PTO/AIA/15 (03-13)
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# UTILITY PATENT APPLICATION TRANSMITTAL

*(Only for new nonprovisional applications under 37 CFR 1.53(b))*

| | |
|---|---|
| *Attorney Docket No.* | 1291-235.101 |
| *First Named Inventor* | Yu-Hsuan Guo |
| *Title* | METHOD AND APPARATUS FOR HANDLING INTER-NODE.. |
| *Express Mail Label No.* | |

## APPLICATION ELEMENTS

*See MPEP chapter 600 concerning utility patent application contents.*

1. [✓] **Fee Transmittal Form** (PTO/SB/17 or equivalent)
2. [ ] **Applicant asserts small entity status.** See 37 CFR 1.27
3. [ ] **Applicant certifies micro entity status.** See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.
4. [✓] **Specification** [*Total Pages* 22] Both the claims and abstract must start on a new page. *(See MPEP § 608.01(a) for information on the preferred arrangement)*
5. [✓] **Drawing(s)** (35 U.S.C. 113) [*Total Sheets* 6]
6. **Inventor's Oath or Declaration** [*Total Pages* 2] *(including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e))*
   a. [✓] Newly executed (original or copy)
   b. [ ] A copy from a prior application (37 CFR 1.63(d))
7. [✓] **Application Data Sheet** * *See note below.* See 37 CFR 1.76 (PTO/AIA/14 or equivalent)
8. **CD-ROM or CD-R** in duplicate, large table, or Computer Program (*Appendix*)
   [ ] Landscape Table on CD
9. **Nucleotide and/or Amino Acid Sequence Submission** *(if applicable, items a. – c. are required)*
   a. [ ] Computer Readable Form (CRF)
   b. [ ] Specification Sequence Listing on:
      i. [ ] CD-ROM or CD-R (2 copies); or
      ii. [ ] Paper
   c. [ ] Statements verifying identity of above copies

## ADDRESS TO:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

## ACCOMPANYING APPLICATION PAPERS

10. [ ] **Assignment Papers** (cover sheet & document(s)) Name of Assignee _____
11. [ ] **37 CFR 3.73(c) Statement** *(when there is an assignee)* [✓] **Power of Attorney**
12. [ ] **English Translation Document** *(if applicable)*
13. [ ] **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
    [ ] Copies of citations attached
14. [ ] **Preliminary Amendment**
15. [ ] **Return Receipt Postcard** *(MPEP § 503) (Should be specifically itemized)*
16. [ ] **Certified Copy of Priority Document(s)** *(if foreign priority is claimed)*
17. [ ] **Nonpublication Request** Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
18. [ ] **Other:** _____

*Note: (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 must be included in an Application Data Sheet (ADS).
(2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

## 19. CORRESPONDENCE ADDRESS

[✓] The address associated with Customer Number: 108622 OR [ ] Correspondence address below

| | | | | | |
|---|---|---|---|---|---|
| Name | | | | | |
| Address | | | | | |
| City | | State | | Zip Code | |
| Country | | Telephone | | Email | |

| | | | |
|---|---|---|---|
| Signature | | Date | January 29, 2014 |
| Name (Print/Type) | Sang N. Dang | Registration No. (Attorney/Agent) | 51,186 |

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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# FEE TRANSMITTAL

| Complete if known | |
|---|---|
| Application Number | Not Yet Assigned |
| Filing Date | Herewith |
| First Named Inventor | Yu-Hsuan Guo |
| Examiner Name | Not Yet Assigned |
| Art Unit | Not Yet Assigned |
| Practitioner Docket No. | 1291-235.101 |

☐ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29. Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

TOTAL AMOUNT OF PAYMENT ($) 1600.00

**METHOD OF PAYMENT** (check all that apply)

☐ Check ☑ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☐ Deposit Account Deposit Account Number: _____ Deposit Account Name: _____

For the above-identified deposit account, the Director is hereby authorized to (check all that apply):

☐ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

☐ Charge any additional fee(s) or underpayment of fee(s) under 37 CFR 1.16 and 1.17 ☐ Credit any overpayment of fee(s)

**WARNING:** Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

**FEE CALCULATION**

**1. BASIC FILING, SEARCH, AND EXAMINATION FEES (U = undiscounted fee; S = small entity fee; M = micro entity fee)**

| | FILING FEES | | | SEARCH FEES | | | EXAMINATION FEES | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Application Type | U ($) | S ($) | M ($) | U ($) | S ($) | M ($) | U ($) | S ($) | M ($) | Fees Paid ($) |
| Utility | 280 | 140* | 70 | 600 | 300 | 150 | 720 | 360 | 180 | 1600 |
| Design | 180 | 90 | 45 | 120 | 60 | 30 | 460 | 230 | 115 | |
| Plant | 180 | 90 | 45 | 380 | 190 | 95 | 580 | 290 | 145 | |
| Reissue | 280 | 140 | 70 | 600 | 300 | 150 | 2,160 | 1,080 | 540 | |
| Provisional | 260 | 130 | 65 | 0 | 0 | 0 | 0 | 0 | 0 | |

* The $140 small entity status filing fee for a utility application is further reduced to $70 for a small entity status applicant who files the application via EFS-Web.

**2. EXCESS CLAIM FEES**

| Fee Description | Undiscounted Fee ($) | Small Entity Fee ($) | Micro Entity Fee ($) |
|---|---|---|---|
| Each claim over 20 (including Reissues) | 80 | 40 | 20 |
| Each independent claim over 3 (including Reissues) | 420 | 210 | 105 |
| Multiple dependent claims | 780 | 390 | 195 |

| Total Claims | | Extra Claims | Fee ($) | | Fee Paid ($) |
|---|---|---|---|---|---|
| 20 | -20 or HP = | _____ | x _____ | = | _____ |

HP = highest number of total claims paid for, if greater than 20.

| Indep. Claims | | Extra Claims | Fee ($) | | Fee Paid ($) |
|---|---|---|---|---|---|
| 3 | -3 or HP = | _____ | x _____ | = | _____ |

HP = highest number of independent claims paid for, if greater than 3.

| Multiple Dependent Claims | Fee ($) | Fee Paid ($) |
|---|---|---|
| | _____ | _____ |

**3. APPLICATION SIZE FEE**

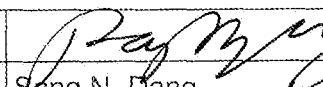
If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $400 ($200 for small entity) ($100 for micro entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

| Total Sheets | | Extra Sheets | | Number of each additional 50 or fraction thereof | | Fee ($) | | Fee Paid ($) |
|---|---|---|---|---|---|---|---|---|
| 28 | - 100 = | _____ | / 50 = | _____ (round up to a whole number) | x | _____ | = | _____ |

**4. OTHER FEE(S)**

| | Fees Paid ($) |
|---|---|
| Non-English specification, $130 fee (no small or micro entity discount) | _____ |
| **Non-electronic filing fee under 37 CFR 1.16(t) for a utility application, $400 fee ($200 small or micro entity)** | _____ |
| Other (e.g., late filing surcharge): _____ | _____ |

SUBMITTED BY

| | | | |
|---|---|---|---|
| Signature |  | Registration No. (Attorney/Agent) 51,186 | Telephone |
| Name (Print/Type) | Sang N. Dang | | Date January 29, 2014 |

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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# METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM

## CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present Application claims the benefit of U.S. Provisional Patent Application Serial No. 61/758,418 filed on January 30, 2013 and U.S. Provisional Patent Application Serial No. 61/768,761 filed on February 25, 2013. The entire disclosures of these U.S. Provisional Patent Applications are incorporated herein by reference.

## FIELD

[0002] This disclosure generally relates to wireless communication networks, and more particularly, to a method and apparatus for handling inter-node connectivity in a wireless communication system.

## BACKGROUND

[0003] With the rapid rise in demand for communication of large amounts of data to and from mobile communication devices, traditional mobile voice communication networks are evolving into networks that communicate with Internet Protocol (IP) data packets. Such IP data packet communication can provide users of mobile communication devices with voice over IP, multimedia, multicast and on-demand communication services.

[0004] An exemplary network structure for which standardization is currently taking place is an Evolved Universal Terrestrial Radio Access Network (E-UTRAN). The E-UTRAN system can provide high data throughput in order to realize the above-noted voice over IP and multimedia services. The E-UTRAN system's standardization work is currently being performed by the 3GPP standards organization. Accordingly, changes to the current body of 3GPP standard are currently being submitted and considered to evolve and finalize the 3GPP standard.



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## SUMMARY

[0005] A method and apparatus for handling inter-node connectivity in a wireless communication system are disclosed. The method includes transmitting a request from a first network node to a second network node to stop aggregating a SCell (Secondary Cell) for a UE (User Equipment); wherein the first network node controls the SCell and the second network node controls PCell (Primary Cell) of the UE.

[0006] Furthermore, another method and apparatus for handling inter-node connectivity in a wireless communication system are disclosed. The method includes transmitting a request from a first network node, which controls a first serving cell of a UE (User Equipment), to a second network node, which controls a second serving cell of the UE, to change a data path corresponding to a first type of transmission and/or reception of the UE from a first path to a different path; wherein the first path is via the first network node and used as the data path corresponding to the first type of transmission and/or reception of the UE, and a second path is via the second network node and used as a data path corresponding to a second type of transmission and/or reception of the UE.

[0007] In addition, an alternative method and apparatus for handling inter-node connectivity in a wireless communication system are disclosed. The method includes transmitting a request from a first network node to a core network node to change a data path corresponding to a first type of transmission and/or reception of a UE (User Equipment) from a first path to a different path; wherein the first path is via the first network node and used as the data path corresponding to the first type and a third type of transmission and/or reception of the UE, a second path is via a second network node and used as a data path corresponding to a second type of transmission and/or reception of the UE, and the request does not indicate to change the data path corresponding to the third type of transmission and/or reception of the UE.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 shows a diagram of a wireless communication system according to one exemplary embodiment.



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[0009] FIG. 2 is a block diagram of a transmitter system (also known as access network) and a receiver system (also known as user equipment or UE) according to one exemplary embodiment.

[0010] FIG. 3 is a functional block diagram of a communication system according to one exemplary embodiment.

[0011] FIG. 4 is a functional block diagram of the program code of FIG. 3 according to one exemplary embodiment.

[0012] FIG. 5 illustrates a possible architecture of Inter-eNB (evolved Node B) Carrier Aggregation as discussed in 3GPP RWS-120045 according to one exemplary embodiment.

[0013] FIG. 6 is a message sequence chart according to one exemplary embodiment.

## DETAILED DESCRIPTION

[0014] The exemplary wireless communication systems and devices described below employ a wireless communication system, supporting a broadcast service. Wireless communication systems are widely deployed to provide various types of communication such as voice, data, and so on. These systems may be based on code division multiple access (CDMA), time division multiple access (TDMA), orthogonal frequency division multiple access (OFDMA), 3GPP LTE (Long Term Evolution) wireless access, 3GPP LTE-A or LTE-Advanced (Long Term Evolution Advanced), 3GPP2 UMB (Ultra Mobile Broadband), WiMax, or some other modulation techniques.

[0015] In particular, the exemplary wireless communication systems devices described below may be designed to support one or more standards such as the standard offered by a consortium named "3rd Generation Partnership Project" referred to herein as 3GPP, including Document Nos. TR 36.932 v12.0.0, “Scenarios and Requirements for Small Cell Enhancements for E-UTRA and E-UTRAN (Release 12)”; RP-122033, “New Study Item Description: Small Cell enhancements for E-UTRA and E-UTRAN – Higher-layer aspects”, NTT DOCOMO, INC.; TS 36.300 V11.4.0, “E-UTRA and E-UTRAN; Overall description; Stage 2”; TS 36.331 V11.2.0, “E-UTRA RRC protocol specification (Release 11)”; RWS-120046, “Technologies for Rel-12 and onwards”; and R2-130845, “TR 36.842 v0.1.0 on Study on Small Cell Enhancements



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for E-UTRA and E-UTRAN – Higher-layer aspects", NTT DOCOMO. The standards and documents listed above are hereby expressly incorporated herein.

[0016] FIG. 1 shows a multiple access wireless communication system according to one embodiment of the invention. An access network 100 (AN) includes multiple antenna groups, one including 104 and 106, another including 108 and 110, and an additional including 112 and 114. In FIG. 1, only two antennas are shown for each antenna group, however, more or fewer antennas may be utilized for each antenna group. Access terminal 116 (AT) is in communication with antennas 112 and 114, where antennas 112 and 114 transmit information to access terminal 116 over forward link 120 and receive information from access terminal 116 over reverse link 118. Access terminal (AT) 122 is in communication with antennas 106 and 108, where antennas 106 and 108 transmit information to access terminal (AT) 122 over forward link 126 and receive information from access terminal (AT) 122 over reverse link 124. In a FDD system, communication links 118, 120, 124 and 126 may use different frequency for communication. For example, forward link 120 may use a different frequency then that used by reverse link 118.

[0017] Each group of antennas and/or the area in which they are designed to communicate is often referred to as a sector of the access network. In the embodiment, antenna groups each are designed to communicate to access terminals in a sector of the areas covered by access network 100.

[0018] In communication over forward links 120 and 126, the transmitting antennas of access network 100 may utilize beamforming in order to improve the signal-to-noise ratio of forward links for the different access terminals 116 and 122. Also, an access network using beamforming to transmit to access terminals scattered randomly through its coverage causes less interference to access terminals in neighboring cells than an access network transmitting through a single antenna to all its access terminals.

[0019] An access network (AN) may be a fixed station or base station used for communicating with the terminals and may also be referred to as an access point, a Node B, a base station, an enhanced base station, an eNB, or some other terminology. An access terminal



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(AT) may also be called user equipment (UE), a wireless communication device, terminal, access terminal or some other terminology.

[0020] FIG. 2 is a simplified block diagram of an embodiment of a transmitter system 210 (also known as the access network) and a receiver system 250 (also known as access terminal (AT) or user equipment (UE)) in a MIMO system 200. At the transmitter system 210, traffic data for a number of data streams is provided from a data source 212 to a transmit (TX) data processor 214.

[0021] In one embodiment, each data stream is transmitted over a respective transmit antenna. TX data processor 214 formats, codes, and interleaves the traffic data for each data stream based on a particular coding scheme selected for that data stream to provide coded data.

[0022] The coded data for each data stream may be multiplexed with pilot data using OFDM techniques. The pilot data is typically a known data pattern that is processed in a known manner and may be used at the receiver system to estimate the channel response. The multiplexed pilot and coded data for each data stream is then modulated (i.e., symbol mapped) based on a particular modulation scheme (e.g., BPSK, QPSK, M-PSK, or M-QAM) selected for that data stream to provide modulation symbols. The data rate, coding, and modulation for each data stream may be determined by instructions performed by processor 230.

[0023] The modulation symbols for all data streams are then provided to a TX MIMO processor 220, which may further process the modulation symbols (e.g., for OFDM). TX MIMO processor 220 then provides $N_T$ modulation symbol streams to $N_T$ transmitters (TMTR) 222a through 222t. In certain embodiments, TX MIMO processor 220 applies beamforming weights to the symbols of the data streams and to the antenna from which the symbol is being transmitted.

[0024] Each transmitter 222 receives and processes a respective symbol stream to provide one or more analog signals, and further conditions (e.g., amplifies, filters, and upconverts) the analog signals to provide a modulated signal suitable for transmission over the MIMO channel. $N_T$ modulated signals from transmitters 222a through 222t are then transmitted from $N_T$ antennas 224a through 224t, respectively.



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[0025] At receiver system 250, the transmitted modulated signals are received by $N_R$ antennas 252a through 252r and the received signal from each antenna 252 is provided to a respective receiver (RCVR) 254a through 254r. Each receiver 254 conditions (e.g., filters, amplifies, and downconverts) a respective received signal, digitizes the conditioned signal to provide samples, and further processes the samples to provide a corresponding "received" symbol stream.

[0026] An RX data processor 260 then receives and processes the $N_R$ received symbol streams from $N_R$ receivers 254 based on a particular receiver processing technique to provide $N_T$ "detected" symbol streams. The RX data processor 260 then demodulates, deinterleaves, and decodes each detected symbol stream to recover the traffic data for the data stream. The processing by RX data processor 260 is complementary to that performed by TX MIMO processor 220 and TX data processor 214 at transmitter system 210.

[0027] A processor 270 periodically determines which pre-coding matrix to use (discussed below). Processor 270 formulates a reverse link message comprising a matrix index portion and a rank value portion.

[0028] The reverse link message may comprise various types of information regarding the communication link and/or the received data stream. The reverse link message is then processed by a TX data processor 238, which also receives traffic data for a number of data streams from a data source 236, modulated by a modulator 280, conditioned by transmitters 254a through 254r, and transmitted back to transmitter system 210.

[0029] At transmitter system 210, the modulated signals from receiver system 250 are received by antennas 224, conditioned by receivers 222, demodulated by a demodulator 240, and processed by a RX data processor 242 to extract the reserve link message transmitted by the receiver system 250. Processor 230 then determines which pre-coding matrix to use for determining the beamforming weights then processes the extracted message.

[0030] Turning to FIG. 3, this figure shows an alternative simplified functional block diagram of a communication device according to one embodiment of the invention. As shown in FIG. 3, the communication device 300 in a wireless communication system can be utilized for



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realizing the UEs (or ATs) 116 and 122 in FIG. 1 or the eNB (or AN) 100 in FIG. 1, and the wireless communications system is preferably the LTE system. The communication device 300 may include an input device 302, an output device 304, a control circuit 306, a central processing unit (CPU) 308, a memory 310, a program code 312, and a transceiver 314. The control circuit 306 executes the program code 312 in the memory 310 through the CPU 308, thereby controlling an operation of the communications device 300. The communications device 300 can receive signals input by a user through the input device 302, such as a keyboard or keypad, and can output images and sounds through the output device 304, such as a monitor or speakers. The transceiver 314 is used to receive and transmit wireless signals, delivering received signals to the control circuit 306, and outputting signals generated by the control circuit 306 wirelessly.

[0031] FIG. 4 is a simplified block diagram of the program code 312 shown in FIG. 3 in accordance with one embodiment of the invention. In this embodiment, the program code 312 includes an application layer 400, a Layer 3 portion 402, and a Layer 2 portion 404, and is coupled to a Layer 1 portion 406. The Layer 3 portion 402 generally performs radio resource control. The Layer 2 portion 404 generally performs link control. The Layer 1 portion 406 generally performs physical connections.

[0032] Based on 3GPP TR 36.932 v12.0.0, a Rel-12 study item of small cell enhancement has been approved in 3GPP RP-122033. According to 3GPP RP-122033, the study item will cover the following aspects:

- Identify and evaluate the benefits of UEs having dual connectivity to macro and small cell layers served by different or same carrier and for which scenarios such dual connectivity is feasible and beneficial.
- Identify and evaluate potential architecture and protocol enhancements for the scenarios in TR 36.932 and in particular for the feasible scenario of dual connectivity and minimize core network impacts if feasible, including:
    - Overall structure of control and user plane and their relation to each other, e.g., supporting C-plane and U-plane in different nodes, termination of different protocol layers, etc.



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- Identify and evaluate the necessity of overall Radio Resource Management structure and mobility enhancements for small cell deployments:
    - Mobility mechanisms for minimizing inter-node UE context transfer and signalling towards the core network.
    - Measurement and cell identification enhancements while minimizing increased UE battery consumption.

[0033] Carrier Aggregation (CA) would be a feasible mechanism to achieve dual connectivity of macro and small cells. Currently, the stage-2 and stage-3 descriptions of CA are specified in 3GPP TS 36.300 V11.4.0 and 3GPP TS 36.331 V11.2.0 respectively. While the currently specified CA is generally for intra-eNB, inter-eNB CA (where the macro and the small cells are controlled by different eNBs) has also been considered, e.g., to achieve dual connectivity in small cell enhancement as discussed in 3GPP RWS-120046. In 3GPP RWS-120046, a possible architecture is set forth as shown in FIG. 5. As shown in FIG. 5, a network node called "Serving eNB" controls a macro cell and a network node called "Drift eNB" controls a small cell.

[0034] Besides, it has been agreed that the study item approved in 3GPP RP-122033 would focus on the deployment scenarios of macro and pico cells connected via non-ideal backhaul (discussed in 3GPP TR 36.932 v12.0.0 and R2-130845). Fibre access, which can be used to deploy Remote Radio Heads (RRHs), is not assumed in the study item.

