claim 5 depends from Claim 1, and thus the discussion above with respect to Claim 1 is incorporated by reference. Yu also discloses the additional limitation of Claim 5: “wherein the first base station is a macro base station and the second base station is a small base station.” Ex. 1005, ¶121.

Yu is directed to uplink/downlink reception imbalance in heterogeneous networks including nodes with different levels of transmission power. Ex. 1003, ¶[0022]. Heterogeneous networks refers to a network that employs both regular nodes, such as conventional LTE eNodeBs, and relay nodes. Ex. 1003, ¶[0004]. The

difference between regular and relay nodes are differences in their transmission power. A POSITA would understand that the regular LTE eNodeB disclosed by Yu is a macro base station, as Yu discloses that the base station has a relatively higher transmission power, there thus a larger coverage area. Ex. 1005, ¶122. On the other hand, a POSITA would understand a relay node to be a small base station, as Yu describes relay nodes as having relatively much smaller transmission power than an eNodeB. *Id.* Yu further discloses different types of relay nodes, such as Type 1, Type 1a, Type 1b, and Type 2 Relay nodes, all of which provide less transmission power than standard nodes. Ex. 1003, ¶[0033]. Based on this disclosure, a POSITA would understand regular and relay nodes disclosed in Yu to be a macro base station and a small base station, respectively. Ex. 1005, ¶122.

Thus, Yu discloses “wherein the first base station is a macro base station and the second base station is a small base station,” as recited in Claim 5.

**G. Independent Claim 6**

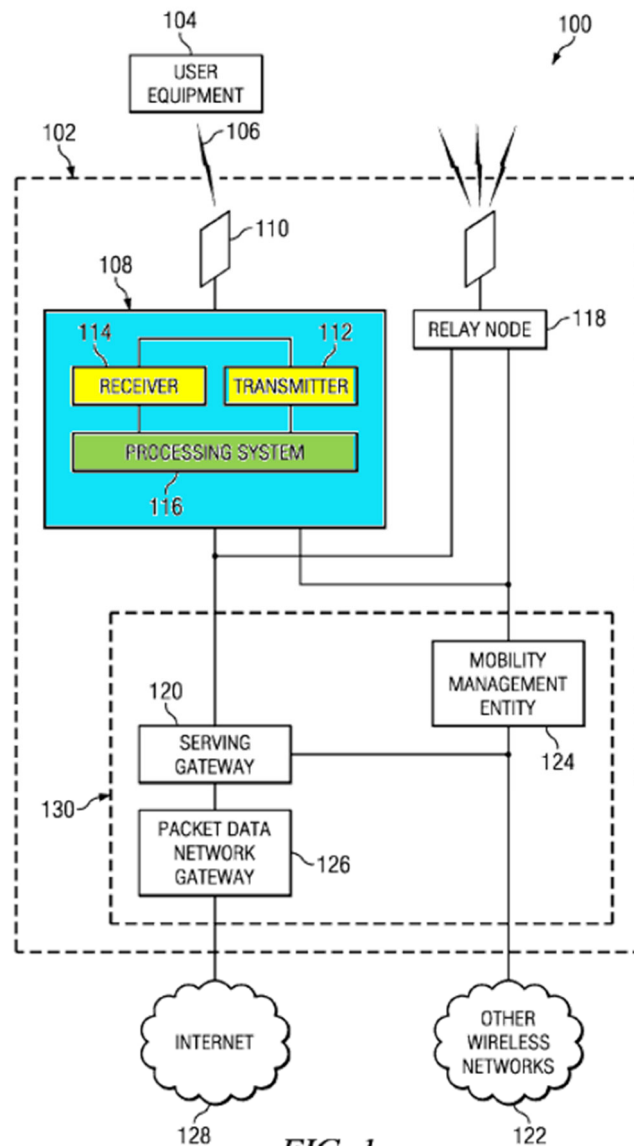
**[6.0] Yu discloses and/or renders obvious “A base station, comprising:”**

To the extent the preamble is limiting Yu discloses and/or renders obvious this limitation for at least the reasons discussed above regarding claim limitation [1.0]. Ex. 1005, ¶124.

Further, Yu discloses a node 108 that is part of a wireless communication system. Yu explains that node 108 may be a radio access node providing the interface

between a wireless network and a UE, and node 108 could be generically referred to as “a base transceiver station.” Ex. 1003, ¶[0031]. A POSITA would understand the node disclosed by Yu to be the base station in claim 6. Ex. 1005, ¶125. Node 108 is shown in blue below in Figure 1. Yu teaches that node 108 includes a receiver and a transmitter, shown in green, and a processing unit, shown in yellow.

Ex. 1003, Fig. 1 (annotated); Ex. 1005, ¶126



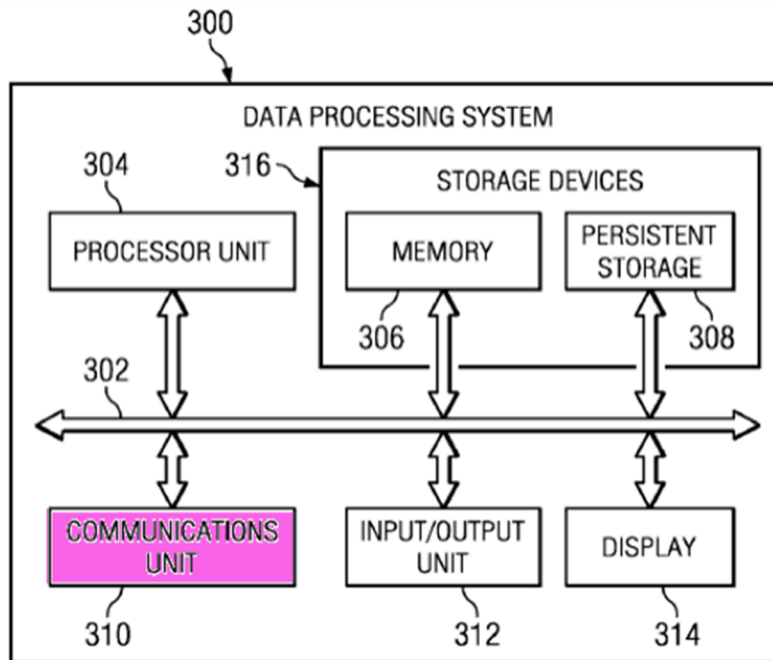
**[6.1] Yu discloses and/or renders obvious “a networking unit configured to transmit a downlink reference signal to a terminal; and”**

For at least the reasons discussed above regarding claim limitation [1.1], Yu discloses and/or renders obvious this limitation. In addition, Yu further discloses a base station comprising a networking unit configured to transmit a downlink

reference signal. Ex. 1005, ¶127. The base station disclosed by Yu discloses a node 108, or a base station, that includes transmitters 112, “which are used by node 108 to communicate directly with mobile devices. Ex. 1003, ¶[0032], Fig. 1. In Figure 1, transmitter 112 is connected to processing system 116, also included in the node, which Yu discloses is used “for implementing the functionality provided by node 108.” Ex. 1003, ¶[0032]. Thus, these transmitters, in connection with the processing system of the base station, would be used to carry out functionality disclosed in Yu, such as transmitting a downlink reference signal to a UE. Ex. 1005, ¶128.

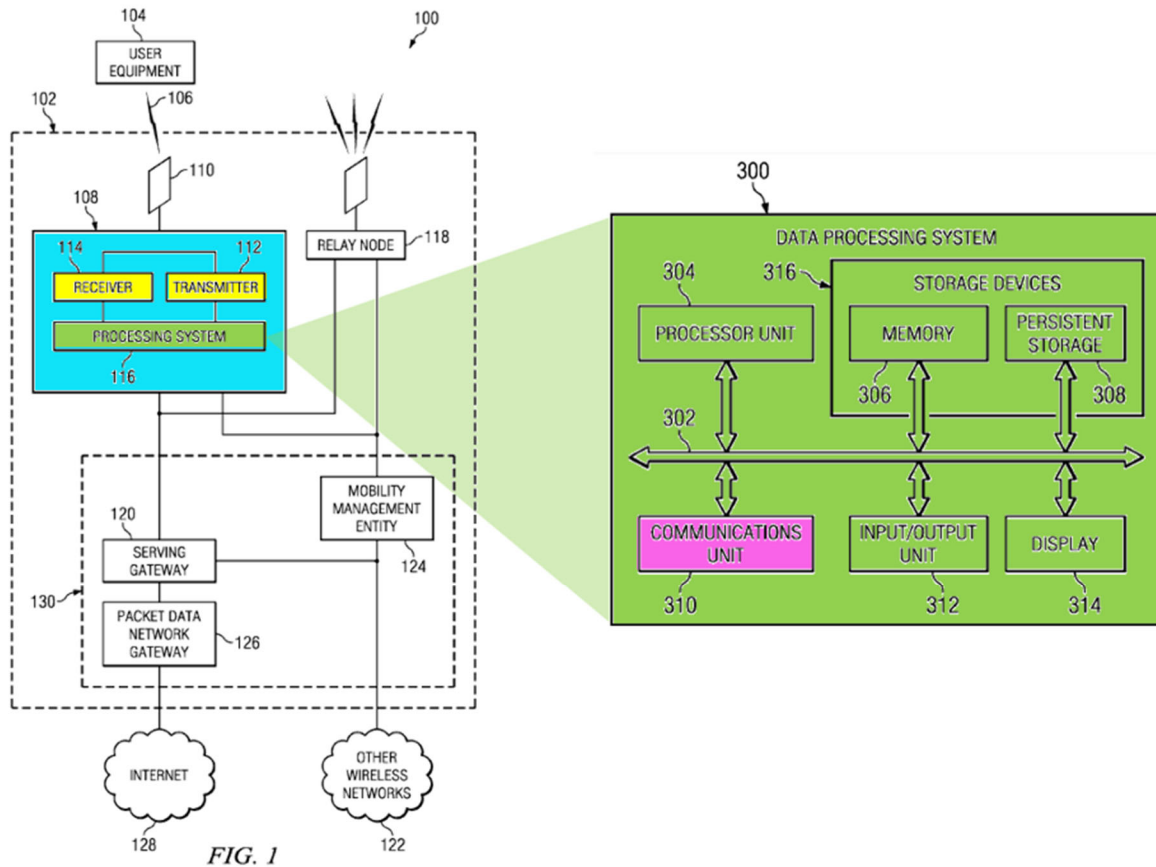
In addition, the transmitters are connected to processing system 116 of the base station shown in Figure 3 that includes communications unit 310, which provides the capability of the base station to communicate with other data processing systems or devices in the network. Ex. 1003, ¶[0057]. In one embodiment, the communications unit 310 could be a “network interface card” which may provide communications through the use of physical or wireless communications links. Thus, a POSITA would understand that the communications unit 310 shown in Figure 3 of Yu is a networking unit configured to perform the communications and networking functions of the methods disclosed in Yu. Ex. 1005, ¶129.