[0035] In general, if a macro and a small cell are controlled by different network node or eNB, inter-eNB CA (or inter-node CA) should be adopted to achieve dual connectivity of the macro and the small cell. In order to support inter-eNB CA (or inter-node CA), some negotiations or procedures between the eNB controlling PCell (Primary Cell) and the eNB controlling a cell that is a candidate for a SCell (Secondary Cell) may need to be defined. The PCell could be a macro cell, and the SCell could be a small cell.

[0036] Besides, in a heterogeneous network, there may be multiple SCell candidates which could be selected by an eNB controlling PCell for carrier aggregation. It may be difficult



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for the eNB to judge which cell is a better SCell candidate without assistance information, and aggregating a bad SCell may cause performance degradation (such as throughput reduction, resource waste, or power consumption).

[0037] Also, the details of inter-node dual connectivity are currently not clear. One possibility is that the transmission and/or reception data path may be split via different network node. The splitting may be according to different aspects (such as based on service type or on QoS requirement). A UE may have multiple data paths where each different data type would have a different data path based on the splitting rule. For example, the data path for some specific service type would be via a macro cell, and the data path for some other specific service type would be via a small cell. Under the circumstances, either data path could be considered as a partial data path of the UE.

[0038] For inter-eNB CA, a negotiation procedure for CA may be required between eNBs. A kind of CA preparation request could be used by a first eNB controlling PCell (such as a macro cell) of a UE to request the aggregation of SCell. In addition, a type of CA Accept/Reject could be used by a second eNB controlling a cell that is a candidate for a SCell (such as a small cell) to respond the first eNB. Furthermore, a type of CA Stop could be used by the first eNB to inform the second eNB to stop aggregating the SCell.

[0039] After CA is complete, the second eNB could send a request to the first eNB to release the SCell of the UE. Confirmation for the SCell release from the first eNB to the second eNB may be required. For example, in some situation (such as the SCell becomes overloaded), the second eNB would transmit a SCell release request to the first eNB. The decision and the action to release the SCell could be done by first eNB.

[0040] Furthermore, after CA is complete, the second eNB could send a request to the first eNB or a core network node (such as a MME (Mobility Management Entity) or a S-GW (Serving Gateway)), to switch a data path (such as a radio bearer, a service, or a logical channel). The switching is from between the UE and the second eNB to between the UE and the first eNB. The first eNB could also send the request to the second eNB or the core network node. Confirmation for the data path switch may be required. For example, in some situation (such as



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the QoS of a specific radio bearer cannot be fulfilled or the SCell becomes overloaded), the second eNB could send a request to the first eNB to switch the data path.

[0041] Also for the first eNB, the decision to aggregate a cell to be a SCell of the UE could be based on various factors (such as radio condition, interference, or UE moving speed, etc.). In addition, whether a cell is suitable to be a SCell of the UE or not would change from time to time and the change may not be easily noticed by the eNB controlling PCell.

[0042] Since some benefits to aggregate a SCell include offloading data and increasing throughput, it would be better for the first eNB to know the loading status of a cell, which can be a candidate for a SCell, when deciding whether to aggregate the cell. Such information could help the first eNB to decide which cell(s) to aggregate. In one embodiment of this invention, the second eNB, which controls a small cell or a SCell or a SCell candidate, could transmit information about its loading status to the first eNB, which controls a macro cell, or PCell. The information could be transmitted during a procedure for carrier aggregation (for example in a CA accept message). Alternatively, the information could be transmitted in a SCell release request message. Furthermore, the information could also be transmitted in a data path switch request message. More specifically, the information could include the loading level (such as low, medium, or high) of the small cell. Here is an exemplary case:

(1) When an eNB controlling PCell of a UE would like to aggregate a SCell for the UE, the eNB would transmit a CA preparation request message to the eNB that controls cell(s) which could be aggregated.

(2) The eNB, which accepts the request, would respond with a CA accept message that would include the information of the eNB's or the cell's loading status. Also, an identification of a cell to be aggregated could be included in the CA accept message.

(3) The eNB controlling PCell could decide which cell(s) should be aggregated based on the provided information.

[0043] In addition, when inter-node dual connectivity is configured to a UE, the rule of splitting data path could be configured by the network. As discussed above, the general concept is that a first eNB controlling one serving cell of a UE could send a request to a second eNB



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controlling another serving cell of the UE or a core network node (such as a MME or a S-GW) to switch a data path or to change a splitting rule (such as for a radio bearer, a service, or a logical channel). The data path switching could be from between the UE and a first eNB to between the UE and a second eNB. Confirmation for the data path switch or splitting rule change may be required. For example, in some situation (such as the QoS of a specific radio bearer cannot be fulfilled or the serving cell of the second eNB becomes overloaded), the second eNB could send a request to the first eNB to switch the data path or to change the splitting rule.

[0044] In addition, a second network node (such as an eNB) could send a request to a first network node (such as another eNB) to release a serving cell of a UE wherein the serving cell is controlled by the second network node. For example, in some situation (such as the UE has no more data to be transmitted to the serving cell), the second network node would transmit a serving cell release request (for example, a SCell release request) to the first network node.

[0045] FIG. 6 is a message sequence chart 500 in accordance with one exemplary embodiment. In step 620, eNB2 610 sends a CA Preparation Request to eNB1 605. In step 625, eNB1 605 sends either a CA Accept Message or a CA Reject Message to eNB2 610. In one embodiment, the CA Accept Message could include the loading level. In step 630, eNB1 sends a SCell Release Request to eNB2. In steps 635 and 640, eNB1 could send a Data Path Switch Request either to eNB2 or to a MWE or a S-GW to change the first data path corresponding the first type of transmission and/or reception of the UE to a different data path. In step 645, eNB2 sends a CA Stop message to eNB1 to inform eNB1 to stop aggregating the SCells. A procedure for negotiation between network nodes may involve one or multiple steps above. For example, a procedure may involve both step 620 and step 625.

[0046] In one embodiment, a first network node (such as an eNB) could transmit information about its loading status to a second network node (such as an eNB) during a procedure for carrier aggregation. Further, the procedure could be used when aggregating PCell and SCell(s) controlled by different network nodes. The procedure could comprise a message transmitted between the first network node and the second network node. In addition, the first network node could control a cell which is a SCell candidate for a UE in carrier aggregation. Also, the cell could be a small cell. Besides, the second network node could control a cell which



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is a PCell for a UE in carrier aggregation. Furthermore, the cell could be a macro cell. The information about the loading status could be included in a response message, such as a CA accept message, for a CA preparation message or a CA request message.

[0047] In one embodiment, a first network node (such as a eNB) could transmit a request to a second network node (such as a eNB) to stop aggregating a SCell for a UE, wherein the first network node controls the SCell of the UE and the second network node controls PCell of the UE. Further, the request could be a SCell release request message. Also, the SCell could be a small cell. The PCell could be a macro cell. In addition, the request could be triggered based on factors including loading of the SCell. Alternatively, the factors could include whether or not a QoS (Quality of Service) for the UE could be guaranteed. Moreover, the request could comprise a cause for aggregation stop, such as overload. Furthermore, the first network node could release configuration or resources for the UE when a confirmation message, such as a CA stop message, a CA release message, or a CA release accept message, of the request is received from the second network node.

[0048] In one embodiment, as shown in step 635 of FIG. 6, a first network node could transmit a request to a second network node to change a data path corresponding to a first type of transmission and/or reception of a UE (User Equipment) from a first path to a different path (such as a second path).

[0049] In another embodiment, as shown in step 640 of FIG. 6, the first network node could transmit a request to a core network node (such as a MME or a S-GW) to change a data path corresponding to a first type of transmission and/or reception of the UE from a first path to a different path (such as a second path). In above embodiments, the first path is via the first network node and used as the data path corresponding to the first type of transmission and/or reception of the UE. Furthermore, the second path is via the second network node and used as a data path corresponding to a second type of transmission and/or reception of the UE.

[0050] In one embodiment, the data path corresponding to the first type of transmission and/or reception of the UE is changed to the second path due to the request. In addition, the



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request is not triggered by handover. In other words, the request is not transmitted due to handover.

[0051] In another embodiment, the first path could be used as a data path corresponding to a third type of transmission and/or reception of the UE. In addition, the request to change the data path corresponding to the first type of transmission and/or reception of the UE (as illustrated in steps 635 and 640 of FIG. 6) does not indicate to change the data path corresponding to the third type of transmission and/or reception of the UE. In other words, the first path would still be used as the data path corresponding to the third type of transmission and/or reception of the UE after changing the data path corresponding to the first type of transmission and/or reception of the UE due to the request. In another embodiment, the UE has multiple paths via different network nodes after the data path change. In addition, the data path is for data in uplink direction, such as from UE to eNB.

[0052] In one embodiment, the first type of transmission and/or reception, the second type of transmission and/or reception, and the third type of transmission and/or reception are differentiated based on service type. Alternatively, they could be differentiated based on radio bearer, on logical channel, and/or on QoS (Quality of Service) level.

[0053] In one embodiment, the request could be triggered based on factors including a loading of a cell controlled by the first network node. Alternatively, the factors could include whether or not a QoS (Quality of Service) corresponding to the first type of transmission and/or reception of the UE could be guaranteed. Furthermore, the request could include a cause for data path switching (such as overload). In addition, the request could include a loading status, such as a loading level indicating current loading condition (such as low, medium, or high), of a cell controlled by the first network node.

[0054] In one embodiment, the first network node could be an eNB (evolved Node B) controlling a serving cell or SCell (Secondary Cell) of the UE. The second network node could be an eNB controlling a serving cell or PCell (Primary Cell) of the UE. In addition, the first network node controls (i) a macro cell or (ii) a small cell that could be a pico cell, a femto cell, or a micro cell. Similarly, the second network node controls (i) a macro cell or (ii) a small cell that



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could be a pico cell, a femto cell, or a micro cell. The small cell could be controlled by a low power node. In addition, the first network node would terminate the first type of transmission and/or reception when a confirmation message (such as a data path changing accept message or a data path reconfiguration message) of the request is received.

[0055] Referring back to FIGs. 3 and 4, in one embodiment, the device 300 could include a program code 312 stored in memory 310 to handle inter-node connectivity. In one embodiment, the CPU 308 could execute the program code 312 to transmit information about its loading status to a network node during a procedure for carrier aggregation. In another embodiment, the device could transmit a request to a network node to stop aggregating a SCell for a UE, wherein (i) the device controls the SCell of the UE, and (ii) the network node control PCell of the UE. In addition, the CPU 308 could execute the program code 312 to perform all of the above-described actions and steps or others described herein.

[0056] Referring back to FIGs. 3 and 4, in one embodiment, the device 300 could include a program code 312 stored in memory 310 to handle inter-node connectivity. In one embodiment, the CPU 308 could execute the program code 312 to transmit a request to a network node to change a data path corresponding to a first type of transmission and/or reception of a UE from a first path to a different path (such as a second path), wherein (i) the first path is via the device and used as the data path corresponding to the first type of transmission and/or reception of the UE, and (ii) the second path is via the network node and used as a data path corresponding to a second type of transmission and/or reception of the UE.

[0057] In another embodiment, the device could transmit a request to a core network node to change a data path corresponding to the first type of transmission and/or reception of the UE from a first path to a different path (such as a second path), wherein (i) the first path is via the first network node and used as the data path corresponding to the first type and a third type of transmission and/or reception of the UE, (ii) a second path is via a second network node and used as a data path corresponding to a second type of transmission and/or reception of the UE, and (iii) the request does not indicate to change the data path corresponding to the third type of transmission and/or reception of the UE. In this embodiment, the core network node could be a



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MME or a S-GW. In addition, the CPU 308 could execute the program code 312 to perform all of the above-described actions and steps or others described herein.

[0058] Various aspects of the disclosure have been described above. It should be apparent that the teachings herein may be embodied in a wide variety of forms and that any specific structure, function, or both being disclosed herein is merely representative. Based on the teachings herein one skilled in the art should appreciate that an aspect disclosed herein may be implemented independently of any other aspects and that two or more of these aspects may be combined in various ways. For example, an apparatus may be implemented or a method may be practiced using any number of the aspects set forth herein. In addition, such an apparatus may be implemented or such a method may be practiced using other structure, functionality, or structure and functionality in addition to or other than one or more of the aspects set forth herein. As an example of some of the above concepts, in some aspects concurrent channels may be established based on pulse repetition frequencies. In some aspects concurrent channels may be established based on pulse position or offsets. In some aspects concurrent channels may be established based on time hopping sequences. In some aspects concurrent channels may be established based on pulse repetition frequencies, pulse positions or offsets, and time hopping sequences.

[0059] Those of skill in the art would understand that information and signals may be represented using any of a variety of different technologies and techniques. For example, data, instructions, commands, information, signals, bits, symbols, and chips that may be referenced throughout the above description may be represented by voltages, currents, electromagnetic waves, magnetic fields or particles, optical fields or particles, or any combination thereof.

[0060] Those of skill would further appreciate that the various illustrative logical blocks, modules, processors, means, circuits, and algorithm steps described in connection with the aspects disclosed herein may be implemented as electronic hardware (e.g., a digital implementation, an analog implementation, or a combination of the two, which may be designed using source coding or some other technique), various forms of program or design code incorporating instructions (which may be referred to herein, for convenience, as "software" or a "software module"), or combinations of both. To clearly illustrate this interchangeability of hardware and software, various illustrative components, blocks, modules, circuits, and steps have



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been described above generally in terms of their functionality. Whether such functionality is implemented as hardware or software depends upon the particular application and design constraints imposed on the overall system. Skilled artisans may implement the described functionality in varying ways for each particular application, but such implementation decisions should not be interpreted as causing a departure from the scope of the present disclosure.

[0061] In addition, the various illustrative logical blocks, modules, and circuits described in connection with the aspects disclosed herein may be implemented within or performed by an integrated circuit ("IC"), an access terminal, or an access point. The IC may comprise a general purpose processor, a digital signal processor (DSP), an application specific integrated circuit (ASIC), a field programmable gate array (FPGA) or other programmable logic device, discrete gate or transistor logic, discrete hardware components, electrical components, optical components, mechanical components, or any combination thereof designed to perform the functions described herein, and may execute codes or instructions that reside within the IC, outside of the IC, or both. A general purpose processor may be a microprocessor, but in the alternative, the processor may be any conventional processor, controller, microcontroller, or state machine. A processor may also be implemented as a combination of computing devices, e.g., a combination of a DSP and a microprocessor, a plurality of microprocessors, one or more microprocessors in conjunction with a DSP core, or any other such configuration.

[0062] It is understood that any specific order or hierarchy of steps in any disclosed process is an example of a sample approach. Based upon design preferences, it is understood that the specific order or hierarchy of steps in the processes may be rearranged while remaining within the scope of the present disclosure. The accompanying method claims present elements of the various steps in a sample order, and are not meant to be limited to the specific order or hierarchy presented.

[0063] The steps of a method or algorithm described in connection with the aspects disclosed herein may be embodied directly in hardware, in a software module executed by a processor, or in a combination of the two. A software module (e.g., including executable instructions and related data) and other data may reside in a data memory such as RAM memory, flash memory, ROM memory, EPROM memory, EEPROM memory, registers, a hard disk, a



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removable disk, a CD-ROM, or any other form of computer-readable storage medium known in the art. A sample storage medium may be coupled to a machine such as, for example, a computer/processor (which may be referred to herein, for convenience, as a "processor") such the processor can read information (e.g., code) from and write information to the storage medium. A sample storage medium may be integral to the processor. The processor and the storage medium may reside in an ASIC. The ASIC may reside in user equipment. In the alternative, the processor and the storage medium may reside as discrete components in user equipment. Moreover, in some aspects any suitable computer-program product may comprise a computer-readable medium comprising codes relating to one or more of the aspects of the disclosure. In some aspects a computer program product may comprise packaging materials.

[0064] While the invention has been described in connection with various aspects, it will be understood that the invention is capable of further modifications. This application is intended to cover any variations, uses or adaptation of the invention following, in general, the principles of the invention, and including such departures from the present disclosure as come within the known and customary practice within the art to which the invention pertains.



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## CLAIMS

What is claimed is:

1. A method for handling inter-node connectivity in a wireless communication system, comprising:

transmitting a request from a first network node to a second network node to stop aggregating a SCell (Secondary Cell) for a UE (User Equipment);

wherein the first network node controls the SCell and the second network node controls PCell (Primary Cell) of the UE.

2. The method of claim 1, wherein the request is a SCell release request message.

3. The method of claim 1, wherein the first network node and the second network node are eNBs (evolved Node B).

4. The method of claim 1, wherein the SCell is a small cell and the PCell is a macro cell.

5. The method of claim 1, wherein the request is triggered based on factors including a loading of the SCell and/or whether or not a QoS for the UE could be guaranteed.

6. A method for handling inter-node connectivity in a wireless communication system, comprising:

transmitting a request from a first network node, which controls a first serving cell of a UE (User Equipment), to a second network node, which controls a second serving cell of the UE, to change a data path corresponding to a first type of transmission and/or reception of the UE from a first path to a different path;



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wherein the first path is via the first network node and used as the data path corresponding to the first type of transmission and/or reception of the UE, and

a second path is via the second network node and used as a data path corresponding to a second type of transmission and/or reception of the UE.

7. The method of claim 6, wherein the different path is the second path.

8. The method of claim 6, wherein the first path is used as a data path corresponding to a third type of transmission and/or reception of the UE, and the request does not indicate to change the data path corresponding to the third type of transmission and/or reception of the UE.

9. The method of claim 6, wherein the first type of transmission and/or reception, the second type of transmission and/or reception, and the third type of transmission and/or reception are differentiated based on service type, radio bearer, logical channel, and/or QoS (Quality of Service) level.

10. The method of claim 6, wherein the UE has multiple paths via different network nodes after the data path change.

11. The method of claim 6, wherein the request is triggered based on factors including a loading of a cell controlled by the first network node, and/or whether or not a QoS (Quality of Service) corresponding to the first type of transmission and/or reception of the UE could be guaranteed.

12. The method of claim 6, wherein the first network node is an eNB (evolved Node B) controlling the first serving cell or SCell (Secondary Cell) of the UE, and the second network node is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE.

13. A method for handling inter-node connectivity in a wireless communication system, comprising:



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transmitting a request from a first network node to a core network node to change a data path corresponding to a first type of transmission and/or reception of a UE (User Equipment) from a first path to a different path;

wherein the first path is via the first network node and used as the data path corresponding to the first type and a third type of transmission and/or reception of the UE,

a second path is via a second network node and used as a data path corresponding to a second type of transmission and/or reception of the UE, and

the request does not indicate to change the data path corresponding to the third type of transmission and/or reception of the UE.

14. The method of claim 13, wherein the different path is the second path.

15. The method of claim 13, wherein the request is not transmitted due to handover.

16. The method of claim 13, wherein the first type of transmission and/or reception, the second type of transmission and/or reception, and the third type of transmission and/or reception are differentiated based on service type, radio bearer, logical channel, and/or QoS (Quality of Service) level.

17. The method of claim 13, wherein the UE has multiple paths via different network nodes after the data path change.

18. The method of claim 13, wherein the request is triggered based on factors including a loading of a cell controlled by the first network node, and/or whether or not a QoS (Quality of Service) corresponding to the first type of transmission and/or reception of the UE could be guaranteed.

19. The method of claim 13, wherein the first network node is an eNB (evolved Node B) controlling a serving cell or SCell (Secondary Cell) of the UE, and the second network node is an eNB controlling a serving cell or PCell (Primary Cell) of the UE.



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20. The method of claim 13, wherein the core network node is a MME (Mobility Management Entity) or a S-GW (Service Gateway).