**Ex. 1003, Fig. 3 (annotated; partial); Ex. 1005, ¶129**



For clarity, Dr. Camp annotated Figures 1 and 3 together to show the inclusion of the data processing system in the network node of Figure 1.

Ex. 1003, Figs. 1, 3 (annotated; partial); Ex. 1005, ¶130



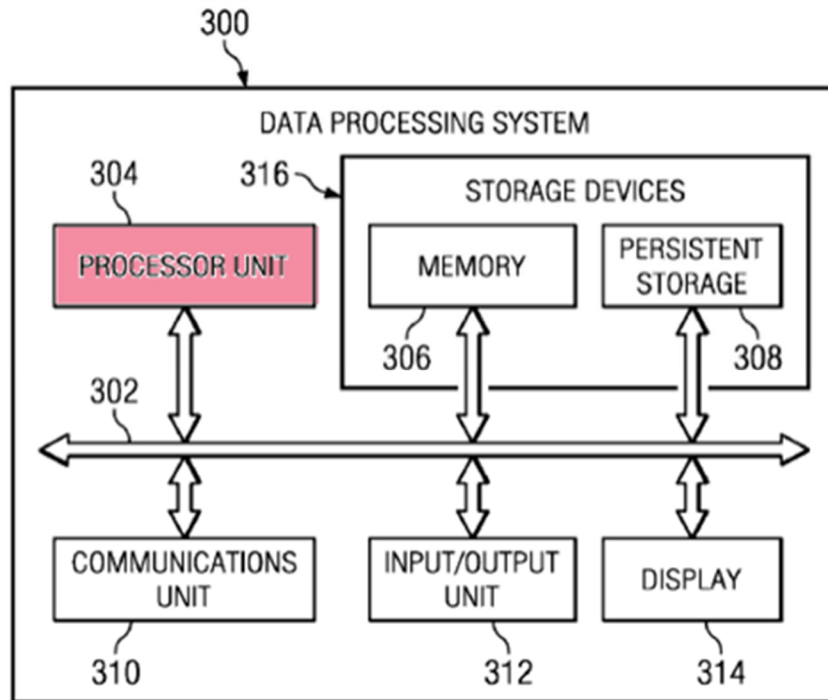
Thus, Yu discloses a base station comprising a networking unit that is configured for carrying out the functionality of the node, such as transmitting a downlink reference signal to a terminal, as discussed above in element [1.1]. Ex. 1005, ¶131.

**[6.2] Yu discloses and/or renders obvious “a processor configured to establish a downlink cell association with the terminal,”**

For at least the reasons discussed above regarding claim limitation [1.3], Yu discloses and/or renders obvious this limitation.

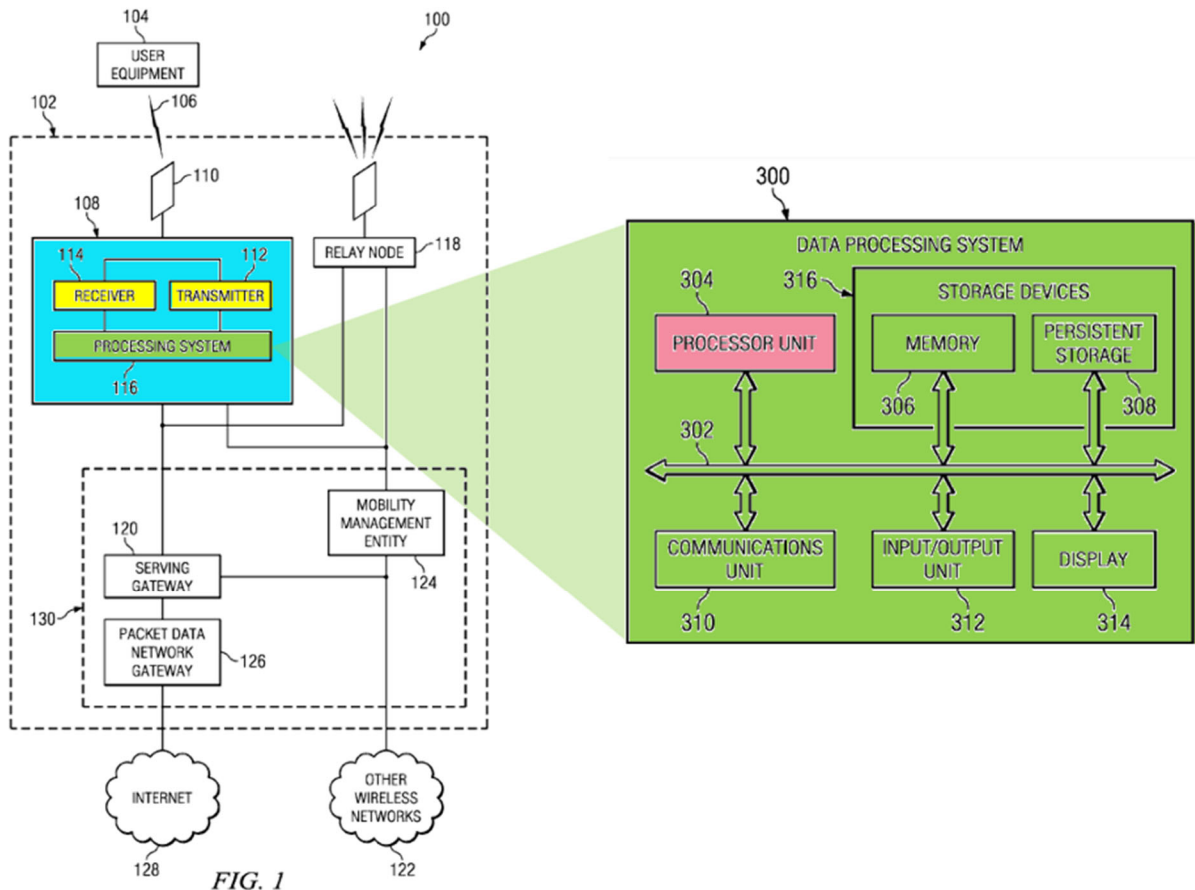
Yu discloses processor unit 304 that is part of the data processing system of the base station shown in Figure 3, which provides the capability of the base station to execute software instructions that dictate the functionality of the node. Ex. 1003, ¶[0055]. Thus, a POSITA would understand that the processor unit 304 shown in Figure 3 of Yu is a processor configured to execute the communications and networking functions of the methods disclosed in Yu, such as establish a downlink cell association with the terminal, as discussed above in claim element [1.3]. Ex. 1005, ¶133.

**Ex. 1003, Fig. 3 (annotated; partial); Ex. 1005, ¶133**



For clarity, Dr. Camp annotated Figures 1 and 3 of Yu together to show the inclusion of the data processing system including the processing unit in the base station of Figure 1.

Ex. 1003, Figs. 1, 3 (annotated; partial); Ex. 1005, ¶134



**[6.3] Yu in view of Acharya discloses and/or renders obvious “wherein the processor further configured to determine an identifier of a second base station providing an uplink control channel, and”**

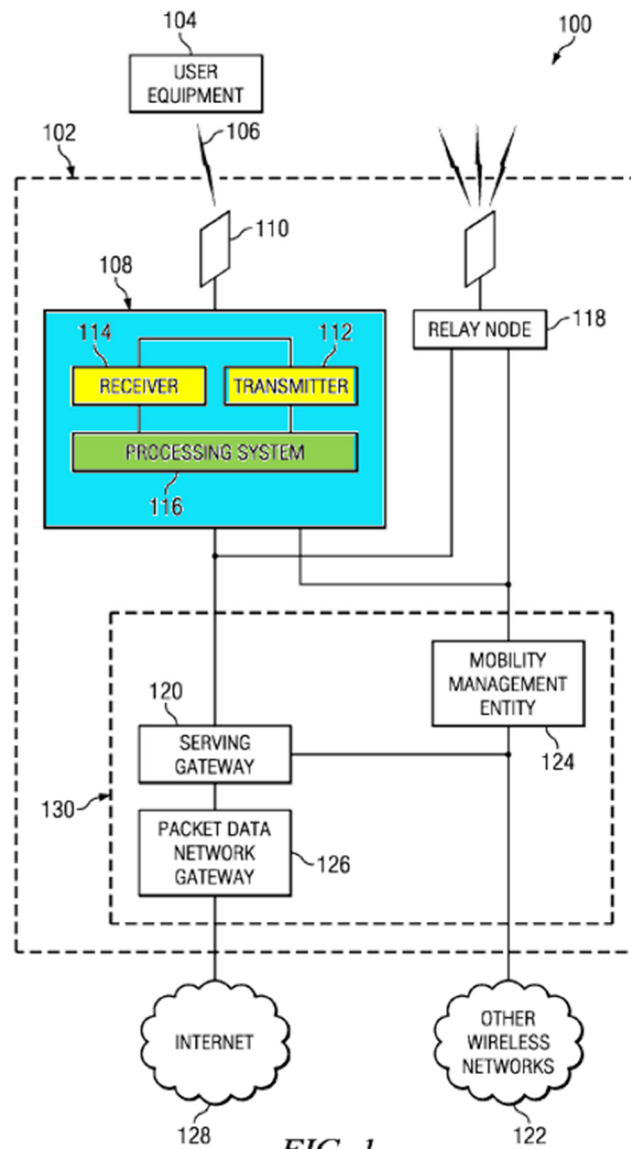
For at least the reasons discussed above regarding claim limitation [1.4], Yu and Acharya render obvious this limitation. In addition, as discussed above in relation to element [6.2], Yu discloses a processor configured to execute the communications and networking functions of the methods disclosed in Yu, such as determine an identifier of a second base station providing an uplink control channel discussed in claim element [1.4]. Ex. 1005, ¶135.

**[6.4] Yu discloses and/or renders obvious “wherein the networking unit further configured to receive a strength of the downlink reference signal from the terminal, and to transmit the identifier of the second base station through the downlink cell association.”**

For at least the reasons discussed above regarding claim limitations [1.2] and [1.5], Yu discloses and/or renders obvious this limitation.

First, for at least the reasons discussed above regarding claim limitations [6.0] and [6.1], Yu discloses a base station comprising a networking unit that is configured for carrying out the functionality of the node, such as receiving a strength of the downlink reference signal from the terminal, and to transmit the identifier of the second base station through the downlink cell association. Moreover, the node or base station disclosed by Yu includes transmitters and receivers 114, which are used by the node to communicate directly with a UE. Ex. 1003, ¶[0032]. In Figure 1, the transmitters and receivers are shown in yellow and are connected to processing system 116, also included in the node, which Yu discloses is used “for implementing the functionality provided by node 108.” Ex. 1003, ¶[0032]. Thus, these transmitters and receivers, in connection with the processing system of the base station, would be used to carry out functionality disclosed in Yu, such as receive a strength of the downlink reference signal from the terminal, and to transmit the identifier of the second base station through the downlink cell association. Ex. 1005, ¶137.