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## ABSTRACT

A method and apparatus for handling inter-node connectivity in a wireless communication system are disclosed. The method includes transmitting a request from a first network node to a second network node to stop aggregating a SCell (Secondary Cell) for a UE (User Equipment); wherein the first network node controls the SCell and the second network node controls PCell (Primary Cell) of the UE. Also, another method and apparatus for handling inter-node connectivity in a wireless communication system are disclosed. The method includes transmitting a request from a first network node, which controls a first serving cell of a UE (User Equipment), to a second network node, which controls a second serving cell of the UE, to change a data path corresponding to a first type of transmission and/or reception of the UE from a first path to a different path; wherein the first path is via the first network node and used as the data path corresponding to the first type of transmission and/or reception of the UE, and a second path is via the second network node and used as a data path corresponding to a second type of transmission and/or reception of the UE. In addition, an alternative method and apparatus for handling inter-node connectivity in a wireless communication system are disclosed. The method includes transmitting a request from a first network node to a core network node to change a data path corresponding to a first type of transmission and/or reception of a UE (User Equipment) from a first path to a different path; wherein the first path is via the first network node and used as the data path corresponding to the first type and a third type of transmission and/or reception of the UE, a second path is via a second network node and used as a data path corresponding to a second type of transmission and/or reception of the UE, and the request does not indicate to change the data path corresponding to the third type of transmission and/or reception of the UE.



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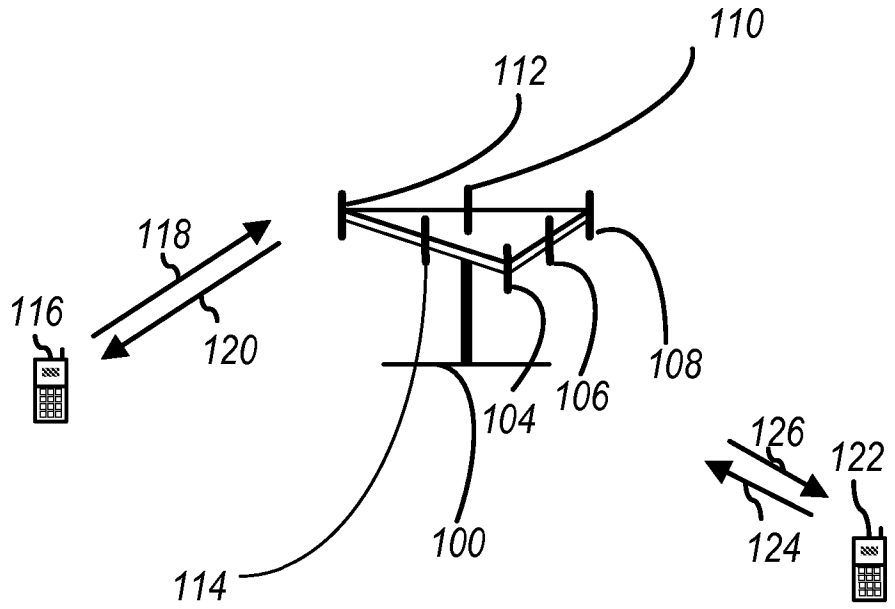



**FIG. 1**

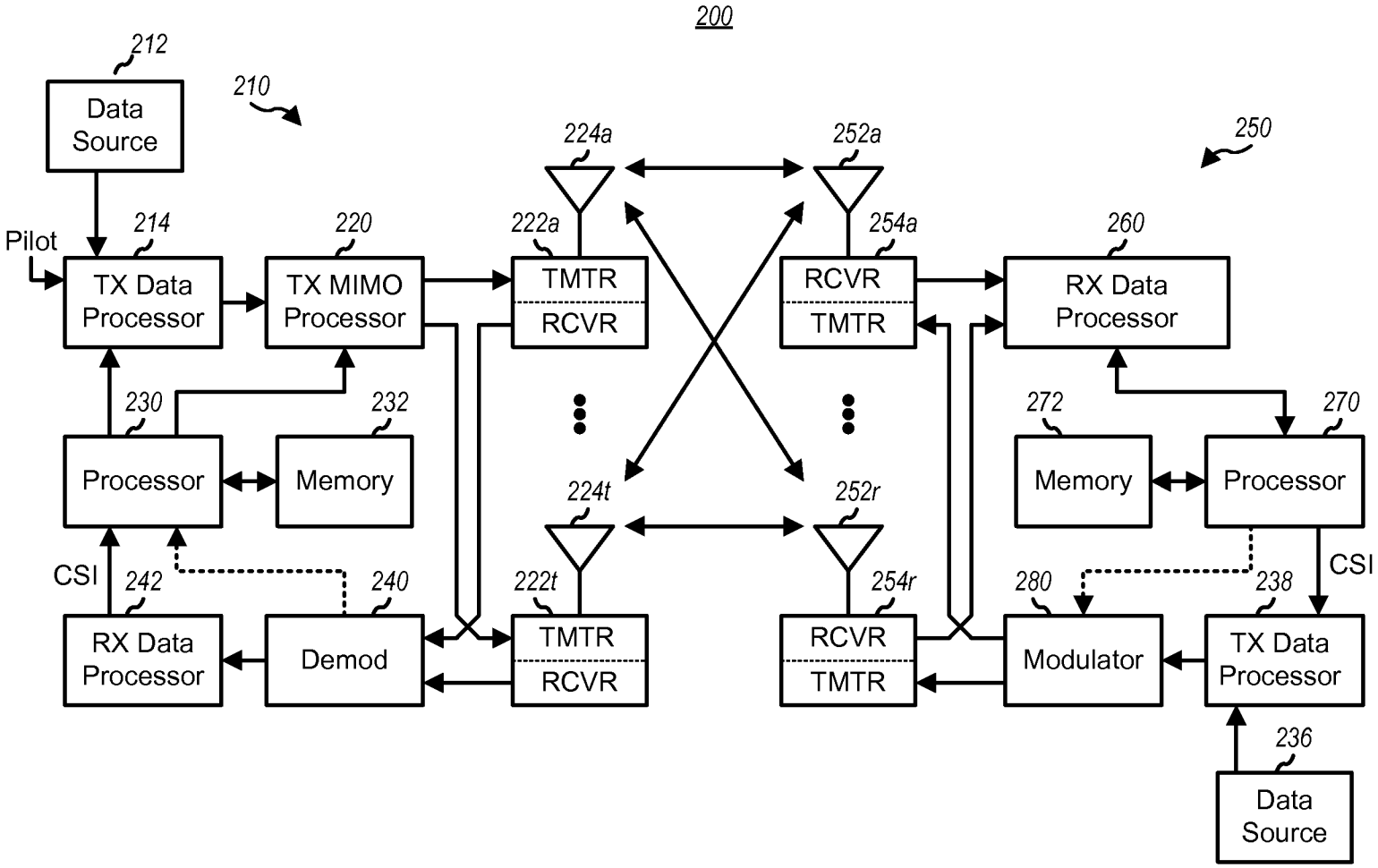



FIG. 2



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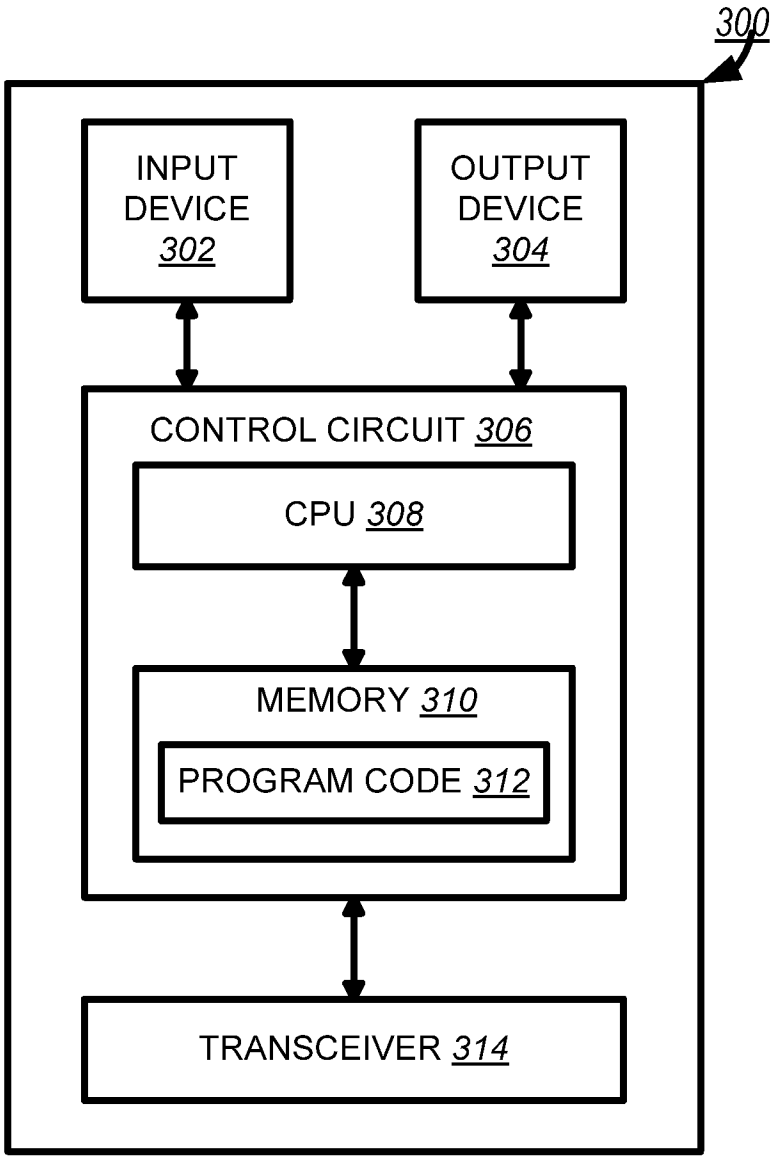

300
INPUT DEVICE 302
OUTPUT DEVICE 304
CONTROL CIRCUIT 306
CPU 308
MEMORY 310
PROGRAM CODE 312
TRANSCEIVER 314

**FIG. 3**

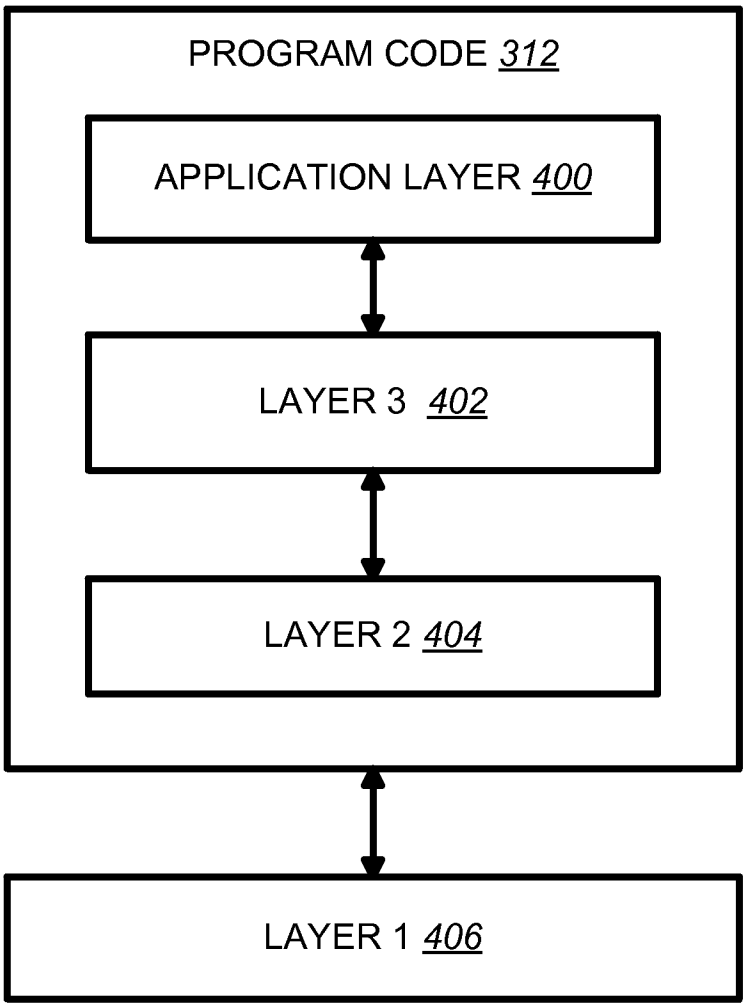

PROGRAM CODE 312
APPLICATION LAYER 400
LAYER 3 402
LAYER 2 404
LAYER 1 406

FIG. 4

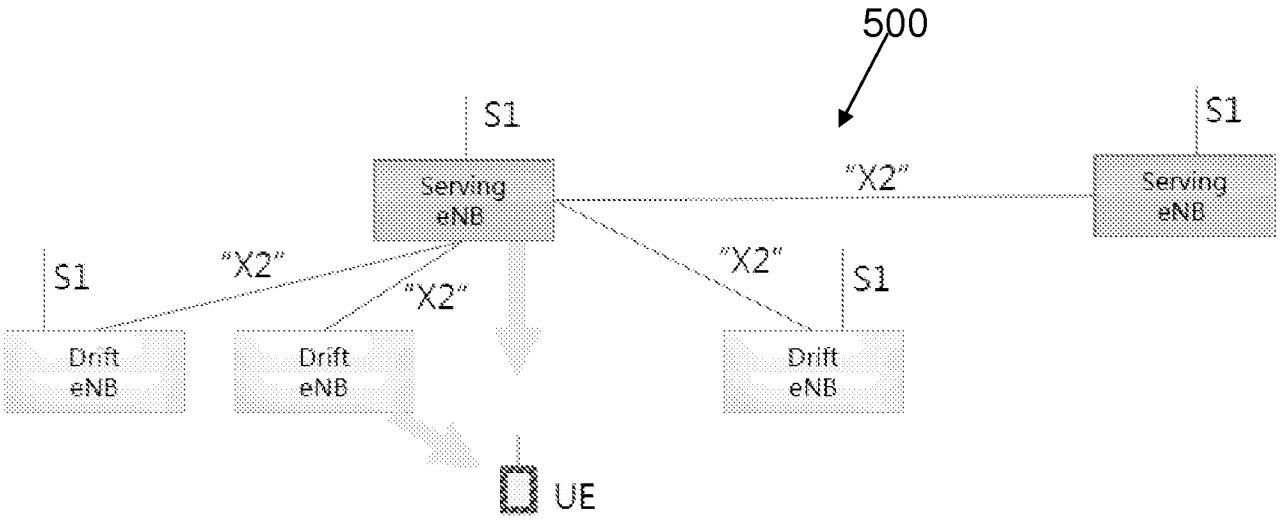



**FIG. 5 (PRIOR ART)**

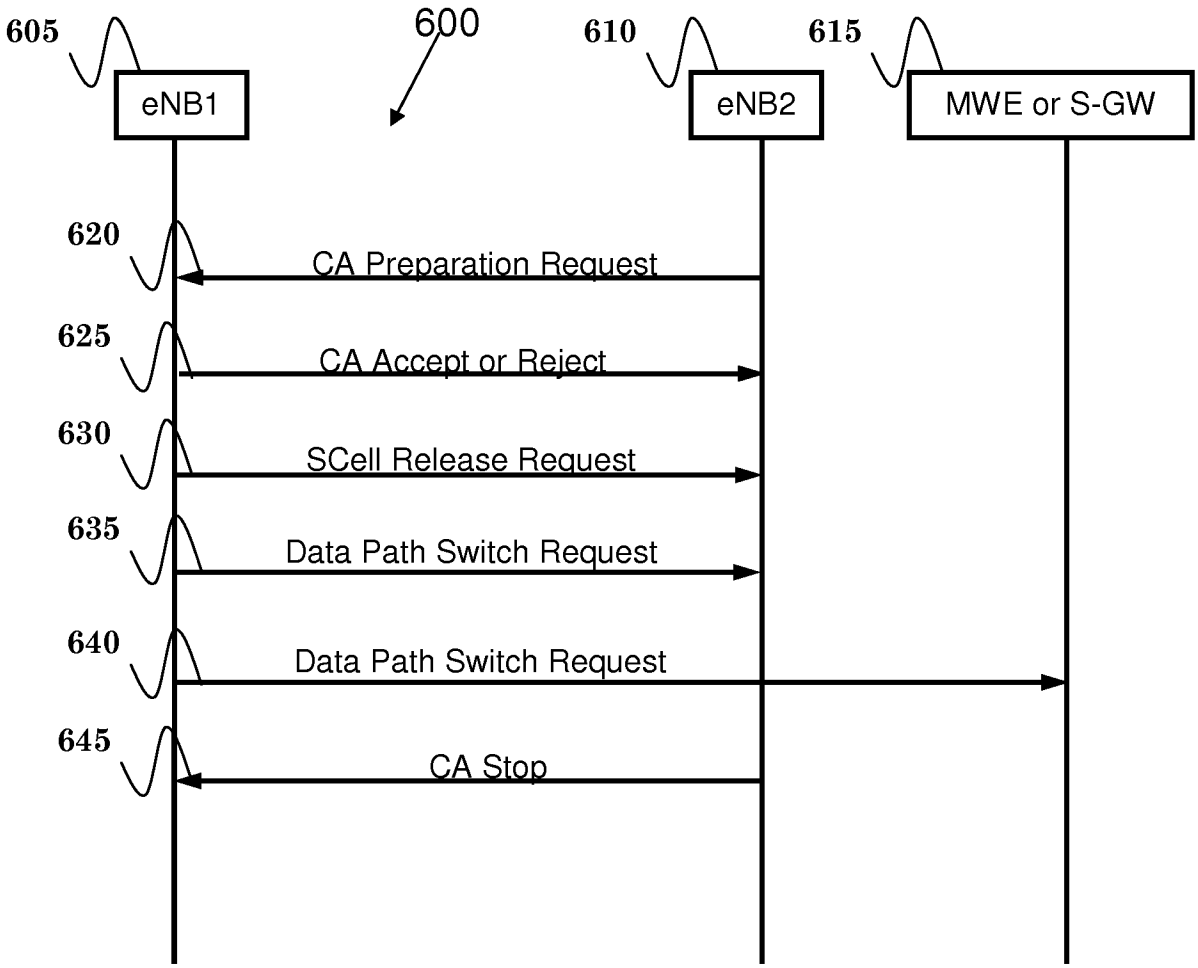

605
600
610
615
eNB1
eNB2
MWE or S-GW
620
CA Preparation Request
625
CA Accept or Reject
630
SCell Release Request
635
Data Path Switch Request
640
Data Path Switch Request
645
CA Stop

**FIG. 6**

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# DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

| Title of Invention | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
|---|---|

As the below named inventor, I hereby declare that:

This declaration is directed to:

- [x] The attached application, or
- [ ] United States application or PCT international application number _____

  filed on _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

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LEGAL NAME OF INVENTOR

Inventor: Yu-Hsuan Guo Date (Optional): 2014. 1. 20

Signature: Guo, Yu-Hsuan

Note: An application data sheet (PTO/AIA/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional PTO/SB/AIA01 form for each additional inventor.

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# DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

| Title of Invention | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
|---|---|

As the below named inventor, I hereby declare that:

This declaration is directed to:

- [x] The attached application, or
- [ ] United States application or PCT international application number _____ filed on _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

## WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Meng-Hui Ou Date (Optional): 2014. 1. 20.

Signature: Ou, Meng-Hui

Note: An application data sheet (PTO/AIA/14 or equivalent), including naming the entire inventive entity, must accompany this form. Use an additional PTO/SB/AIA01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82A (07-13)
Approved for use through 11/30/2014. OMB 0651-0051
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

# TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

| | |
|---|---|
| Application Number | Not Yet Assigned |
| Filing Date | Herewith |
| First Named Inventor | Yu-Hsuan Guo |
| Title | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| Art Unit | Not Yet Assigned |
| Examiner Name | Not Yet Assigned |
| Attorney Docket Number | 1291-235.101 |

**SIGNATURE of Applicant or Patent Practitioner**

| | | | |
|---|---|---|---|
| Signature |  | Date (Optional) | January 29, 2014 |
| Name | Sang N. Dang | Registration Number | 51,186 |
| Title (if Applicant is a juristic entity) | | | |
| Applicant Name (if Applicant is a juristic entity) | | | |

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ *Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

PTO/AIA/82B(07-12)
Approved for use through 11/30/2014. OMB 0651-0035
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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

# POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in the attached transmittal letter.

☒ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A or equivalent):

106622

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A or equivalent):

| Name | Registration Number | Name | Registration Number |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Please recognize or change the correspondence address for the application identified in the attached transmittal letter to:

☒ The address associated with the above-mentioned Customer Number.

OR

☐ The address associated with Customer Number:

OR

| | | | | | |
|---|---|---|---|---|---|
| ☐ Firm or Individual Name | | | | | |
| Address | | | | | |
| City | | State | | Zip | |
| Country | | | | | |
| Telephone | | Email | | | |

I am the Applicant:

☐ Inventor or Joint Inventor

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor

☒ Assignee or Person to Whom the Inventor is Under an Obligation to Assign

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (*e.g.*, a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document)

**SIGNATURE of Applicant for Patent**

| | | | |
|---|---|---|---|
| Signature | | Date | Sep 20 2012 |
| Name | Yao Ching Hsu | Telephone | |
| Title and Company | General Manager as Representative for Innovative Sonic Corporation | | |

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms for more than one signature, see below *.

☐ *Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | | |
|---|---|---|
| Applicants: | Yu-Hsuan Guo and Meng-Hui Ou | |
| Title: | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM | |
| Serial No.: | TBD | Filed: Herewith |
| Examiner: | TBD | Group Art Unit: TBD |
| Attorney Docket No.: | 1291-235.101 (IS102004-US-D1) | |

---

**CERTIFICATE OF EFS-WEB TRANSMISSION**
**UNDER 37 CFR § 1.8**

I hereby certify that the enclosed 1 Page Utility Transmittal; 1 Page Fee Transmittal; 6 Page WebADS; 22 Page Specification; 6 Page Drawings; 2 Page executed Declaration; and 2 Page Power of Attorney are being transmitted to the United States Patent and Trademark Office via EFS-Web on January 29, 2014.

Date: January 29, 2014

Sandy Kim

Mailing Address:

**BLUE CAPITAL LAW FIRM, P.C. (Customer No.: 106622)**
600 Anton Blvd., Suite 1000
Costa Mesa, California 92626
Tel: 714-839-3800
Fax: 714-795-2995

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | |
| **Filing Date:** | |
| **Title of Invention:** | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| **First Named Inventor/Applicant Name:** | Yu-Hsuan Guo |
| **Filer:** | Sang N. Dang/Sandy Kim |
| **Attorney Docket Number:** | 1291-235.101 |

Filed as Large Entity

## Utility under 35 USC 111(a) Filing Fees

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| Utility application filing | 1011 | 1 | 280 | 280 |
| Utility Search Fee | 1111 | 1 | 600 | 600 |
| Utility Examination Fee | 1311 | 1 | 720 | 720 |
| **Pages:** | | | | |
| **Claims:** | | | | |
| **Miscellaneous-Filing:** | | | | |
| **Petition:** | | | | |
| **Patent-Appeals-and-Interference:** | | | | |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Post-Allowance-and-Post-Issuance:** | | | | |
| **Extension-of-Time:** | | | | |
| **Miscellaneous:** | | | | |
| | | **Total in USD ($)** | | **1600** |

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 18057283 |
| **Application Number:** | 14167405 |
| **International Application Number:** | |
| **Confirmation Number:** | 6471 |
| **Title of Invention:** | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| **First Named Inventor/Applicant Name:** | Yu-Hsuan Guo |
| **Customer Number:** | 106622 |
| **Filer:** | Sang N. Dang/Sandy Kim |
| **Filer Authorized By:** | Sang N. Dang |
| **Attorney Docket Number:** | 1291-235.101 |
| **Receipt Date:** | 29-JAN-2014 |
| **Filing Date:** | |
| **Time Stamp:** | 15:45:38 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | yes |
| Payment Type | Credit Card |
| Payment was successfully received in RAM | $1600 |
| RAM confirmation Number | 1968 |
| Deposit Account | |
| Authorized User | |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi-Part / zip | Pages (if appl.) |
|---|---|---|---|---|---|

Petitioners' Exhibit 1002, p. 38
AT&T et al v. Innovative Sonic & Celonity
IPR2024-00991

| | | | | | |
|---|---|---|---|---|---|
| 1 | Application Data Sheet | WebADS.pdf | 111776<br>de98ee3b5afb089ed507ba65e8236ec4f438b498 | no | 6 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 2 | | 1291-235-101--PackageAsFiled01292014.pdf | 4660867<br>d99afbd52b6344429acaa68864572efb740f1219 | yes | 35 |

**Multipart Description/PDF files in .zip description**

| Document Description | Start | End |
|---|---|---|
| Transmittal of New Application | 1 | 1 |
| Fee Worksheet (SB06) | 2 | 2 |
| Specification | 3 | 19 |
| Claims | 20 | 23 |
| Abstract | 24 | 24 |
| Drawings-only black and white line drawings | 25 | 30 |
| Oath or Declaration filed | 31 | 32 |
| Power of Attorney | 33 | 34 |
| Miscellaneous Incoming Letter | 35 | 35 |

| | | | | | |
|---|---|---|---|---|---|
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 3 | Fee Worksheet (SB06) | fee-info.pdf | 33269<br>fa708df3dd2365ce0abe7f2bc6179f7bc37e83f3 | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| | | | **Total Files Size (in bytes):** | 4805912 | |

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

| Application Data Sheet 37 CFR 1.76 | Attorney Docket Number | 1291-235.101 |
|---|---|---|
| | Application Number | |
| Title of Invention | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM | |

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

## Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2(Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

## Inventor Information:

**Inventor 1** Remove

**Legal Name**

| Prefix | Given Name | Middle Name | Family Name | Suffix |
|---|---|---|---|---|
| | Yu-Hsuan | | Guo | |

**Residence Information (Select One)** ○ US Residency ◉ Non US Residency ○ Active US Military Service

| City | Taipei City | Country of Residence i | TW |
|---|---|---|---|

**Mailing Address of Inventor:**

| | | | |
|---|---|---|---|
| **Address 1** | 14F, No. 30, Beiping E. Rd., Zhongzheng District | | |
| **Address 2** | | | |
| **City** | Taipei City | **State/Province** | OT |
| **Postal Code** | 10049 | **Country** i | TW |

**Inventor 2** Remove

**Legal Name**

| Prefix | Given Name | Middle Name | Family Name | Suffix |
|---|---|---|---|---|
| | Meng-Hui | | Ou | |

**Residence Information (Select One)** ○ US Residency ◉ Non US Residency ○ Active US Military Service

| City | Taipei City | Country of Residence i | TW |
|---|---|---|---|

**Mailing Address of Inventor:**

| | | | |
|---|---|---|---|
| **Address 1** | 14F, No. 30, Beiping E. Rd., Zhongzheng District | | |
| **Address 2** | | | |
| **City** | Taipei City | **State/Province** | OT |
| **Postal Code** | 10049 | **Country** i | TW |

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add



Petitioners' Exhibit 1002, p. 41
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

| Application Data Sheet 37 CFR 1.76 | Attorney Docket Number | 1291-235.101 |
|---|---|---|
| | Application Number | |
| Title of Invention | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM | |

## Correspondence Information:

**Enter either Customer Number or complete the Correspondence Information section below.**
**For further information see 37 CFR 1.33(a).**

☐ **An Address is being provided for the correspondence Information of this application.**

| | | | |
|---|---|---|---|
| **Customer Number** | 106622 | | |
| **Email Address** | | Add Email | Remove Email |

## Application Information:

| | | | |
|---|---|---|---|
| **Title of the Invention** | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM | | |
| **Attorney Docket Number** | 1291-235.101 | **Small Entity Status Claimed** | ☐ |
| **Application Type** | Nonprovisional | | |
| **Subject Matter** | Utility | | |
| **Total Number of Drawing Sheets (if any)** | 6 | **Suggested Figure for Publication (if any)** | |

## Filing By Reference

Only compete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

| Application number of the previously filed application | Filing date (YYYY-MM-DD) | Intellectual Property Authority or Country i |
|---|---|---|
| | | |

## Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

## Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.



**Petitioners' Exhibit 1002, p. 42**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

| **Application Data Sheet 37 CFR 1.76** | Attorney Docket Number | 1291-235.101 |
|---|---|---|
| | Application Number | |
| Title of Invention | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM | |

| Please Select One: | ◉ Customer Number | ○ US Patent Practitioner | ○ Limited Recognition (37 CFR 11.9) |
|---|---|---|---|
| Customer Number | 106622 | | |

Additional Representative Information blocks may be generated within this form by selecting the **Add** button.

## Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

| Prior Application Status | Pending | | Remove |
|---|---|---|---|
| Application Number | Continuity Type | Prior Application Number | Filing Date (YYYY-MM-DD) |
| | Claims benefit of provisional | 61/758418 | 2013-01-30 |
| Prior Application Status | Pending | | Remove |
| Application Number | Continuity Type | Prior Application Number | Filing Date (YYYY-MM-DD) |
| | Claims benefit of provisional | 61/768761 | 2013-02-25 |

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

## Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

| | | | Remove |
|---|---|---|---|
| Application Number | Country i | Filing Date (YYYY-MM-DD) | Access Code (if applicable) |
| | | | |

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

| Application Data Sheet 37 CFR 1.76 | Attorney Docket Number | 1291-235.101 |
|---|---|---|
| | Application Number | |
| Title of Invention | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM | |

## Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

## Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

## Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

**Applicant 1**

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

◉ Assignee ○ Legal Representative under 35 U.S.C. 117 ○ Joint Inventor

○ Person to whom the inventor is obligated to assign. ○ Person who shows sufficient proprietary interest



Petitioners' Exhibit 1002, p. 44
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

| **Application Data Sheet 37 CFR 1.76** | Attorney Docket Number | 1291-235.101 |
|---|---|---|
| | Application Number | |
| Title of Invention | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM | |

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor :

If the Applicant is an Organization check here. ☒

| Organization Name | INNOVATIVE SONIC CORPORATION |
|---|---|

**Mailing Address Information:**

| **Address 1** | 14F, No. 30, Beiping E. Rd., Zhongzheng District | | |
|---|---|---|---|
| Address 2 | | | |
| **City** | Taipei City | **State/Province** | OT |
| **Country** i | TW | Postal Code | 10049 |
| Phone Number | | Fax Number | |
| Email Address | | | |

Additional Applicant Data may be generated within this form by selecting the Add button.

## Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not subsitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

**Assignee 1**

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication . An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee or Non-Applicant Assignee is an Organization check here ☐

| Prefix | **Given Name** | Middle Name | **Family Name** | Suffix |
|---|---|---|---|---|
| | | | | |



**Petitioners' Exhibit 1002, p. 45**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

| **Application Data Sheet 37 CFR 1.76** | Attorney Docket Number | 1291-235.101 |
|---|---|---|
| | Application Number | |
| Title of Invention | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM | |

Mailing Address Information For Assignee including Non-Applicant Assignee:

| | | | |
|---|---|---|---|
| **Address 1** | | | |
| Address 2 | | | |
| **City** | | **State/Province** | |
| **Country** i | | Postal Code | |
| Phone Number | | Fax Number | |
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Application Number: 14167405 Document Date: 01/29/2014

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| APPLICATION NUMBER | FILING or 371(c) DATE | GRP ART UNIT | FIL FEE REC'D | ATTY.DOCKET.NO | TOT CLAIMS | IND CLAIMS |
|---|---|---|---|---|---|---|
| 14/167,405 | 01/29/2014 | 2414 | 1600 | 1291-235.101 | 20 | 3 |

**CONFIRMATION NO. 6471**

106622
Blue Capital Law Firm, P.C.
600 Anton Blvd., Suite 1000
Costa Mesa, CA 92626

**FILING RECEIPT**

*OC00000066607122*

Date Mailed: 02/18/2014

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

**Inventor(s)**

Yu-Hsuan Guo, Taipei City, TAIWAN;
Meng-Hui Ou, Taipei City, TAIWAN;

**Applicant(s)**

INNOVATIVE SONIC CORPORATION, Taipei City, TAIWAN

**Assignment For Published Patent Application**

INNOVATIVE SONIC CORPORATION, Taipei City, TAIWAN

**Power of Attorney:** The patent practitioners associated with Customer Number 106622

**Domestic Priority data as claimed by applicant**

This appln claims benefit of 61/758,418 01/30/2013
and claims benefit of 61/768,761 02/25/2013

**Foreign Applications** for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
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**Projected Publication Date:** 07/31/2014



**Petitioners' Exhibit 1002, p. 48**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

**Non-Publication Request:** No

**Early Publication Request:** No

**Title**

METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM

**Preliminary Class**

370

**Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications:** No

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**Petitioners' Exhibit 1002, p. 49**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

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## PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 14/167,405

### APPLICATION AS FILED - PART I

| FOR | (Column 1) NUMBER FILED | (Column 2) NUMBER EXTRA | SMALL ENTITY RATE($) | SMALL ENTITY FEE($) | OR | OTHER THAN SMALL ENTITY RATE($) | OTHER THAN SMALL ENTITY FEE($) |
|---|---|---|---|---|---|---|---|
| BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | | | N/A | 280 |
| SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | N/A | | | N/A | 600 |
| EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | | | N/A | 720 |
| TOTAL CLAIMS (37 CFR 1.16(i)) | 20 minus 20 = | * | | | OR | x 80 = | 0.00 |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | 3 minus 3 = | * | | | | x 420 = | 0.00 |
| APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | | | | 0.00 |
| MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | | | | 0.00 |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | | | TOTAL | 1600 |

### APPLICATION AS AMENDED - PART II

| | | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | SMALL ENTITY RATE($) | SMALL ENTITY ADDITIONAL FEE($) | OR | OTHER THAN SMALL ENTITY RATE($) | OTHER THAN SMALL ENTITY ADDITIONAL FEE($) |
|---|---|---|---|---|---|---|---|---|---|---|
| AMENDMENT A | Total (37 CFR 1.16(i)) | * | Minus | ** | = | x = | | OR | x = | |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | x = | | OR | x = | |
| | Application Size Fee (37 CFR 1.16(s)) | | | | | | | | | |
| | FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | OR | | |
| | | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE | |

| | | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE($) | ADDITIONAL FEE($) | | RATE($) | ADDITIONAL FEE($) |
|---|---|---|---|---|---|---|---|---|---|---|
| AMENDMENT B | Total (37 CFR 1.16(i)) | * | Minus | ** | = | x = | | OR | x = | |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | x = | | OR | x = | |
| | Application Size Fee (37 CFR 1.16(s)) | | | | | | | | | |
| | FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | | OR | | |
| | | | | | | TOTAL ADD'L FEE | | OR | TOTAL ADD'L FEE | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
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|---|---|---|---|
| 14/167,405 | 01/29/2014 | Yu-Hsuan Guo | 1291-235.101 |

**CONFIRMATION NO. 6471**

106622
Blue Capital Law Firm, P.C.
600 Anton Blvd., Suite 1000
Costa Mesa, CA 92626

**POA ACCEPTANCE LETTER**

*OC000000066607169*

Date Mailed: 02/18/2014

## NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/29/2014.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/kthai/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



**Petitioners' Exhibit 1002, p. 52**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

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|---|---|---|---|
| 14/167,405 | 01/29/2014 | Yu-Hsuan Guo | 1291-235.101 |

**CONFIRMATION NO. 6471**

106622
Blue Capital Law Firm, P.C.
600 Anton Blvd., Suite 1000
Costa Mesa, CA 92626

**PUBLICATION NOTICE**

*OC00000006992717 5*

**Title:**METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM

**Publication No.**US-2014-0211759-A1
**Publication Date:**07/31/2014

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**Petitioners' Exhibit 1002, p. 53**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
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# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

**( Not for submission under 37 CFR 1.99)**

| | |
|---|---|
| Application Number | 14167405 |
| Filing Date | 2014-01-29 |
| First Named Inventor | Yu-Hsuan Guo |
| Art Unit | 2472 |
| Examiner Name | Kizou, Hassan |
| Attorney Docket Number | 1291-235.101 |

**U.S.PATENTS**

| Examiner Initial* | Cite No | Patent Number | Kind Code[1] | Issue Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|---|
| | 1 | | | | | |

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| Examiner Initial* | Cite No | Publication Number | Kind Code[1] | Publication Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|---|
| | 1 | 20120106511 | A1 | 2012-05-03 | Chih-Hsiang Wu | |

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**FOREIGN PATENT DOCUMENTS**

| Examiner Initial* | Cite No | Foreign Document Number[3] | Country Code[2] i | Kind Code[4] | Publication Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear | T[5] |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2448325 | EP | A1 | 2012-05-02 | Innovative Sonic Corporation | | ☐ |

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| Examiner Initials* | Cite No | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published. | T[5] |
|---|---|---|---|

| INFORMATION DISCLOSURE STATEMENT BY APPLICANT ( Not for submission under 37 CFR 1.99) | | |
|---|---|---|
| | Application Number | 14167405 |
| | Filing Date | 2014-01-29 |
| | First Named Inventor | Yu-Hsuan Guo |
| | Art Unit | 2472 |
| | Examiner Name | Kizou, Hassan |
| | Attorney Docket Number | 1291-235.101 |

| | | | |
|---|---|---|---|
| | 1 | 3GPP TS 36.321 V11.0.0 (2012-09) | ☐ |
| | 2 | Search Report on corresponding EP Patent Application No. 14152813.3 dated July 30, 2014 | ☐ |

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(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 448 325 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
**02.05.2012 Bulletin 2012/18**

(51) Int Cl.:
***H04W 36/00*** *(2009.01)*

(21) Application number: **11008725.1**

(22) Date of filing: **31.10.2011**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**
Designated Extension States:
**BA ME**

(30) Priority: **02.11.2010 US 409416 P**

(71) Applicant: **Innovative Sonic Corporation**
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**Hoefer & Partner**
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# (54) Method and apparatus for secondary cell release during handover in a wireless communication system

(57) Methods and an apparatus for Secondary Cell (SCell) release during User Equipment (UE) handover comprises including information by a source eNB in a *HandoverPreparationInformation* message for a target eNB to control SCell release in the UE during handover, or including an indicator by a target eNB in a handover command for the UE to distinguish whether or not to release all configured SCells.

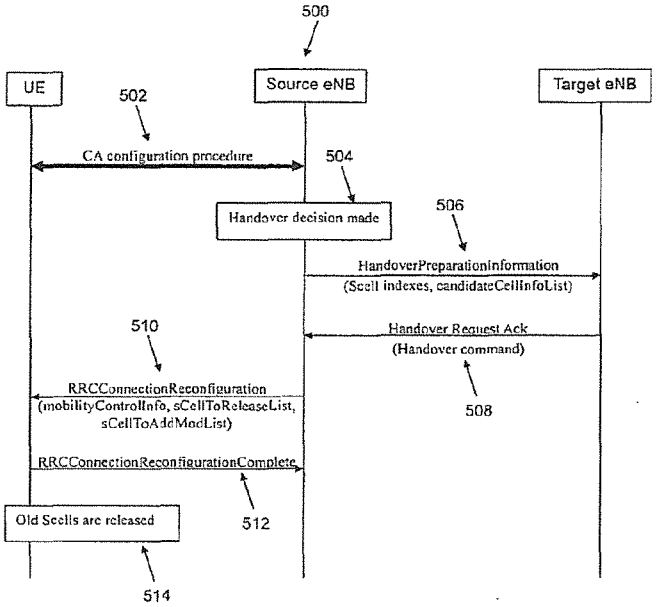



FIG. 6

EP 2 448 325 A1

Printed by Jouve, 75001 PARIS (FR)

Petitioners' Exhibit 1002, p. 56
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

BNSDOCID: <EP_____2448325A1_I_>

## Description

### CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present Application claims the benefit of U.S. Provisional Patent Application Serial No. 61/409,416, filed on November 2, 2010, the entire disclosure of which is incorporated herein by reference.

### FIELD

[0002] This disclosure generally relates to wireless communication networks, and more particularly, to a method and apparatus for Secondary Cell (SCell) release during handover in a wireless communication system.

### BACKGROUND

[0003] With the rapid rise in demand for communication of large amounts of data to and from mobile communication devices, traditional mobile voice communication networks are evolving into networks that communicate with Internet Protocol (IP) data packets. Such IP data packet communication can provide users of mobile communication devices with voice over IP, multimedia, multicast and on-demand communication services.

[0004] An exemplary network structure for which standardization is currently taking place is an Evolved Universal Terrestrial Radio Access Network (E-UTRAN). The E-UTRAN system can provide high data throughput in order to realize the above-noted voice over IP and multimedia services. The E-UTRAN system's standardization work is currently being performed by the 3GPP standards organization. Accordingly, changes to the current body of 3GPP standard are currently being submitted and considered to evolve and finalize the 3GPP standard.

### SUMMARY

[0005] According to one aspect, a method of Secondary Cell (SCell) release during handover comprises including information by a source eNB in a *HandoverPreparationInformation* message for a target eNB to control SCell release in a User Equipment (UE) during handover.