Ex. 1003, Fig. 1 (annotated); Ex. 1005, ¶137



## H. Dependent Claim 7

[7] The base station of claim 6, wherein the base station is a macro base station and the second base station is a small base station.

Claim 7 depends from Claim 6, and thus the discussion above with respect to Claim 6 is incorporated by reference. For the same reasons discussed above regarding claim 5, Yu discloses this limitation.

**I. Independent Claim 8**

**[8.0] Yu discloses and/or renders obvious “An operating method of a terminal performed by the terminal, the method comprising:**

To the extent the preamble is limiting, Yu discloses “[a]n operating method of a terminal performed by the terminal, the method comprising:” Ex. 1005, ¶139.

Yu is specifically related to “the use of supplemental wireless communication network nodes to improve uplink and downlink wireless transmissions between the network and wireless user equipment.” Ex. 1003, ¶[0001]. Yu explains that there were known wireless communication networks with different types of network nodes for providing wireless communications with wireless user equipment. Ex. 1003, ¶[0004]. For example, Yu describes a supplemental node selection procedure that involves UE 600. Ex. 1004, ¶[0085]; FIG. 6. Yu also explicitly identified examples as user equipment including pagers, cellular phones, cellular smartphones, wireless organizers, personal digital assistants, computer, laptops, among other. A POSITA would have been well aware that the user equipment described by Yu could also be referred to as terminals, as recited in Claim 3. Ex. 1005, ¶141. Thus, Yu discloses this limitation.

[8.1] Yu discloses and/or renders obvious “receiving a downlink reference signal from each of base stations;” & [8.2] “measuring a strength of the downlink reference signal;”

Yu discloses and/or renders obvious “receiving a downlink reference signal from each of base stations” and “measuring a strength of the downlink reference signals.” Ex. 1005, ¶142.

Yu discloses that the system selects both the initial “serving node” and the subsequent “supplemental node” by the UE’s measuring of downlink reference signals sent by each base stations. As described above in Claim 1, Yu’s method takes place according to the steps of Figure 5.

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**Ex. 1003, Fig. 5**

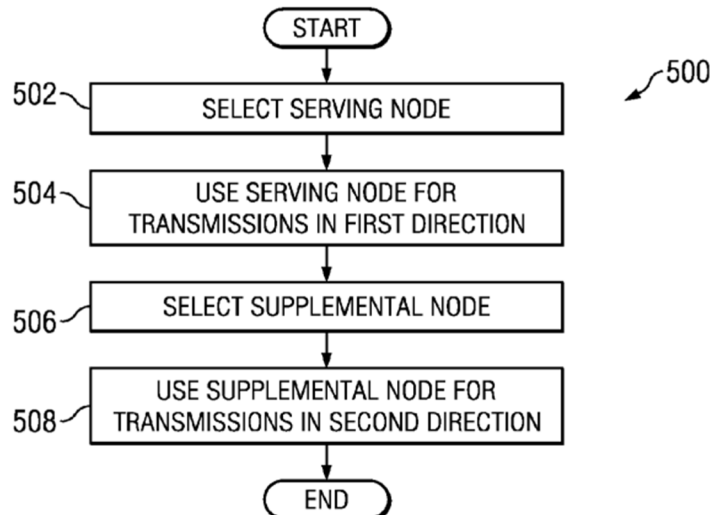


**FIG. 5**

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The system selects the serving node at step 502. Yu explains that the “user equipment may select the network node from which the user equipment *receives the*

*strongest reference signal* receive power, RSRP, to be the serving node.” Ex. 1003, ¶[0079]; *see also* ¶[0082] (disclosing a UE selecting “a serving node based on downlink signal strength, such as *reference signal* receive power”). Thus, the fact that Yu discloses the step of selecting amongst various network nodes based upon their RSRP necessarily means that the UE is measuring the downlink reference signal from each of the base stations. Ex. 1005, ¶144.

This is shown in more detail in Figure 6. Figure 6 “is a diagram illustrating message flows in a method for selecting an uplink supplemental node.” Ex. 1003, ¶[0012].

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**Ex. 1003, Fig. 6 (annotated); Ex. 1005, ¶145.**