[0006] According to another aspect, a method of Secondary Cell (SCell) release during handover comprises including an indicator by a target eNB in a handover command for a User Equipment (UE) to distinguish whether or not to release all configured SCells.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. 1 shows a diagram of a wireless communication system according to one exemplary embodiment.

[0008] FIG. 2 shows a user plane protocol stack of the wireless communication system of FIG. 1 according to one exemplary embodiment.

[0009] FIG. 3 shows a control plane protocol stack of the wireless communication system of FIG. 1 according to one exemplary embodiment.

[0010] FIG. 4 is a block diagram of a transmitter system (also known as access network) and a receiver system (also known as user equipment or UE) according to one exemplary embodiment.

[0011] FIG. 5 is a functional block diagram of a communication device according to one exemplary embodiment.

[0012] FIG. 6 shows a method of Secondary Cell (SCell) release during handover according to one exemplary embodiment.

[0013] FIG. 7 shows a method of SCell release during handover according to one exemplary embodiment.

### DETAILED DESCRIPTION

[0014] The exemplary wireless communication systems and devices described below employ a wireless communication system, supporting a broadcast service. Wireless communication systems are widely deployed to provide various types of communication such as voice, data, and so on. These systems may be based on code division multiple access (CDMA), time division multiple access (TDMA), orthogonal frequency division multiple access (OFDMA), 3GPP LTE (Long Term Evolution) wireless access, 3GPP LTE-A (Long Term Evolution Advanced), 3GPP2 UMB (Ultra Mobile Broadband), WiMax, or some other modulation techniques.

[0015] In particular, The exemplary wireless communication systems devices described below may be designed to support one or more standards such as the standard offered by a consortium named "3rd Generation Partnership Project" referred to herein as 3GPP, including Document Nos. TS36.331-940, TS36.300-950, and R2-105971. The standards and documents listed above are hereby expressly incorporated herein.

[0016] An exemplary network structure of an Evolved Universal Terrestrial Radio Access Network (E-UTRAN) 100 as a mobile communication system is shown in FIG. 1 according to one exemplary embodiment. The E-UTRAN system can also be referred to as a LTE (Long-Term Evolution) system or LTE-A (Long-Term Evolution Advanced). The E-UTRAN generally includes eNode B or eNB 102, which function similar to a base station in a mobile voice communication network. Each eNB is connected by X2 interfaces. The eNBs are connected to terminals or user equipment (UE) 104 through a radio interface, and are connected to Mobility Management Entities (MME) or Serving Gateway (S-GW) 106 through S1 interfaces.

[0017] Referring to FIGS. 2 and 3, the LTE system is divided into control plane 108 protocol stack (shown in FIG. 3) and user plane 110 protocol stack (shown in FIG. 2) according to one exemplary embodiment. The control plane performs a function of exchanging a control signal



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IPR2024-00991

BNSDOCID: <EP_____2448325A1_I_>

between a UE and an eNB and the user plane performs a function of transmitting user data between the UE and the eNB. Referring to FIGS. 2 and 3, both the control plane and the user plane include a Packet Data Convergence Protocol (PDCP) layer, a Radio Link Control (RLC) layer, a Medium Access Control (MAC) layer and a physical (PHY) layer. The control plane additionally includes a Radio Resource Control (RRC) layer. The control plane also includes a Network Access Stratum (NAS) layer, which performs among other things including Evolved Packet System (EPS) bearer management, authentication, and security control.

**[0018]** The PHY layer provides information transmission service using a radio transmission technology and corresponds to a first layer of an open system interconnection (OSI) layer. The PHY layer is connected to the MAC layer through a transport channel. Data exchange between the MAC layer and the PHY layer is performed through the transport channel. The transport channel is defined by a scheme through which specific data are processed in the PHY layer.

**[0019]** The MAC layer performs the function of sending data transmitted from a RLC layer through a logical channel to the PHY layer through a proper transport channel and further performs the function of sending data transmitted from the PHY layer through a transport channel to the RLC layer through a proper logical channel. Further, the MAC layer inserts additional information into data received through the logical channel, analyzes the inserted additional information from data received through the transport channel to perform a proper operation and controls a random access operation.

**[0020]** The MAC layer and the RLC layer are connected to each other through a logical channel. The RLC layer controls the setting and release of a logical channel and may operate in one of an acknowledged mode (AM) operation mode, an unacknowledged mode (UM) operation mode and a transparent mode (TM) operation mode. Generally, the RLC layer divides Service Data Unit (SDU) sent from an upper layer at a proper size and vice versa. Further, the RLC layer takes charge of an error correction function through an automatic retransmission request (ARQ).

**[0021]** The PDCP layer is disposed above the RLC layer and performs a header compression function of data transmitted in an IP packet form and a function of transmitting data without loss even when an eNB providing a service changes due to the movement of a UE.

**[0022]** The RRC layer is only defined in the control plane. The RRC layer controls logical channels, transport channels and physical channels in relation to establishment, re-configuration and release of Radio Bearers (RBs). Here, the RB signifies a service provided by the second layer of an OSI layer for data transmissions between the terminal and the E-UTRAN. If an RRC connection is established between the RRC layer of a UE and the RRC layer of the radio network, the UE is in the RRC connected mode. Otherwise, the UE is in an RRC idle mode.

**[0023]** FIG. 4 is a simplified block diagram of an exemplary embodiment of a transmitter system 210 (also known as the access network) and a receiver system 250 (also known as access terminal or UE in a MIMO system 200. At the transmitter system 210, traffic data for a number of data streams is provided from a data source 212 to a transmit (TX) data processor 214.

**[0024]** In one embodiment, each data stream is transmitted over a respective transmit antenna. TX data processor 214 formats, codes, and interleaves the traffic data for each data stream based on a particular coding scheme selected for that data stream to provide coded data.

**[0025]** The coded data for each data stream may be multiplexed with pilot data using OFDM techniques. The pilot data is typically a known data pattern that is processed in a known manner and may be used at the receiver system to estimate the channel response. The multiplexed pilot and coded data for each data stream is then modulated (i.e., symbol mapped) based on a particular modulation scheme (e.g., BPSK, QPSK, M-PSK, or M-QAM) selected for that data stream to provide modulation symbols. The data rate, coding, and modulation for each data stream may be determined by instructions performed by processor 230.

**[0026]** The modulation symbols for all data streams are then provided to a TX MIMO processor 220, which may further process the modulation symbols (e.g., for OFDM). TX MIMO processor 220 then provides $N_T$ modulation symbol streams to $N_T$ transmitters (TMTR) 222a through 222t. In certain embodiments, TX MIMO processor 220 applies beam forming weights to the symbols of the data streams and to the antenna from which the symbol is being transmitted.

**[0027]** Each transmitter 222 receives and processes a respective symbol stream to provide one or more analog signals, and further conditions (e.g., amplifies, filters, and upconverts) the analog signals to provide a modulated signal suitable for transmission over the MIMO channel. $N_T$ modulated signals from transmitters 222a through 222t are then transmitted from $N_T$ antennas 224a through 224t, respectively.

**[0028]** At receiver system 250, the transmitted modulated signals are received by $N_R$ antennas 252a through 252r and the received signal from each antenna 252 is provided to a respective receiver (RCVR) 254a through 254r. Each receiver 254 conditions (e.g., filters, amplifies, and downconverts) a respective received signal, digitizes the conditioned signal to provide samples, and further processes the samples to provide a corresponding "received" symbol stream.

**[0029]** An RX data processor 260 then receives and processes the $N_R$ received symbol streams from $N_R$ receivers 254 based on a particular receiver processing technique to provide $N_T$ "detected" symbol streams. The RX data processor 260 then demodulates, deinterleaves, and decodes each detected symbol stream to recover



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the traffic data for the data stream. The processing by RX data processor 260 is complementary to that performed by TX MIMO processor 220 and TX data processor 214 at transmitter system 210.

**[0030]** A processor 270 periodically determines which pre-coding matrix to use (discussed below). Processor 270 formulates a reverse link message comprising a matrix index portion and a rank value portion.

**[0031]** The reverse link message may comprise various types of information regarding the communication link and/or the received data stream. The reverse link message is then processed by a TX data processor 238, which also receives traffic data for a number of data streams from a data source 236, modulated by a modulator 280, conditioned by transmitters 254a through 254r, and transmitted back to transmitter system 210.

**[0032]** At transmitter system 210, the modulated signals from receiver system 250 are received by antennas 224, conditioned by receivers 222, demodulated by a demodulator 240, and processed by a RX data processor 242 to extract the reserve link message transmitted by the receiver system 250. Processor 230 then determines which pre-coding matrix to use for determining the beamforming weights then processes the extracted message.

**[0033]** Turning to FIG. 5, this figure shows an alternative simplified functional block diagram of a communication device according to one exemplary embodiment. The communication device 300 in a wireless communication system can be utilized for realizing the UE 104 in FIG. 1, and the wireless communications system is preferably the LTE system, the LTE-A system or the like. The communication device 300 may include an input device 302, an output device 304, a control circuit 306, a central processing unit (CPU) 308, a memory 310, a program code 312, and a transceiver 314. The program code 312 includes the application layers and the layers of the control plane 108 and layers of user plane 110 as discussed above except the PHY layer. The control circuit 306 executes the program code 312 in the memory 310 through the CPU 308, thereby controlling an operation of the communications device 300. The communications device 300 can receive signals input by a user through the input device 302, such as a keyboard or keypad, and can output images and sounds through the output device 304, such as a monitor or speakers. The transceiver 314 is used to receive and transmit wireless signals, delivering received signals to the control circuit 306, and outputting signals generated by the control circuit 306 wirelessly.

**[0034]** The LTE DownLink (DL) transmission scheme is based on Orthogonal Frequency Division Multiple Access (OFDMA), and the LTE UpLink (UL) transmission scheme is based on Single-Carrier (SC) Discrete Fourier Transform (DFT)-spread OFDMA (DFT-S-OFDMA) or equivalently, Single Carrier Frequency Division Multiple Access (SC-FDMA). LTE-Advanced (LTE-A), however, is designed to meet higher bandwidth requirements both in the DL and UL directions. In order to provide the higher bandwidth requirements, LTE-A utilizes component carrier aggregation. A user equipment (UE) with reception and/or transmission capabilities for carrier aggregation (CA) can simultaneously receive and/or transmit on multiple component carriers (CCs). A carrier may be defined by a bandwidth and a center frequency.

**[0035]** There are several physical control channels used in the physical layer that are relevant to CA operations. A physical downlink control channel (PDCCH) may inform the UE about the resource allocation of paging channel (PCH) and downlink shared channel (DL-SCH), about hybrid automatic repeat request (HARQ) information related to DL-SCH. The PDCCH may carry the uplink scheduling grant which informs the UE about resource allocation of uplink transmission. A physical control format indicator channel (PCFICH) informs the UE about the number of OFDM symbols used for the PDCCHs and is transmitted in every subframe. A physical Hybrid ARQ Indicator Channel (PHICH) carries HARQ ACK/NAK signals in response to uplink transmissions. A physical uplink control channel (PUCCH) carries uplink control information such as HARQ ACK/NAK signals in response to downlink transmission, scheduling request and channel quality indicator (CQI). A physical uplink shared channel (PUSCH) carries uplink shared channel (UL-SCH).

**[0036]** Carriers may be divided into a primary component carrier (PCC) and a secondary component carrier (SCC). The PCC refers to a carrier that is constantly activated, and the SCC refers to a carrier that may be activated or deactivated according to the traffic status. Activation means that transmission or reception of traffic data may be performed or traffic data is ready for its transmission or reception on the concerned CC. Deactivation means that transmission or reception of traffic data is not permitted on the concerned CC. The UE uses only a single PCC or one or more SCCs along with the PCC.

**[0037]** A PCC is used by an eNB to exchange traffic and PHY/MAC control signaling with a UE. SCCs are additional carriers which the UE may use for traffic, only per eNB specific commands and rules received on the PCC. The PCC may be a fully configured carrier, by which major control information is exchanged between the eNB and the UE. The SCC may be a fully configured carrier or a partially configured carrier, which is allocated according to a request of the UE or according to an instruction of the eNB. The PCC may be used for entering of the UE into a network or for an allocation of the SCC. The PCC may be changed via a handover procedure.

**[0038]** In LTE, a Primary Cell includes the cell operating in the primary frequency in which the UE either performs the initial connection establishment procedure or initiates the connection reestablishment procedure, or the cell indicated as the primary cell in the handover procedure. The UE also uses the PCell to derive the parameters for the security functions and for upper layer system information such as NAS mobility information. A Secondary Cell (SCell) includes the cell operating on a secondary frequency which may be configured once an RRC connection is established and which may be used to provide



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additional radio resources. System information relevant for operation in the concerned SCell is typically provided using dedicated signaling when the SCell is added to the UE's configuration. Basically a PCell contains an uplink PCC and a downlink PCC, while an Scell configured to a UE may contain a downlink SCC or an uplink SCC along with a downlink SCC.

**[0039]** In the RRC_CONNECTED state, the network controls UE mobility. For network controlled mobility in the RRC_CONNECTED state, UE mobility is realized with a handover procedure, which is triggered by the network. The network may initiate handover by first configuring the UE to perform measurement reporting or initiate handover without having received measurement reports from the UE.

**[0040]** For UEs that support CA, E-UTRAN can change the PCell with the handover procedure using an *RRCConnectionReconfiguration* message including the *mobilityControlInfo*. The *RRCConnectionReconfiguration* message is the command to modify an RRC connection. It may convey information for measurement configuration, mobility control, radio resource configuration (including RBs, MAC main configuration and physical channel configuration) including any associated dedicated NAS information and security configuration. The E-UTRAN can independently add, remove or modify SCells by means of the RRC connection reconfiguration procedure using the *RRCConnectionReconfiguration* message, either including the *mobilityControlInfo* or not.

**[0041]** Before sending the handover message to the UE, the source eNB firstly selects the target eNB. The source eNB may also provide the target eNB with a list of cells. The target eNB decides which serving cells are to be configured for use after handover, which may include cells other than the ones indicated by the source eNB. The target eNB generates the message containing one Pcell or at least one Scell along with one Pcell for initiating the handover. After receiving the handover message, the UE attempts to access the target PCell at the first available RACH occasion according to the defined Random Access resource selection. Upon successful completion of the handover, the UE sends a message to confirm the handover.

**[0042]** Currently, different eNBs do not share the same SCells for carrier aggregation such that no SCell configuration needs to be transferred to the target eNB for delta configuration. Thus, all the current SCells configured to a UE need to be released upon inter-eNB handover. If the SCells configured to a UE before inter-eNB are not released, a newly configured SCell by the new target eNB would be considered by the UE as a modification to an existing SCell with the same SCell index, which may result in inconsistent configurations between the UE and the target eNB. Therefore, all the current SCells configured to a UE should be released upon inter-eNB handover.

**[0043]** However, currently there is no information included in *RRCConnectionReconfiguration* message for a UE to distinguish whether the handover is an intra-eNB or inter-eNB handover. Accordingly, the UE cannot decide whether or not to release the current SCells upon handover. As a result, the target eNB has to include a *sCellToReleaseList* with all valid SCell indexes in the handover command for the UE to release all the potentially configured SCells even when there is actually no SCell configured to the UE.

**[0044]** Currently, there are 7 valid values of SCell indexes and the maximum number of SCell indexes in a *SCellToReleaseList* is only 4. The handover command cannot include all the potential SCell Indexes which may be used in the UE. Accordingly, one additional *RRCConnectionReconfiguration* message is needed to release all the SCells in the UE. As a result, signaling overhead may be significantly increased.

**[0045]** According to one aspect the disclosure, to avoid the above-described signaling overhead during handover, information is included by the source eNB in the *HandoverPreparationInformation* message for the target eNB to control SCell release in a UE during an inter-eNB handover procedure. More specifically, the information indicates the SCell indexes of all the SCells configured to the concerned UE, thereby allowing the target eNB to include the *sCellToReleaseList* with the SCells configured to the UE in the *RRCConnectionReconfiguration* message so that the UE can release the Scell(s) according to the *sCellToReleaseList*.

**[0046]** According to another aspect the disclosure, to avoid the above-described signaling overhead during handover, an indicator is included by the target eNB in the *RRCConnectionReconfiguration* message for a UE to distinguish whether the handover is an intra-eNB or inter-eNB handover. The UE releases all the configured SCells if the handover is an inter-eNB handover.

**[0047]** The above-described exemplary embodiments are described in further detail below with reference to FIGS. 6 and 7.

**[0048]** Referring to FIG. 6, a method 500 for SCell release during handover according to one exemplary embodiment includes configuring at least one SCell by a source eNB to a UE at 502, and after handover decision is made at 504, including by the source eNB information in a *HandoverPreparationInformation* message at 506 for a target eNB to control SCell release in the UE during handover. The included information indicates the SCell indexes of all the SCells configured to the UE, thereby allowing the target eNB to include the *sCellToReleaseList* with the SCells configured to the UE in a handover command, which is contained in a Handover Request Ack message sent to the Source eNB at 508. The *HandoverPreparationInformation* message may also contain a *candidateCellInfoList* for the target eNB to select as the Scell(s) to use after handover. The source eNB then sends an *RRCConnectionReconfiguration* message including *mobilityControlInfo* and the *sCellToReleaseList* to the UE at 510. In response, the UE replies with an *RRCConnectionReconfigurationComplete* message at



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512 to complete this procedure. Based on the *sCellToReleaseList*, the UE releases the Scell(s) configured before handover at 514. The *RRCConnectionReconfiguration* message may also include an *sCellToAddModList* to configure new Scell(s) to the UE. The *RRCConnectionReconfiguration* message including *mobilityControlInfo* corresponds to the handover command received from the target eNB.

**[0049]** Referring to FIG. 7, a method 600 for SCell release during a handover according one exemplary embodiment includes configuring at least one SCell by a source eNB to a UE at 602. After handover decision is made at 604, the source eNB sends at 606 a *HandoverPreparationInformation* message containing a *candidateCellInfoList* for the target eNB to select as the Scell(s) to use after handover. The target eNB then includes an indicator in a handover command for the UE to distinguish whether or not to release all of the configured SCells. The handover command is contained in a Handover Request Ack message sent to the Source eNB at 608. The indicator may indicate whether the handover is an intra-eNB or inter-eNB handover. The source eNB then sends an *RRCConnectionReconfiguration* message including *mobilityControlInfo* to the UE at 610. In response, the UE replies with an *RRCConnectionReconfigurationComplete* message at 612 to complete this procedure. The UE releases all the SCells configured before handover at 614 if the indicator indicates the handover is an inter-eNB handover. The *RRCConnectionReconfiguration* message may also include an *sCellToAddModList* to configure new Scell(s) to the UE. The *RRCConnectionReconfiguration* message including *mobilityControlInfo* corresponds to the handover command received from the target eNB.

**[0050]** According to the above embodiments, all SCells in the UE are released when the handover is an inter-eNB handover. As described above, releasing all SCells when the handover is an inter-eNB handover reduces signaling overhead.

**[0051]** Referring back to FIG. 5, which is a functional block diagram of a communication device according to one exemplary embodiment and which may be any of the communication devices described herein, the communication device 300 includes a program code 312 stored in memory 310. The CPU 308 executes the program code 312 to perform any one or a plurality of the above-described actions, steps and/or other procedures described herein.

**[0052]** Various aspects of the disclosure have been described above. It should be apparent that the teachings herein may be embodied in a wide variety of forms and that any specific structure, function, or both being disclosed herein is merely representative. Based on the teachings herein one skilled in the art should appreciate that an aspect disclosed herein may be implemented independently of any other aspects and that two or more of these aspects may be combined in various ways. For example, an apparatus may be implemented or a method may be practiced using any number of the aspects set forth herein. In addition, such an apparatus may be implemented or such a method may be practiced using other structure, functionality, or structure and functionality in addition to or other than one or more of the aspects set forth herein. As an example of some of the above concepts, in some aspects concurrent channels may be established based on pulse repetition frequencies. In some aspects concurrent channels may be established based on pulse position or offsets. In some aspects concurrent channels may be established based on time hopping sequences. In some aspects concurrent channels may be established based on pulse repetition frequencies, pulse positions or offsets, and time hopping sequences.

**[0053]** Those of skill in the art would understand that information and signals may be represented using any of a variety of different technologies and techniques. For example, data, instructions, commands, information, signals, bits, symbols, and chips that may be referenced throughout the above description may be represented by voltages, currents, electromagnetic waves, magnetic fields or particles, optical fields or particles, or any combination thereof.

**[0054]** Those of skill would further appreciate that the various illustrative logical blocks, modules, processors, means, circuits, and algorithm steps described in connection with the aspects disclosed herein may be implemented as electronic hardware (e.g., a digital implementation, an analog implementation, or a combination of the two, which may be designed using source coding or some other technique), various forms of program or design code incorporating instructions (which may be referred to herein, for convenience, as "software" or a "software module"), or combinations of both. To clearly illustrate this interchangeability of hardware and software, various illustrative components, blocks, modules, circuits, and steps have been described above generally in terms of their functionality. Whether such functionality is implemented as hardware or software depends upon the particular application and design constraints imposed on the overall system. Skilled artisans may implement the described functionality in varying ways for each particular application, but such implementation decisions should not be interpreted as causing a departure from the scope of the present disclosure.

**[0055]** In addition, the various illustrative logical blocks, modules, and circuits described in connection with the aspects disclosed herein may be implemented within or performed by an integrated circuit ("IC"), an access terminal, or an access point. The IC may comprise a general purpose processor, a digital signal processor (DSP), an application specific integrated circuit (ASIC), a field programmable gate array (FPGA) or other programmable logic device, discrete gate or transistor logic, discrete hardware components, electrical components, optical components, mechanical components, or any combination thereof designed to perform the functions



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described herein, and may execute codes or instructions that reside within the IC, outside of the IC, or both. A general purpose processor may be a microprocessor, but in the alternative, the processor may be any conventional processor, controller, microcontroller, or state machine. A processor may also be implemented as a combination of computing devices, e.g., a combination of a DSP and a microprocessor, a plurality of microprocessors, one or more microprocessors in conjunction with a DSP core, or any other such configuration.

**[0056]** It is understood that any specific order or hierarchy of steps in any disclosed process is an example of a sample approach. Based upon design preferences, it is understood that the specific order or hierarchy of steps in the processes may be rearranged while remaining within the scope of the present disclosure. The accompanying method claims present elements of the various steps in a sample order, and are not meant to be limited to the specific order or hierarchy presented.

**[0057]** The steps of a method or algorithm described in connection with the aspects disclosed herein may be embodied directly in hardware, in a software module executed by a processor, or in a combination of the two. A software module (e.g., including executable instructions and related data) and other data may reside in a data memory such as RAM memory, flash memory, ROM memory, EPROM memory, EEPROM memory, registers, a hard disk, a removable disk, a CD-ROM, or any other form of computer-readable storage medium known in the art. A sample storage medium may be coupled to a machine such as, for example, a computer/processor (which may be referred to herein, for convenience, as a "processor") such the processor can read information (e.g., code) from and write information to the storage medium. A sample storage medium may be integral to the processor. The processor and the storage medium may reside in an ASIC. The ASIC may reside in user equipment. In the alternative, the processor and the storage medium may reside as discrete components in user equipment. Moreover, in some aspects any suitable computer-program product may comprise a computer-readable medium comprising codes relating to one or more of the aspects of the disclosure. In some aspects a computer program product may comprise packaging materials.

**[0058]** While the invention has been described in connection with various aspects, it will be understood that the invention is capable of further modifications. This application is intended to cover any variations, uses or adaptation of the invention following, in general, the principles of the invention, and including such departures from the present disclosure as come within the known and customary practice within the art to which the invention pertains.

## Claims

1. A method of Secondary Cell (SCell) release during handover comprising:

   configuring at least one Scell by a source eNB to a User Equipment (UE); and
   including information by the source eNB in a *HandoverPreparationInformation* message for a target eNB to control SCell release in the UE during handover.

2. The method of claim 1, wherein the information indicates SCell indexes of all SCells configured to the UE, thereby allowing the target eNB to include a *sCellToReleaseList* with all the SCells configured to the UE in a handover command.

3. The method of claim 2, wherein the handover command corresponds to an *RRCConnectionReconfiguration* message including *mobilityControlInfo*.

4. The method of claim 3, wherein the *RRCConnectionReconfiguration* message is sent from the source eNB to the UE to initiate a handover procedure.

5. The method of claim 1, wherein the *HandoverPreparationInformation* message is sent from the source eNB to the target eNB to request a handover.

6. The method of claim 1, wherein the handover is an inter-eNB handover.

7. A method of Secondary Cell (SCell) release during handover comprising:

   configuring at least one SCell by a source eNB to a User Equipment (UE); and
   including an indicator in a handover command by a target eNB for the UE to distinguish whether or not to release all the configured SCells.

8. The method of claim 7, wherein the indicator indicates whether the handover is an intra-eNB or inter-eNB handover.

9. The method of claim 8, wherein the UE releases all configured SCells if the handover is an inter-eNB handover.

10. The method of claim 7, wherein the handover command corresponds to an *RRCConnectionReconfiguration* message including *mobilityControlInfo*.

11. The method of claim 10, wherein the *RRCConnectionReconfiguration* message is sent from the source eNB to the UE to initiate a handover proce-



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dure.

12. A communication device for use in a wireless communication system, the communication device comprising:

a control circuit;
a processor installed in the control circuit; and
a memory installed in the control circuit and coupled to the processor;
wherein the processor is configured to execute a program code stored in memory to perform the method steps as defined in anyone of claims 1 to 11.



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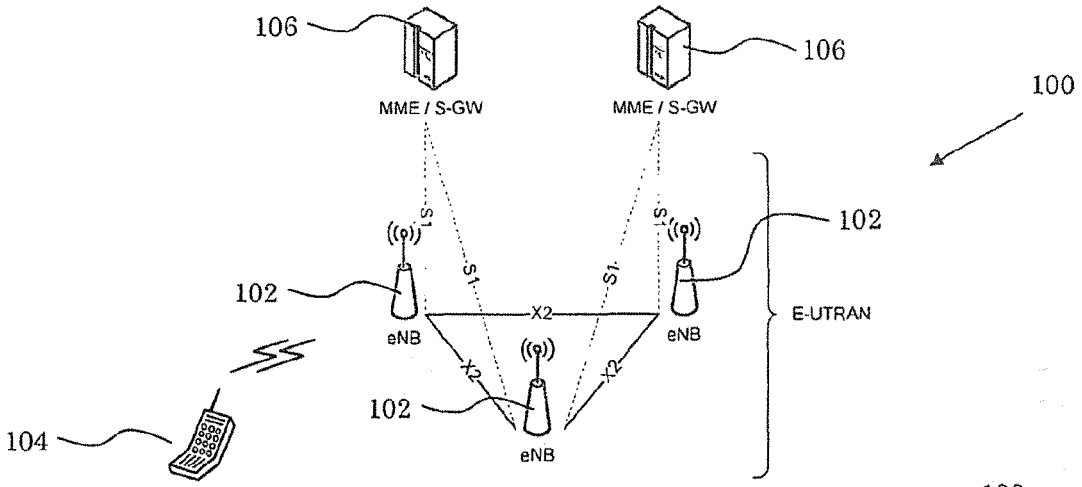



FIG. 1

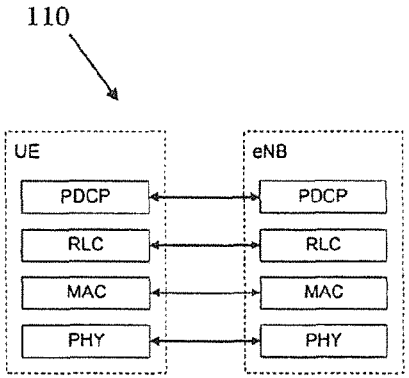



FIG. 2

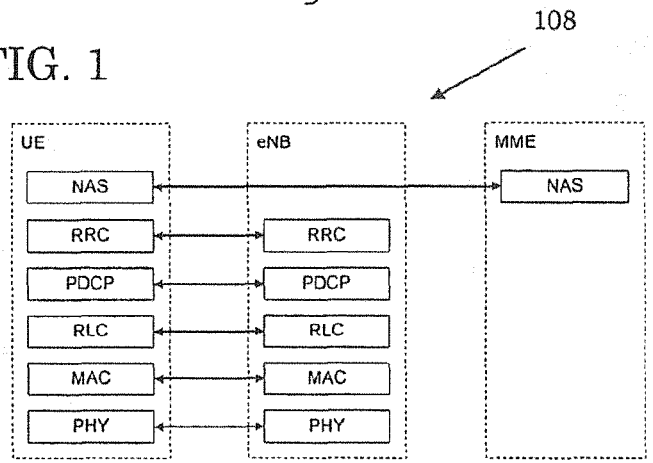



FIG. 3





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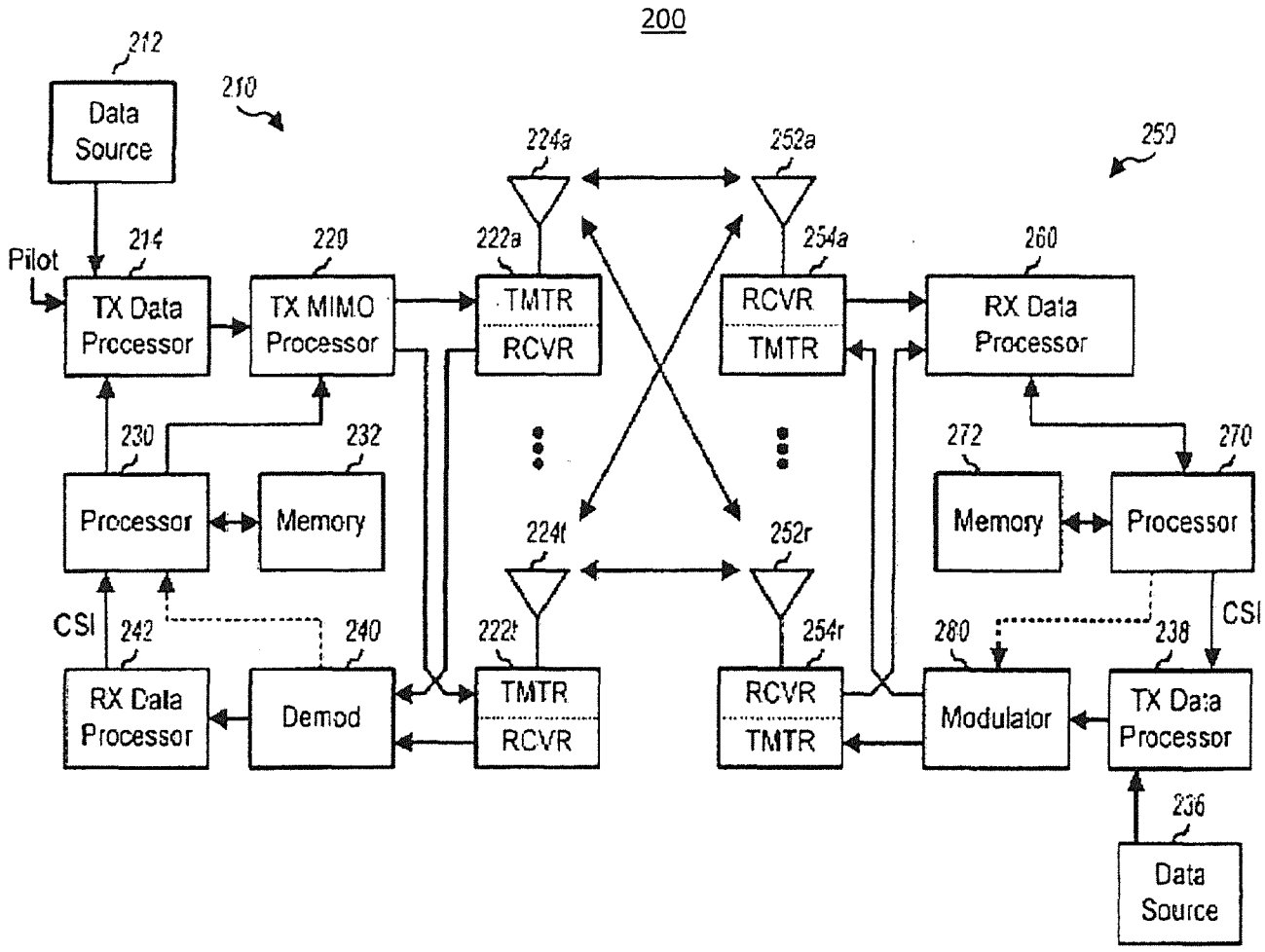



FIG. 4

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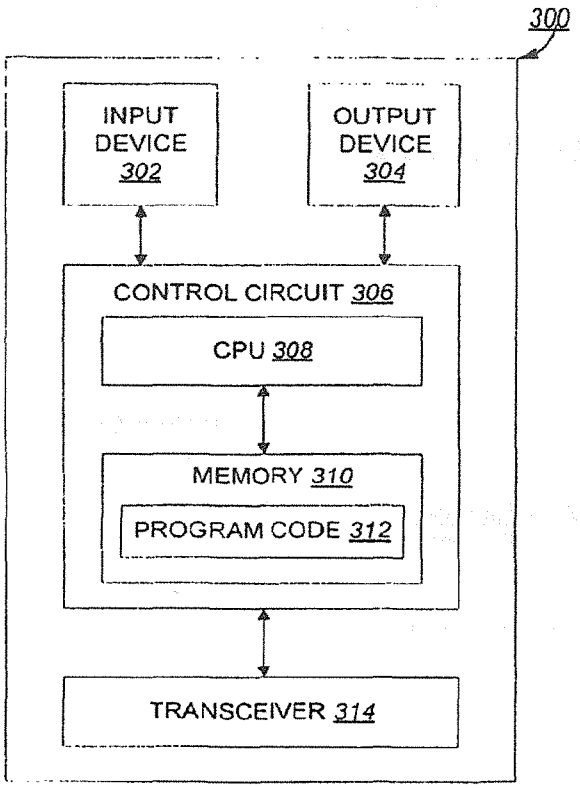



FIG. 5



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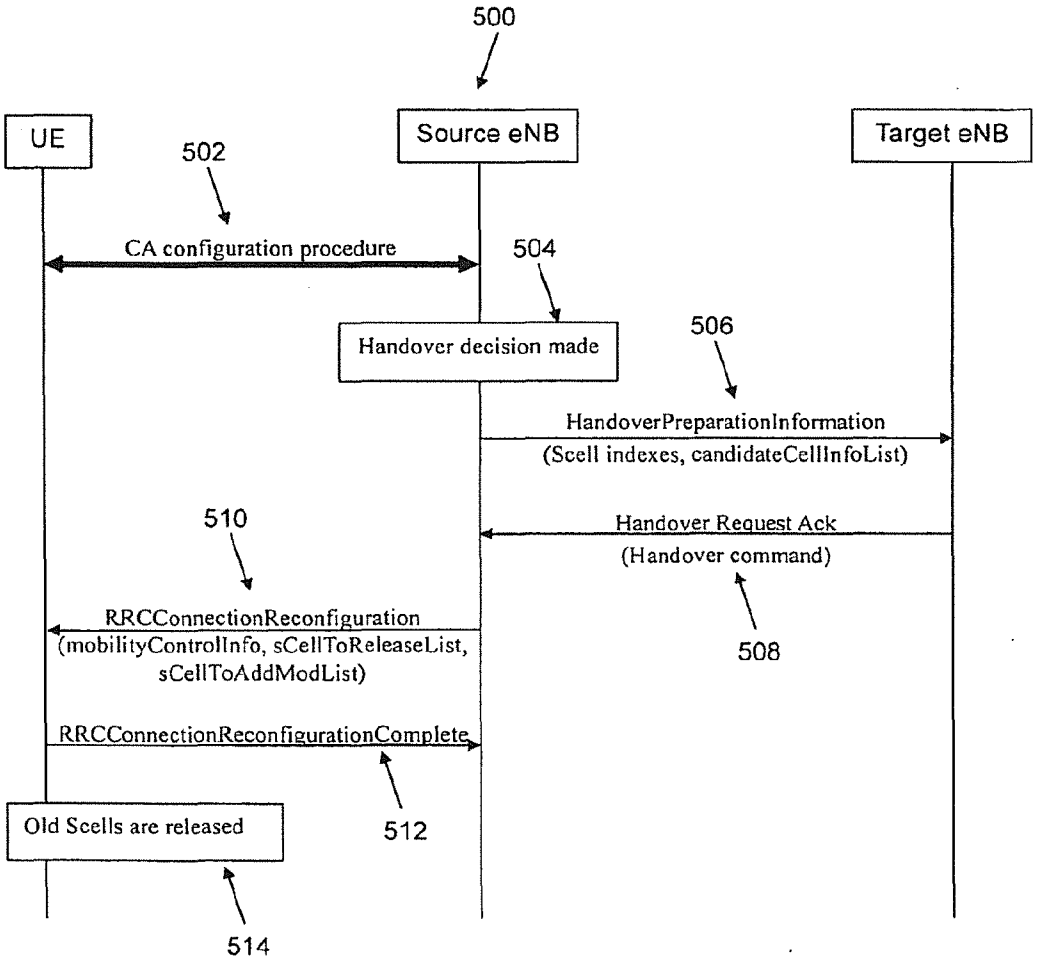



FIG. 6



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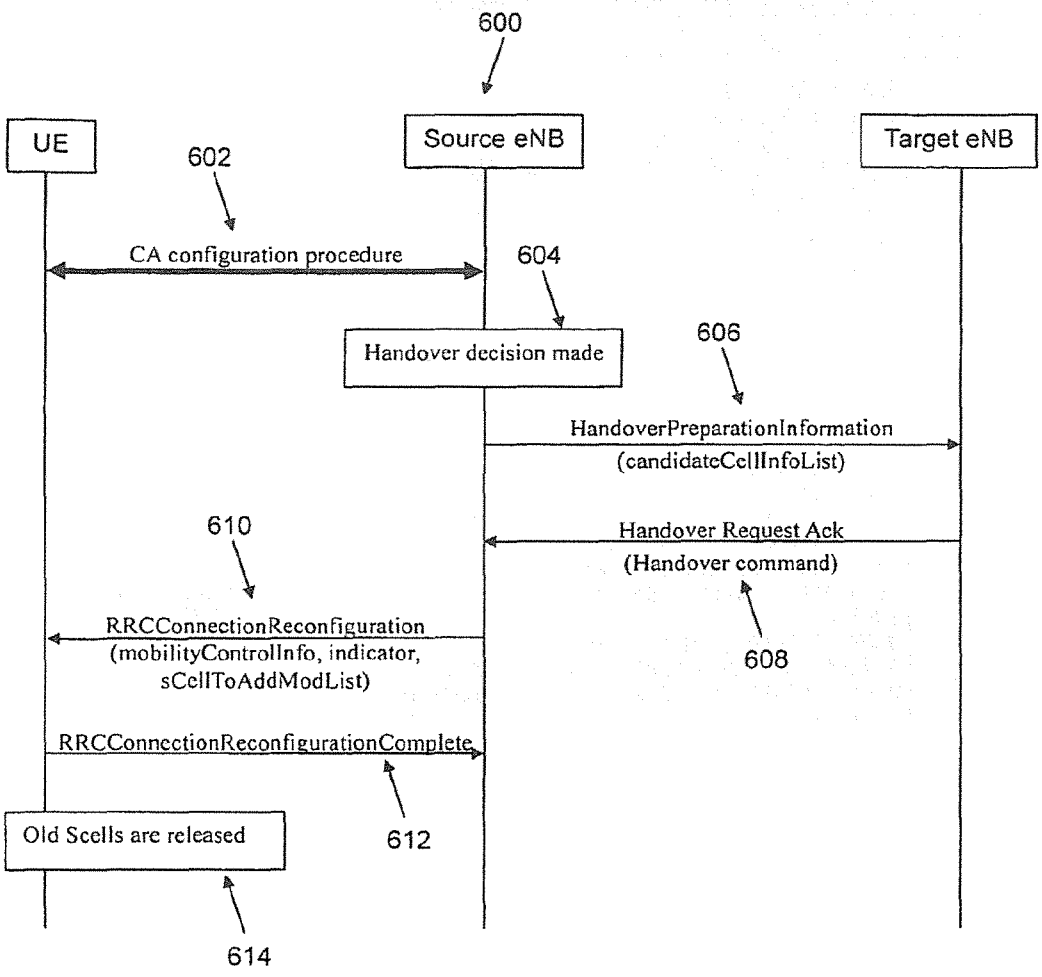