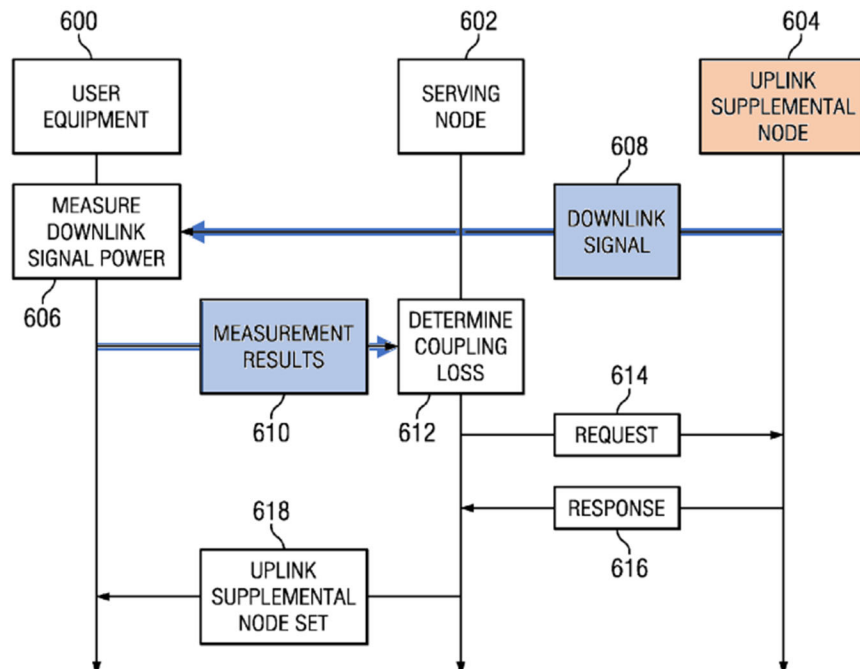


**FIG. 6**

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Prior to selecting the Uplink Supplemental Node (604), User Equipment (600) measures the downlink signal power received in downlink signals transmitted from nodes in the network that may be considered for operation as the Uplink Supplemental Node. Ex. 1003, ¶[0085]. This is shown for one of the nodes that is eventually selected as the Uplink Supplemental Node (604) in step 608, where Uplink Supplemental Node (604, in orange) sends a “downlink signal” which contains the downlink reference signal. Ex. 1003, Fig. 6; Ex. 1005, ¶146. Yu discloses that User Equipment 600 could perform these measurements for a specified period of time or until a measurement threshold is met. Ex. 1003, ¶[0085]. Once the measurement period has expired or the measurement threshold is met, the User Equipment (600) returns “measurement results” (labeled 610) for the candidate supplemental nodes. *Id.* Yu states “measurement results 610 may include *the reference signal receive power.*” Ex. 1003, ¶[0086]. As with above, a POSITA would have understood that for the UE to measure the reference signal receive power, the base station (*e.g.*, uplink supplemental node 604, in orange) must have sent the downlink reference signal to be measured in the downlink signal. Ex. 1005, ¶146.

Thus, Yu discloses a UE receiving and measuring a strength of a downlink reference signal, thereby rendering this claim limitation obvious.

**[8.3] Yu discloses and/or renders obvious “updating a base station candidate group by adding at least one base station among the base stations to the base station candidate group;”**

Yu discloses and/or renders obvious “updating a base station candidate group by adding at least one base station among the base stations to the base station candidate group.” Ex. 1005, ¶148.

In the supplemental node selection process disclosed in Yu, “user equipment 600 . . . measures the downlink signal power 606 in downlink signal 608 received from network nodes that may be considered for operations as uplink supplemental node 602.” Ex. 1003, ¶[0085]. Yu discloses that the downlink signal strength measurement could be performed by the UE until a certain measurement threshold event occurs, or a configured time interval expires. Once the event is satisfied, Yu discloses that the UE reports the measurement results it obtains to the serving node for supplemental node selection. Ex. 1003, ¶¶[0085]-[0086]. Thus, it would have been obvious to a POSITA that a UE is “updating” the base station candidate group and adding a base station to the base station candidate group by reporting its measurement of the downlink signal strength of possible supplemental nodes until a certain threshold or for a certain period of time, and subsequently reporting those results to the serving node. Ex. 1005, ¶149. Thus, Yu renders this limitation obvious.

**[8.4] Yu discloses and/or renders obvious “establishing a downlink cell association with a first base station;”**

Yu discloses and/or renders obvious “establishing a downlink cell association with a first base station.” Ex. 1005, ¶150.

Yu discloses that a downlink cell association is established between the serving node (*e.g.*, the first base station) and the terminal. Yu describes that node 108 is the serving node and that “[s]uch a node performs many functions, including radio resource management, admission control, scheduling, enforcement of negotiated uplink quality of service, cell information broadcast, ciphering and deciphering of user and control data, and compression and decompression of downlink and uplink user packet headers.” Ex. 1003, ¶[0032]. A POSITA would recognize that functions such as radio resource management are used to establish downlink cell association because the radio resource control (RRC) protocol is the higher-layer signaling in LTE that performs the control plane procedures, including connection management, between the base station and the UE. Ex. 1005, ¶151. Likewise, admission control and scheduling are used to establish a connection (or cell association) with the terminal. *Id.* Yu finally discloses that the selected serving node is used “for transmissions in a first direction, *i.e.*, downlink transmissions.” Ex. 1003, ¶[0079].

Thus, a POSITA would understand that Yu discloses “establishing a downlink cell association with a first base station,” as recited in Claim 8. Ex. 1005, ¶152.

**[8.5] Yu in view of Acharya renders obvious “receiving an identifier of a second base station providing an uplink control channel from the first base station through the downlink cell association, wherein the second base station is selected by the first base station;”**

Yu discloses “receiving an identifier of a second base station providing an uplink control channel from the first base station through the downlink cell association, wherein the second base station is selected by the first base station.” Ex. 1005, ¶153.

As explained above, the message flows for the uplink supplemental node selection taught by Yu is shown in Figure 6. Also, as described above, after the serving node determines the candidate uplink supplemental nodes, the serving node and candidate uplink supplemental node set perform the query-response procedure, and an uplink supplemental node set shown in 618 in Figure 6 is determined at the conclusion of this procedure by the serving node (“wherein the second base station is selected by the first base station”). Ex. 1003, ¶[0091]. Yu discloses that the uplink supplemental node set for UE 600 “includes each candidate node that was determined to be appropriate for operation as an uplink supplemental node for user equipment 600.” Ex. 1003, ¶[0091]. Importantly, Yu discloses that in the next step, the “*uplink supplemental node set 618 may . . . be transmitted to UE 600.*” Ex. 1003, ¶[0093] (emphasis added). As explained above, Yu discloses that the “uplink supplemental node set 618” does not have to be a set of multiple nodes. Rather, Yu

discloses an example in typical wireless network including “Type-I relay nodes,” where the uplink supplemental node set would include only one uplink supplemental node. Ex. 1003, ¶[0092].