FIG. 7



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# EUROPEAN SEARCH REPORT

Application Number
EP 11 00 8725

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
| Y | RAPPORTEUR (SAMSUNG): "Introduction of Carrier Aggregation", 3GPP DRAFT; R2-105507 CR TO 36331 ON INTRODUCTION OF CARRIER AGGREGATION, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG2, no. Xi'an; 20101011, 4 October 2010 (2010-10-04), XP050452542, [retrieved on 2010-10-04] | 1-6,12 | INV. H04W36/00 |
| A | * summary of change * * section 5.3.5.4 * * section 5.3.10.3a * | 7-11 | |
| Y | "3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2 (Release 10)", 3GPP STANDARD; 3GPP TS 36.300, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, no. V10.0.0, 17 June 2010 (2010-06-17), pages 1-183, XP050441905, [retrieved on 2010-06-17] | 1-6,12 | TECHNICAL FIELDS SEARCHED (IPC) H04W |
| A | * figures 19.2.2.5.6-1 * | 7-11 | |

-/--

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| The Hague | 23 January 2012 | Marín Saldaña, I |

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)



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IPR2024-00991

BNSDOCID: <EP_____2448325A1_I_>

Europäisches Patentamt
European Patent Office
Office européen des brevets

# EUROPEAN SEARCH REPORT

Application Number
EP 11 00 8725

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
|---|---|---|---|
| A | ALCATEL-LUCENT ET AL: "Delta Configuration for reconfiguration and handover", 3GPP DRAFT; [41] R2-104790 DELTACONFIG_V05, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG2, no. Madrid, Spain; 20100823, 17 August 2010 (2010-08-17), XP050452038, [retrieved on 2010-08-17] * section 2.1.2 * * section 2.2 * | 1-12 | |
| A | NOKIA SIEMENS NETWORKS (RAPPORTEUR): "Stage 2 description of Carrier Aggregation", 3GPP DRAFT; 36300_CR0230R3-(REL-10)_R2-103427 ON CA STAGE 2, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. RAN WG2, no. Montreal, Canada; 20100510, 21 May 2010 (2010-05-21), XP050423504, [retrieved on 2010-05-21] * section X.3.2 * | 1-12 | TECHNICAL FIELDS SEARCHED (IPC) |

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| The Hague | 23 January 2012 | Marín Saldaña, I |

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)



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IPR2024-00991

BNSDOCID: <EP_____2448325A1_I_>

## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


- US 61409416 A **[0001]**




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IPR2024-00991

BNSDOCID: <EP_____2448325A1_I_>

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 20450150 |
| **Application Number:** | 14167405 |
| **International Application Number:** | |
| **Confirmation Number:** | 6471 |
| **Title of Invention:** | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| **First Named Inventor/Applicant Name:** | Yu-Hsuan Guo |
| **Customer Number:** | 106622 |
| **Filer:** | Sang N. Dang/Sandy Kim |
| **Filer Authorized By:** | Sang N. Dang |
| **Attorney Docket Number:** | 1291-235.101 |
| **Receipt Date:** | 17-OCT-2014 |
| **Filing Date:** | 29-JAN-2014 |
| **Time Stamp:** | 16:23:56 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | no |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Information Disclosure Statement (IDS) Form (SB08) | 1291-235-101--IDSasFiled10172014.pdf | 54998<br>ba95734b8a7a604b722fa131e45e1c0322bf0d48 | no | 2 |

| | |
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| **Warnings:** | |
| **Information:** | |

| This is not an USPTO supplied IDS fillable form | | | | | |
|---|---|---|---|---|---|
| 2 | Foreign Reference | EP2448325A1v2.pdf | 2819978<br>2f0e0ff7a5ebe84e6dda43d7d52a4291498fbfba | no | 16 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 3 | Non Patent Literature | 3GPPTS36321v2.pdf | 10853146<br>4d6544a74ea8830923f7ca5e8dec90990699ed01 | no | 56 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 4 | Non Patent Literature | EPSearchreport-20140730v2.pdf | 1317999<br>d4447de930270fa2da1c5dd435f366598b83023f | no | 7 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| | | **Total Files Size (in bytes):** | 15046121 | | |

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**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

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# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

**( Not for submission under 37 CFR 1.99)**

| | |
|---|---|
| Application Number | 14167405 |
| Filing Date | 2014-01-29 |
| First Named Inventor | Yu-Hsuan Guo |
| Art Unit | 2464 |
| Examiner Name | NGO, RICKY QUOC |
| Attorney Docket Number | 1291-235.101 |

**U.S.PATENTS**

| Examiner Initial* | Cite No | Patent Number | Kind Code[1] | Issue Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|---|
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**U.S.PATENT APPLICATION PUBLICATIONS**

| Examiner Initial* | Cite No | Publication Number | Kind Code[1] | Publication Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear |
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**FOREIGN PATENT DOCUMENTS**

| Examiner Initial* | Cite No | Foreign Document Number[3] | Country Code[2] ¡ | Kind Code[4] | Publication Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear | T[5] |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2014022895 | JP | A | 2014-02-03 | Sharpp Corp. | | ☐ |
| | 2 | 1020120046692 | KR | A | 2012-05-10 | Innovative Sonic Corporation | | ☐ |

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**NON-PATENT LITERATURE DOCUMENTS**

# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

( **Not for submission under 37 CFR 1.99**)

| | |
|---|---|
| Application Number | 14167405 |
| Filing Date | 2014-01-29 |
| First Named Inventor | Yu-Hsuan Guo |
| Art Unit | 2464 |
| Examiner Name | NGO, RICKY QUOC |
| Attorney Docket Number | 1291-235.101 |

| Examiner Initials* | Cite No | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published. | T[5] |
|---|---|---|---|
| | 1 | LTE-Advanced: An Operator Perspective | ☐ |
| | 2 | Office Action on corresponding JP Patent Application No. 2014-013920 dated January 6, 2015 | ☐ |
| | 3 | Office Action on corresponding KR Patent Application No. 10-2014-0009620 dated January 21, 2015 | ☐ |

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**EXAMINER SIGNATURE**

| Examiner Signature | | Date Considered | |
|---|---|---|---|

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.



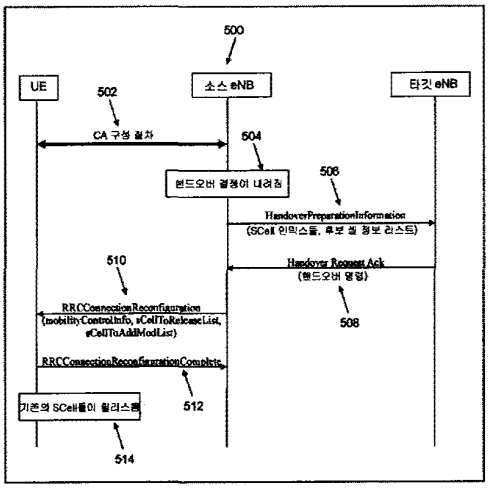
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**IPR2024-00991**

# 무선 통신 시스템에서 핸드오버시 세컨더리 셀 릴리스를 위한 방법 및 장치

Method and apparatus for secondary cell release during handover in a wireless communication system

| | |
|---|---|
| (51) Int. CL | H04W 76/00(2009.01) H04W 36/08(2009.01) |
| (21) Application No.(Date) | 1020110112048 (2011.10.31) |
| (71) Applicant | Innovative Sonic Corporation |
| (11) Registration No.(Date) | 1014432350000 (2014.09.16) |
| (65) Unex. Pub. No.(Date) | 1020120046692 (2012.05.10) |
| (11) Publication No.(Date) | (2014.09.19) |
| (86) Int'l Application No.(Date) | |
| (87) Int'l Unex. Pub. No.(Date) | |
| (30) Priority info.<br>(Country / No. / Date) | 미국(US) \| 61/409,416 \| 2010.11.02 |
| Final administrative status | Decision to grant after reexamination |
| Registration Status | Registered |
| Trial Info | |
| Kind/Right of Org. Application | New Application / |
| Right of Org. Application No.(Date) | |
| Related Application No. | |
| Request for an examination(Date) | Y(2011.10.31) |
| Number of examination claims | 12 |

Zoom




In method and apparatus for the secondary cell (Secondary Cell: SCell) release in the user equipment (User Equipment: UE) hand over is the user equipment (UE) in hand over, it implies to include the indicator by the target eNB in the handover command for the user equipment (UE) in order to identify whether or not of the paper to release comprised all SCells it includes the information by



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the source eNB in the hand over ready information (HandoverPreparationInformation) message for the target eNB in order to control the SCell release.



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(19) 대한민국특허청(KR)
(12) 공개특허공보(A)

(11) 공개번호 10-2012-0046692
(43) 공개일자 2012년05월10일

(51) 국제특허분류(Int. Cl.)
*H04W 36/08* (2009.01) *H04W 76/00* (2009.01)
(21) 출원번호 10-2011-0112048
(22) 출원일자 2011년10월31일
심사청구일자 2011년10월31일
(30) 우선권주장
61/409,416 2010년11월02일 미국(US)

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(74) 대리인
**리앤목특허법인**

전체 청구항 수 : 총 22 항

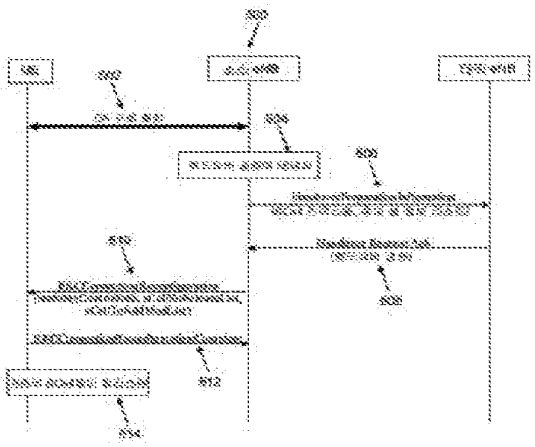
(54) 발명의 명칭 **무선 통신 시스템에서 핸드오버시 세컨더리 셀 릴리스를 위한 방법 및 장치**

(57) 요 약

사용자 장비(User Equipment; UE) 핸드오버시 세컨더리 셀(Secondary Cell; SCell) 릴리스를 위한 방법 및 장치는,

핸드오버시 상기 사용자 장비(UE)에서 SCell 릴리스를 제어하도록 타깃 eNB를 위한 *핸드오버 준비 정보(HandoverPreparationInformation)* 메시지에 소스 eNB에 의한 정보를 포함시키는 것; 또는 구성된 모든 SCell들을 릴리스해야 할 지의 여부를 식별하도록 상기 사용자 장비(UE)를 위한 핸드오버 명령에 타깃 eNB에 의한 표시자를 포함시키는 것;을 포함한다.

*대 표 도* - 도6





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*특허청구의 범위*

**청구항 1**

핸드오버시 세컨더리 셀(Secondary Cell; SCell) 릴리스를 위한 방법에 있어서,

소스 eNB에 의해 사용자 장비(UE)에 적어도 하나의 SCell을 구성하는 것;과

핸드오버시 상기 사용자 장비(UE)에서 SCell 릴리스를 제어하도록 타깃 eNB를 위한 *핸드오버 준비 정보(HandoverPreparationInformation)* 메시지에 상기 소스 eNB에 의한 정보를 포함시키는 것;을 포함함을 특징으로 하는, 핸드오버시 SCell 릴리스를 위한 방법.

**청구항 2**

제1항에 있어서, 상기 정보는 상기 사용자 장비(UE)에 구성된 모든 SCell들의 SCell 인덱스들을 표시함으로써, 상기 타깃 eNB가 상기 UE에 구성된 모든 SCell들을 갖는 *sCellToReleaseList*를 핸드오버 명령에 포함시키는 것을 허용함을 특징으로 하는, 핸드오버시 SCell 릴리스를 위한 방법.

**청구항 3**

제2항에 있어서, 상기 핸드오버 명령은 *이동성 제어 정보(mobilityControlInfo)*가 포함된 *RRC 접속 재구성(RRCConnectionReconfiguration)* 메시지에 해당함을 특징으로 하는, 핸드오버시 SCell 릴리스를 위한 방법.

**청구항 4**

제3항에 있어서, 상기 *RRC 접속 재구성(RRCConnectionReconfiguration)* 메시지는 핸드오버 절차를 개시하도록 상기 소스 eNB로부터 상기 사용자 장비(UE)로 송신됨을 특징으로 하는, 핸드오버시 SCell 릴리스를 위한 방법.

**청구항 5**

제1항에 있어서, 상기 *핸드오버 준비 정보(HandoverPreparationInformation)* 메시지는 핸드오버를 요구하도록 상기 소스 eNB로부터 상기 타깃 eNB로 송신됨을 특징으로 하는, 핸드오버시 SCell 릴리스를 위한 방법.

**청구항 6**

제1항에 있어서, 상기 핸드오버는 인터-eNB 핸드오버임을 특징으로 하는, 핸드오버시 SCell 릴리스를 위한 방법.

**청구항 7**

핸드오버시 세컨더리 셀(Secondary Cell; SCell) 릴리스를 위한 방법에 있어서,

소스 eNB에 의해 사용자 장비(UE)에 적어도 하나의 SCell을 구성하는 것;과

구성된 모든 SCell들을 릴리스해야 할 지의 여부를 식별하도록 상기 사용자 장비(UE)를 위한 핸드오버 명령에 타깃 eNB에 의한 표시자를 포함시키는 것;을 포함함을 특징으로 하는, 핸드오버시 SCell 릴리스를 위한 방법.

**청구항 8**

제7항에 있어서, 상기 표시자는 상기 핸드오버가 인트라-eNB 핸드오버 인지 아니면 인터-eNB 핸드오버 인지를 표시함을 특징으로 하는, 핸드오버시 SCell 릴리스를 위한 방법.

**청구항 9**

제8항에 있어서, 상기 사용자 장비(UE)는 상기 핸드오버가 인터-eNB 핸드오버일 경우에 구성된 모든 SCell들을 릴리스함을 특징으로 하는, 핸드오버시 SCell 릴리스를 위한 방법.

**청구항 10**

제7항에 있어서, 상기 핸드오버 명령은 *이동성 제어 정보(mobilityControlInfo)*가 포함된 *RRC 접속 재구성*



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*(RRCConnectionReconfiguration)* 메시지에 해당함을 특징으로 하는, 핸드오버시 SCell 릴리스를 위한 방법.

**청구항 11**

제10항에 있어서, 상기 *RRC 접속 재구성(RRCConnectionReconfiguration)* 메시지는 핸드오버 절차를 개시하도록 상기 소스 eNB로부터 상기 사용자 장비(UE)로 송신됨을 특징으로 하는, 핸드오버시 SCell 릴리스를 위한 방법.

**청구항 12**

무선 통신 시스템에서 사용하기 위한 통신 장치에 있어서,

상기 통신 장치는,

제어 회로;

상기 제어 회로에 설치된 프로세서; 및

상기 제어 회로에 설치된 메모리로서, 상기 프로세서에 연결된 메모리;

를 포함하며,

상기 프로세서는,

상기 메모리에 저장된 프로그램 코드를 실행하도록 구성되고,

상기 프로그램 코드는,

소스 eNB에 의해 사용자 장비(UE)에 적어도 하나의 SCell을 구성하는 프로그램 코드; 및

핸드오버시 상기 사용자 장비(UE)에서 SCell 릴리스를 제어하도록 타깃 eNB를 위한 *핸드오버 준비 정보(HandoverPreparationInformation)* 메시지에 상기 소스 eNB에 의한 정보를 포함시키는 프로그램 코드;를 포함함을 특징으로 하는, 통신 장치.

**청구항 13**

제12항에 있어서, 상기 정보는 상기 사용자 장비(UE)에 구성된 모든 SCell들의 SCell 인덱스들을 표시함으로써, 상기 타깃 eNB가 상기 UE에 구성된 모든 SCell들을 갖는 *sCellToReleaseList*를 핸드오버 명령에 포함시키는 것을 허용함을 특징으로 하는, 통신 장치.

**청구항 14**

제13항에 있어서, 상기 핸드오버 명령은 *이동성 제어 정보(mobilityControlInfo)*가 포함된 *RRC 접속 재구성(RRCConnectionReconfiguration)* 메시지에 해당함을 특징으로 하는, 통신 장치.

**청구항 15**

제14항에서, 상기 *RRC 접속 재구성(RRCConnectionReconfiguration)* 메시지는 핸드오버 절차를 개시하도록 상기 소스 eNB로부터 상기 사용자 장비(UE)로 송신됨을 특징으로 하는, 통신 장치.

**청구항 16**

제12항에 있어서, 상기 *핸드오버 준비 정보(HandoverPreparationInformation)* 메시지는 핸드오버를 요구하도록 상기 소스 eNB로부터 상기 타깃 eNB로 송신됨을 특징으로 하는, 통신 장치.

**청구항 17**

제12항에 있어서, 상기 핸드오버는 인터-eNB 핸드오버임을 특징으로 하는, 통신 장치.

**청구항 18**

무선 통신 시스템에서 사용하기 위한 통신 장치에 있어서,

상기 통신 장치는,



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제어 회로;

상기 제어 회로에 설치된 프로세서; 및

상기 제어 회로에 설치된 메모리로서, 상기 프로세서에 연결된 메모리;

를 포함하며,

상기 프로세서는,

상기 메모리에 저장된 프로그램 코드를 실행하도록 구성되고,

상기 프로그램 코드는,

소스 eNB에 의해 사용자 장비(UE)에 적어도 하나의 SCell을 구성하는 프로그램 코드; 및

구성된 모든 SCell들을 릴리스해야 할 지의 여부를 식별하도록 상기 사용자 장비(UE)를 위한 핸드오버 명령에 타깃 eNB에 의한 표시자를 포함시키는 프로그램 코드;를 포함함을 특징으로 하는, 통신 장치.

**청구항 19**

제18항에 있어서, 상기 표시자는 상기 핸드오버가 인트라-eNB 핸드오버 인지 아니면 인터-eNB 핸드오버 인지를 표시함을 특징으로 하는, 통신 장치.

**청구항 20**

제19항에 있어서, 상기 사용자 장비(UE)는 상기 핸드오버가 인터-eNB 핸드오버일 경우에 구성된 모든 SCell들을 릴리스함을 특징으로 하는, 통신 장치.

**청구항 21**

제18항에 있어서, 상기 핸드오버 명령은 *이동성 제어 정보(mobilityControlInfo)*가 포함된 *RRC 접속 재구성(RRCConnectionReconfiguration)* 메시지에 해당함을 특징으로 하는, 통신 장치.

**청구항 22**

제21항에 있어서, 상기 *RRC 접속 재구성(RRCConnectionReconfiguration)* 메시지는 핸드오버 절차를 개시하도록 상기 소스 eNB로부터 상기 사용자 장비(UE)로 송신됨을 특징으로 하는, 통신 장치.

## *명 세 서*

### *기 술 분 야*

[0001] 관련 출원들의 전후참조

[0002] 본원은 2010년 11월 2일자로 출원된 미국 임시 특허출원 제61/409,416호에 기초한 우선권을 주장한 것이며, 상기 미국 임시 특허출원의 전체 개시내용은 본원에 참조병합된다.

[0003] 기술분야

[0004] 본원의 개시내용은 일반적으로 기술하면 무선 통신 네트워크들에 관한 것이며, 좀더 구체적으로 기술하면, 무선 통신 시스템에서 핸드오버시 세컨더리 셀 릴리스(Secondary cell release; SCell 릴리스)를 위한 방법 및 장치에 관한 것이다.

### *배 경 기 술*

[0005] 이동 통신 장치들로 대량의 데이터를 전달하고 이동 통신 장치들로부터 대량의 데이터를 전달하는 것에 대한 요구가 급속히 늘어남에 따라, 전형적인 이동 음성 통신 네트워크들은 인터넷 프로토콜(Internet Protocol; IP) 데이터 패킷들을 가지고 통신하는 네트워크들로 진화하고 있다. 그러한 IP 데이터 패킷 통신은 이동 통신 장치들의 사용자들에게 IP를 통한 음성, 멀티미디어, 멀티캐스트 및 주문형(on-demand) 통신 서비스들을 제공할 수 있다.