Further, “dedicated radio resource control, RRC, signaling” is used to inform UE 600 of the identity of the uplink supplemental node. Ex. 1003, ¶[0093]. A POSITA would understand that RRC signaling is a function of the downlink cell association established between the serving node and the UE. Ex. 1005, ¶155. This disclosed transmission of the identity of the uplink supplemental node from the serving node to the UE using RRC signaling is illustrated as the last step of the message flow in Figure 6 below. Ex. 1005, ¶155.

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**Ex. 1003, Fig. 6 (annotated); Ex. 1005, ¶155**

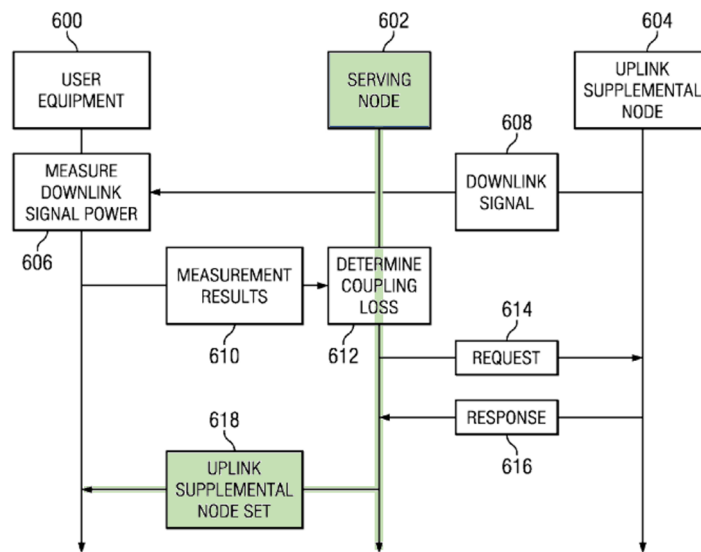


**FIG. 6**

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Thus, Yu discloses “establishing, performed by the second base station, an uplink cell association with the terminal,” as recited in Claim 8.

**[8.6] Yu discloses and/or renders obvious “establishing an uplink cell association with the second base station based on the identifier of the second base station.”**

Yu discloses “establishing an uplink cell association with the second base station based on the identifier of the second base station.” Ex. 1005, ¶157.

Yu discloses that, after the selection of the uplink supplemental node described above, use of the supplemental node for uplink transmission is initiated. Ex. 1003, ¶¶[0093]-[0095]. Prior to use of the supplemental uplink node, as described above in Claim 1, Yu discloses that uplink supplement node may be transmitted to the UE. As a result, the UE sends scheduling requests to the resultant supplemental nodes. *Id.*, ¶¶[0092]-[0095]. The message flows for establishing an uplink connection between the UE and the uplink supplemental node are shown in Figure 7 of Yu.

Ex. 1003, Fig. 7 (annotated); Ex. 1005, ¶158

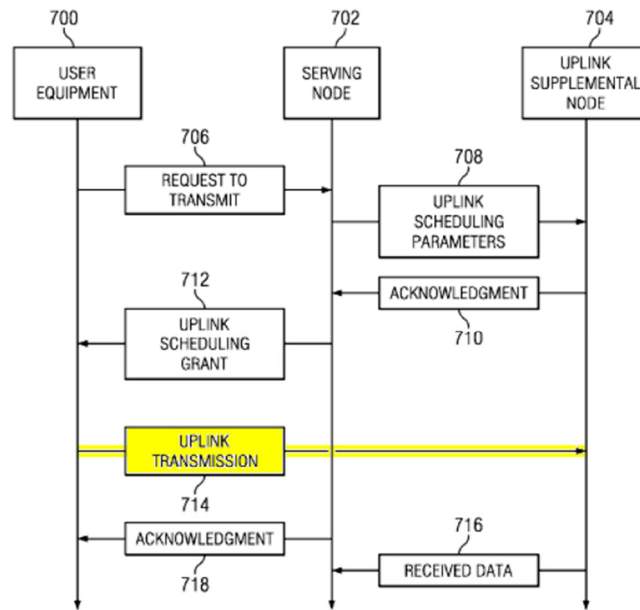


FIG. 7

Uplink supplemental node 704 is prepared to receive an uplink transmission, and the serving node (downlink node) sends an uplink scheduling grant to the UE. The UE subsequently performs an uplink transmission shown as 714 in Figure 7. Reception of an uplink transmission and the successful decoding of that transmission would indicate an uplink cell association to a POSITA. Ex. 1005, ¶159.

Thus, Yu discloses and/or renders obvious this limitation.

**XI. THIS PETITION CONTAINS NEW ARGUMENTS AND PRIOR ART NOT PREVIOUSLY PRESENTED TO THE OFFICE**

Under 35 U.S.C § 325(d), if a Petition contains the “same or substantially the same prior art or arguments” as those previously presented to the Office, this Board

may exercise discretion to deny institution of the Petition pertaining to that prior art or arguments. 35 U.S.C. § 325(d); *see also Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte Ges.m.b.H.*, IPR2019-01469, Paper 6 (P.T.A.B. Feb. 13, 2020). That is not the same case here.

Yu, Acharya, and Ground 1 have never been presented or otherwise considered by the Office until this Petition and are not substantially the same as any other prior art or arguments presented to the Office during examination. As such, the teachings of Yu and Acharya were not considered by the Examiner during prosecution. *See Oticon Med. AB v. Cochlear Ltd.*, IPR2019-00975, Paper 15, at 15-16 (P.T.A.B. Oct. 16, 2019) (applying *Becton Dickinson* factors a) and b) to decide that the prior art cited in the IPR (Choi) is not the same or substantially the same as the art (Härle) relied on by the Examiner during examination). Thus, the institution of Ground 1 based on Yu and Acharya should not be barred by 35 U.S.C. § 325(d).

## **XII. *FINTIV* FACTORS IN FAVOR OF INSTITUTION**

The Board balances six factors in considering discretionary denial under 35 U.S.C. § 314(a) when parallel litigation exists. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential). Here, the factors (“*Fintiv* factors”) favor institution.

***Factor 1***—potential stay of the district court litigation—is neutral because no party has requested a stay. *VMWare, Inc. v. Intellectual Ventures I LLC*, No.

IPR2020-00470, Paper 13 (P.T.A.B. Aug. 18, 2020), at 17 (finding in the absence of a stay motion that this factor “does not weigh for or against discretionary denial”).

***Factor 2***—district court trial date and the Board’s statutory deadline— should be considered neutral. The earliest estimated trial date for the district court litigation is far in the future as jury selection in AT&T, T-Mobile, and Verizon is not set to begin until at least October 21, 2024. *See* Ex. 1012, 1. Because much can change in six months, the current trial date does not support denial. *See Dish Network v. Broadband iTV*, IPR2020-01280, Paper 17 at 16 (PTAB Feb. 4, 2021) (“We cannot ignore the fact that the currently scheduled trial date is more than nine months away and much can change during this time”).

***Factor 3***—investment in the district court proceedings—weighs heavily against discretionary denial. The associated district court case is still in the very early stages of litigation: discovery is still in the preliminary stages, the Defendants served their invalidity contentions in September 2023, and Claim Construction is not scheduled until April 10, 2024. Ex. 1013 at 3-4. Moreover, a claim construction order will not issue prior to the PTAB’s projected institution decision date. Accordingly, the district court will not invest significant resources or issue substantive orders related to the challenged patent prior to the issuance of an institution decision. *See Fintiv*, IPR2020-00019, Paper 11 at 9-12. Regardless,

Petitioners diligently prepared this Petition and filed well in advance of the statutory deadline, which weighs against denying institution.

**Factor 4**—overlap in the parallel proceedings—favors institution. Instituting trial will allow issues to be narrowed in the district court because, if instituted, Petitioners stipulate that it will not pursue invalidity against the asserted claims in the district court using the specific combination of prior art references set forth in this Petition for the purposes of establishing obviousness. *See Sand Revolution II LLC v. Continental Intermodal Group-Trucking LLC*, IPR2019-01393, Paper 24 at 11-12 (PTAB June 16, 2020) (holding a similar stipulation weighs against discretionary denial). Given the lack of overlap between the proceedings, this factor weighs against the Board exercising discretion to deny.

**Factor 5**—overlapping parties—is neutral as it is “far from an unusual circumstance that a petitioner in *inter partes* review and a defendant in a parallel district court proceeding are the same.” *Sand*, No. IPR2019-01393, Paper 24, at 12-13.

**Factor 6**—other considerations—weighs against discretionary denial. As explained, the merits of the Petition are strong, and the Challenged Claims are invalid. For example, none of the grounds asserted herein were previously considered by either the Office or the district courts. *Cf. Comcast Cable Commn’s, LLC v. Rovi Guides, Inc.*, IPR2019-00231, Paper 14 at 11 (PTAB May 20, 2019)

(obviousness challenges not “previously considered by the Office or any court” weigh in favor of not denying institution). Moreover, the ’383 patent is currently asserted in a district court case. Institution of this IPR provides the opportunity for narrowing and simplifying the litigations for the district court.

***Compelling Merits*** – Finally, discretionary denial is not warranted because this petition presents compelling evidence of unpatentability. Ex. 1014 at 2. Yu in view of Acharya presents compelling invalidity arguments with clear disclosures of the allegedly novel aspects of the Challenged Claims, particularly in light of Patent Owner’s apparent interpretation of the claims.

Accordingly, the Board should decline to exercise its discretion under *Fintiv* and institute trial.

### **XIII. CONCLUSION**

Based on the grounds specified above, *inter partes* review of claims 1-8 of the ’383 patent is respectfully requested.

Dated: March 1, 2024

Respectfully submitted,

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***Inter Partes* Review of U.S. Patent No. 10,045,383**

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**CERTIFICATE OF WORD COUNT**

Under the provisions of 37 C.F.R. § 42.24, the undersigned hereby certifies that the word count for the foregoing Petition for *Inter Partes* Review of U.S. Patent 10,045,383 totals 12,710 words, which is less than the 14,000 allowed words under 37 C.F.R. § 42.24(a)(1)(i), (b)(1).

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**CERTIFICATION OF SERVICE (37 C.F.R. §§ 42.6(e), 42.105(a))**

The undersigned hereby certifies that true and correct copies of the above-captioned **PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 10,045,383**, all associated exhibits, and Petitioner's Power of Attorney were served in their entireties on March 1, 2024, upon the following parties via FedEx® Express:

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