[0006] 표준화가 현재 진행되고 있는 전형적인 네트워크 구조는 진화된 범용 지상파 무선 액세스 네트워크(Evolved



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Universal Terrestrial Radio Access Network: E-UTRAN)이다. E-UTRAN 시스템은 위에서 주지한 IP를 통한 음성 및 멀티미디어 서비스들을 실현하기 위해 높은 데이터 처리량을 제공할 수 있다. E-UTRAN 시스템의 표준화 작업은 현재 3GPP 표준화 기구에 의해 수행되고 있다. 따라서, 3GPP 표준의 현재 본문에 대한 수정안들이 현재 제출되고 있으며 3GPP 표준을 진화 및 완성하는데 고려되고 있다.

## 발명의 내용

### 해결하려는 과제

[0007] 본 발명의 목적은 무선 통신 시스템에서 핸드오버시 세컨더리 셀 릴리스를 위한 개선된 기법을 제공하는 것이다.

### 과제의 해결 수단

[0008] 한 실시태양에 의하면, 핸드오버시 세컨더리 셀(Secondary Cell: SCell) 릴리스를 위한 방법은 핸드오버시 사용자 장비(User Equipment: UE)에서 SCell 릴리스를 제어하도록 소스 eNB에 의한 정보를 타깃 eNB를 위한 *핸드오버 준비 정보(HandoverPreparationInformation)* 메시지에 포함시키는 것을 포함한다.

[0009] 다른 한 실시태양에 의하면, 핸드오버시 세컨더리 셀(SCell) 릴리스를 위한 방법은 구성된 모든 SCell들을 릴리스해야 할 지의 여부를 식별하도록 타깃 eNB에 의한 표시자(indicator)를 사용자 장비(UE)를 위한 핸드오버 명령에 포함시키는 것을 포함한다.

### 발명의 효과

[0010] 본 발명은, 인터-eNB 핸드오버 절차시 사용자 장비(UE)에서 SCell 릴리스를 제어하도록 하는 정보를 소스 eNB에 의해 타깃 eNB를 위한 *HandoverPreparationInformation* 메시지에 포함시킴으로써, 핸드오버시 시그널링 오버헤드를 회피한다.

[0011] 또한, 본 발명은, 핸드오버가 인트라-eNB 인지 아니면 인터-eNB 인지를 식별하도록 하는 표시자를 타깃 eNB에 의해 사용자 장비(UE)를 위한 *RRC 접속 재구성(RRCConnectionReconfiguration)* 메시지에 포함시킴으로써, 핸드오버시 시그널링 오버헤드를 회피한다.

### 도면의 간단한 설명

[0012] 도 1은 한 전형적인 실시예에 따른 무선 통신 시스템을 보여주는 도면이다.

도 2는 한 전형적인 실시예에 따른 도 1의 무선 통신 시스템의 사용자 평면 프로토콜 스택을 보여주는 도면이다.

도 3은 한 전형적인 실시예에 따른 도 1의 무선 통신 시스템의 제어 평면 프로토콜 스택을 보여주는 도면이다.

도 4는 한 전형적인 실시예에 따른 (또한 액세스 네트워크로서 알려져 있는) 송신기 시스템 및 (또한 사용자 장비 또는 UE로서 알려져 있는) 수신기 시스템을 블록 다이어그램으로 보여주는 도면이다.

도 5는 한 전형적인 실시예에 따른 통신 장치를 기능적인 블록 다이어그램으로 보여주는 도면이다.

도 6은 한 전형적인 실시예에 따른, 핸드오버시 세컨더리 셀(SCell) 릴리스를 위한 방법을 보여주는 도면이다.

도 7은 한 전형적인 실시예에 따른, 핸드오버시 SCell 릴리스를 위한 방법을 보여주는 도면이다.

### 발명을 실시하기 위한 구체적인 내용

[0013] 이하에서 설명되는 전형적인 무선 통신 시스템들 및 장치들은 브로드캐스트 서비스를 지원하는 무선 통신 시스템을 채용한 것이다. 무선 통신 시스템들은, 음성, 데이터 등등과 같은 다양한 통신 타입들을 제공하도록 널리 포진되어 있다. 이러한 시스템들은 코드 분할 다중 액세스(code division multiple access: CDMA), 시간 분할 다중 액세스(time division multiple access: TDMA), 직교 주파수 분할 다중 액세스(orthogonal frequency division multiple access: OFDMA), 3GPP LTE(3GPP Long Term Evolution: 3GPP 장기 진화) 무선 액세스, 3GPP LTE-A(3GPP Long Term Evolution Advanced: 3GPP 장기 진화 고급), 3GPP2 UMB(3GPP2 Ultra Mobile Broadband: 3GPP2 울트라 모바일 브로드밴드), 와이맥스(Wimax), 또는 기타 변조 기법들을 기반으로 하며 이루어질 수



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있다.

[0014] 특히, 이하에서 설명되는 전형적인 무선 통신 시스템들 및 장치들은, 하나 이상의 표준들, 예컨대 문헌 번호들 TS36.331-940, TS36.300-950, 및 R2-105971을 포함하는, 본원에서 3GPP로서 언급되는 "3세대 파트너십 프로젝트(3rd Generation Partnership Project)"로 불리는 컨소시엄에 의해 제안된 표준을 지원하도록 설계될 수 있다, 위에 리스트된 표준들 및 문헌들은 이로써 본원에 명시적으로 합체된다.

[0015] 한 전형적인 실시예에 따른 도 1에는 이동 통신 시스템으로서 진화된 범용 지상파 무선 액세스 네트워크(Evolved Universal Terrestrial Radio Access Network; E-UTRAN)(100)의 전형적인 네트워크 구조가 도시되어 있다. E-UTRAN 시스템은 또한 LTE(Long-Term Evolution; 장기 진화) 시스템 또는 LTE-A(Long-Term Evolution Advanced; 장기 진화 고급)로서 언급될 수 있다. 상기 E-UTRAN은, 이동 음성 통신 네트워크에서 기지국과 유사한 기능을 수행하는, eNode B 또는 eNB(102)를 포함하는 것이 일반적이다. 각각의 eNB는 X2 인터페이스들에 의해 접속된다. 상기 eNB들은 무선 인터페이스를 통해 단말기들 또는 사용자 장비(UE)(104)에 접속되며 S1 인터페이스들을 통해 이동성 관리 엔티티(Mobility Management Entity; MME)를 또는 서빙 게이트웨이(Serving Gateway; S-GW)(106)에 접속된다.

[0016] 도 2 및 도 3을 참조하면, LTE 시스템은 한 전형적인 실시예에 따라 (도 3에 도시된) 제어 평면(108) 프로토콜 스택 및 (도 2에 도시된) 사용자 평면(110) 프로토콜 스택으로 나뉘어진다. 상기 제어 평면은 UE 및 eNB 간에 제어 신호를 교환하는 기능을 수행하고 상기 사용자 평면은 UE 및 eNB 간에 사용자 데이터를 전송하는 기능을 수행한다. 도 2 및 도 3을 참조하면, 상기 제어 평면 및 상기 사용자 평면 모두는 패킷 데이터 수렴 프로토콜(Packet Data Convergence Protocol; PDCP) 계층, 무선 링크 제어(Radio Link Control; RLC) 계층, 미디어 액세스 제어(Medium Access Control; MAC) 계층 및 물리(physical; PHY) 계층을 포함한다. 상기 제어 평면은 무선 자원 제어(Radio Resource Control; RRC) 계층을 추가로 포함한다. 상기 제어 평면은 또한 네트워크 액세스 스트라텀(Network Access Stratum; NAS) 계층을 포함하며, 상기 NAS 계층은 특히 진화된 패킷 시스템(Evolved Packet System; EPS) 베어러 관리, 인증, 및 보안 관리를 포함하는 기능을 수행한다.

[0017] 상기 PHY 계층은 무선 전송 기술을 사용하여 정보 전송 서비스를 제공하며 개방 시스템 상호접속(Open System Intercomection; OSI) 계층의 제1 계층에 해당한다. 상기 PHY 계층은 전송 채널을 통해 상기 MAC 계층에 접속된다. 상기 MAC 계층 및 상기 PHY 계층 간의 데이터 교환은 상기 전송 채널을 통해 수행된다. 상기 전송 채널은 특정 데이터가 상기 PHY 계층에서 처리되게 하는 스킴(scheme)에 의해 정의된다.

[0018] 상기 MAC 계층은, RLC 계층으로부터 논리 채널을 통해 전송된 데이터를 적절한 전송 채널을 통해 상기 PHY 계층으로 송신하는 기능을 수행하고 상기 PHY 계층으로부터 전송 채널을 통해 전송된 데이터를 적절한 논리 채널을 통해 상기 RLC 계층으로 송신하는 기능을 부가적으로 수행한다. 더욱이, 상기 MAC 계층은, 상기 논리 채널을 통해 수신된 데이터 내에 추가 정보를 삽입하고, 상기 전송 채널을 통해 수신된 데이터로부터 상기 삽입된 추가 정보를 분석하여 적절한 동작을 수행하며, 그리고 랜덤 액세스 동작을 제어한다.

[0019] 상기 MAC 계층 및 상기 RLC 계층은 논리 채널을 통해 서로 접속된다. 상기 RLC 계층은, 논리 채널의 설정 및 설정해제(release; 릴리스)를 제어하며 승인 모드(acknowledged mode; AM) 동작 모드, 비승인 모드(unacknowledged mode; UM) 동작 모드 및 투명 모드(transparent mode; TM) 동작 모드 중 하나로 동작가능하다. 상기 RLC 계층은 상위 계층으로부터 수신된 서비스 데이터 단위(Service Data Unit; SDU)를 적절한 크기로 분할하고 이와는 반대로 하위 계층으로부터 수신된 서비스 데이터 단위(SDU)를 적절한 크기로 분할하는 것이 일반적이다. 더욱이, 상기 RLC 계층은 자동 재송 요구(automatic retransmission request; ARQ)를 통한 오류 정정 기능을 맡고 있다.

[0020] 상기 PDCP 계층은, 상기 RLC 계층 상에 배치되어 있고 IP 패킷 형태로 전송된 데이터의 헤더 압축 기능 및 심지어는 UE의 이동으로 인해 서비스를 제공하는 eNB가 바뀌게 될 때에도 손실 없이 데이터를 전송하는 기능을 수행한다.

[0021] 상기 RRC 계층은 단지 상기 제어 평면에만 정의되어 있다. 상기 RRC 계층은 무선 베어러(Radio Bearer; RB)들의 확립, 재-구성 및 해제와 관련하여 논리 채널들, 전송 채널들 및 물리 채널들을 제어한다. 여기서, 상기 RB는 상기 단말기 및 상기 E-UTRAN 간의 데이터 전송을 위한 OSI 계층의 제2 계층에 의해 제공되는 서비스를 나타낸다. 만약 RRC 접속이 UE의 RRC 계층 및 상기 무선 네트워크의 RRC 계층 간에 확립되어 있다면, UE는 RRC 접속 모드에 있게 된다. 만약 RRC 접속이 UE의 RRC 계층 및 상기 무선 네트워크의 RRC 계층 간에 확립되어 있지 않다면, UE는 RRC 유휴 모드에 있게 된다.



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[0022] 도 4는 MIMO 시스템(200)에 내재하는 (또한 액세스 네트워크로서 알려져 있는) 송신기 시스템(210) 및 (또한 액세스 단말기 또는 UE라고 알려져 있는) 수신기 시스템(250)의 전형적인 실시예를 간략하게 보여주는 블록 다이어그램이다. 상기 송신기 시스템(210)에서, 다수의 데이터 스트림들에 대한 트래픽 데이터는 데이터 소스(212)로부터 송신(transmit; TX) 데이터 프로세서(214)로 제공된다.

[0023] 한 실시예에서는, 각각의 데이터 스트림이 개별 송신 안테나를 통해 전송된다. TX 데이터 프로세서(214)는 부호화된 데이터를 제공하도록 그러한 데이터 스트림에 대해 선택된 특정의 부호화 스킴에 기반하여 각각의 데이터 스트림에 대한 트래픽 데이터를 포맷, 부호화, 및 인터리브(interleave)한다.

[0024] 각각의 데이터 스트림에 대한 부호화된 데이터는 OFDM(orthogonal frequency division multiplexing; 직교 주파수 분할 다중) 기법들을 사용하여 파일롯 데이터와 다중화될 수 있다. 상기 파일롯 데이터는, 공지된 방식으로 처리되는 공지된 데이터 패턴인 것이 전형적이며 상기 수신기 시스템에서 채널 응답을 추정하는데 사용될 수 있다. 각각의 데이터 스트림에 대한 다중화된 파일롯 및 부호화된 데이터는 그후에, 변조 심볼들을 제공하도록 그러한 데이터 스트림에 대하여 선택된 특정의 변조 스킴(예컨대, BPSK(binary phase shift keying; 이진 위상 편이 변조), QPSK(quadrature phase shift keying; 직교 위상 편이 변조), M-PSK(m-ary phase shift keying; m진 위상 편이 변조), 또는 M-QAM(m-ary quadrature amplitude modulation; m진 직교 진폭 변조))에 기반하여 변조(즉, 심볼 매핑(symbol mapping))된다. 각각의 데이터 스트림에 대한 데이터 비율, 부호화, 및 변조는 프로세서(230)에 의해 수행되는 명령어들에 의해 결정될 수 있다.

[0025] 모든 데이터 스트림들에 대한 변조 심볼들은 그후에, TX MIMO 프로세서(220)에 제공되는데, 상기 TX MIMO 프로세서(220)는 (예컨대, OFDM을 위해) 상기 변조 심볼들을 부가적으로 처리할 수 있다. 상기 TX MIMO 프로세서(220)는 그후에, $N_T$ 변조 심볼 스트림들을 $N_T$ 송신기(TMTR)들(222a 내지 222t)에 제공한다. 특정 실시예들에서는, TX MIMO 프로세서(220)는, 빔형성(beam forming) 가중치들을, 상기 데이터 스트림들의 심볼들에, 그리고 상기 심볼이 전송되고 있는 안테나에 적용한다.

[0026] 각각의 송신기(222)는, 하나 이상의 아날로그 신호들을 제공하도록 개별 심볼 스트림을 수신 및 처리하고, MIMO 채널을 통한 전송에 적합한 변조 신호를 제공하도록 상기 아날로그 신호들을 부가적으로 컨디셔닝(conditioning)(예컨대, 증폭, 필터링, 및 상향 변환(up-conversion))한다. 송신기들(222a 내지 222t)로부터의 $N_T$ 변조 신호들은 그후에, $N_T$ 안테나들(224a 내지 224t)로부터 각각 전송된다.

[0027] 수신기 시스템(250)에서는, 상기 전송된 변조 신호들은 $N_R$ 안테나들(252a 내지 252r)에 의해 수신되고 각각의 안테나(252)로부터의 상기 수신된 신호는 개별 수신기(RCVR)(254a 내지 254r)에 제공된다. 각각의 수신기(254)는 개별 수신 신호를 컨디셔닝(예컨대, 필터링, 증폭 및 하향 변환(down-conversion))하고, 샘플들을 제공하도록 상기 컨디셔닝된 신호를 디지털화하며, 그리고 상응하는 "수신된" 심볼 스트림을 제공하도록 상기 샘플들을 부가적으로 처리한다.

[0028] RX 데이터 프로세서(260)는 그후에, $N_R$ "검출된" 심볼 스트림들을 제공하도록 특정의 수신기 처리 기법에 기반하여 $N_R$ 수신기들(245)로부터 $N_R$ 수신된 심볼 스트림들을 수신 및 처리한다. 상기 RX 데이터 프로세서(260)는 그후에, 상기 데이터 스트림에 대한 트래픽 데이터를 복구하도록 각각의 검출된 심볼 스트림을 복조, 디인터리브(deinterleave) 및 복호화한다. RX 데이터 프로세서(260)에 의한 처리는 송신기 시스템(210)에서의 TX MIMO 프로세서(220) 및 TX 데이터 프로세서(214)에 의해 수행되는 것과는 상보적(complementary)이다.

[0029] 프로세서(270)는 어떤 사전 부호화(pre-coding) 매트릭스를 사용해야 할지를 주기적으로 판단한다(이하에서 논의됨). 프로세서(270)는 매트릭스 인덱스 부분 및 랭크(rank) 값 부분을 포함하는 역링크(reverse link) 메시지를 공식화한다.

[0030] 상기 역링크 메시지는 통신 링크 및/또는 수신된 데이터 스트림에 관한 다양한 타입의 정보를 포함할 수 있다. 상기 역링크 메시지는 그후에, TX 데이터 프로세서(238)에 의해 처리되는데, 상기 TX 데이터 프로세서(238)는 또한 데이터 소스(236)로부터 다수의 데이터 스트림들에 대한 트래픽 데이터를 수신하며, 이러한 트래픽 데이터는 변조기(280)에 의해 변조되고, 송신기들(254a 내지 254r)에 의해 컨디셔닝되며, 그리고 송신기 시스템(210)으로 다시 전송된다.

[0031] 송신기 시스템(210)에서는, 수신기 시스템(250)으로부터의 변조된 신호들이 안테나(224)에 의해 수신되고, 수신기들(222)에 의해 컨디셔닝되며, 복조기(240)에 의해 복조되고, 그리고 RX 데이터 프로세서(242)에 의해 처리됨으로써, 상기 수신기 시스템(250)에 의해 전송된 역링크 메시지가 추출되게 한다. 프로세서(230)는 그후에, 빔



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형성 가중치들을 결정하기 위해 어떤 사전 부호화 매트릭스를 사용해야 할 지를 판단한 다음에 상기 추출된 메시지를 처리한다.

[0032] 도 5를 참조하면, 이러한 도면에는 한 전형적인 실시예에 따른 변형적인 통신 장치가 기능적인 블록 다이어그램으로 간략하게 도시되어 있다. 무선 통신 시스템에서의 통신 장치(300)는 도 1에 도시된 UE(104)를 실현하기 위해 채용될 수 있으며, 상기 무선 통신 시스템은 상기 LTE 시스템, LTE-A 시스템 등등과 같은 것이 바람직하다. 상기 통신 장치(300)는 입력 장치(302), 출력 장치(304), 제어 회로(306), 중앙 처리 유닛(central processing unit; CPU)(308), 메모리(310), 프로그램 코드(312), 및 트랜시버(transceiver; 314)를 포함할 수 있다. 상기 프로그램 코드(312)는 애플리케이션 계층들, 및 상기 PHY 계층을 제외하고 위에서 논의된 바와 같은 제어 평면(108)의 계층들 및 사용자 평면(110)의 계층들을 포함한다. 상기 제어 회로(306)는 상기 CPU(308)를 통해 상기 메모리(310) 내의 프로그램 코드(312)를 실행함으로써 상기 통신 장치(300)의 동작을 제어한다. 상기 통신 장치(300)는 키보드 또는 키패드와 같은 입력 장치(302)를 통해 사용자에 의해 입력된 신호들을 수신할 수 있으며, 모니터 또는 스피커들과 같은 출력 장치(304)를 통해 이미지들 및 사운드들을 출력할 수 있다. 상기 트랜시버(314)는, 무선 신호들을 수신 및 전송함으로써, 무선 방식으로, 수신된 신호들을 상기 제어 회로(306)에 전달하고 상기 제어 회로(306)에 의해 생성된 신호들을 출력하는데 사용된다.

[0033] LTE 다운링크(DownLink; DL) 전송 스킴은 직교 주파수 분할 다중 액세스(Orthogonal Frequency Division Multiple Access; OFDMA)를 기반으로 하여 이루어지며, LTE 업링크(UpLink; UL) 전송 스킴은 단일-캐리어(Single-Carrier; SC) 이산 푸리에 변환(Discrete Fourier Transform; DFT)-확산 OFDMA(DFT-S-OFDMA) 또는 동등하게는 단일 캐리어 주파수 분할 다중 액세스(Single Carrier Frequency Division Multiple Access; SC-FDMA)를 기반으로 하여 이루어진다. 그러나, LTE-A(Long-Term Evolution Advanced; 장기 진화 고급)는 다운링크(DownLink; DL) 및 업링크(UpLink; UL) 방향들 모두에서 높은 대역폭 요건들을 충족하도록 설계되어 있다. 높은 대역폭 요건들을 제공하기 위해, LTE-A는 컴포넌트 캐리어 집성(component carrier aggregation)을 채용한다. 캐리어 집성(carrier aggregation; CA)에 대한 수신 및/또는 전송 능력들을 갖는 사용자 장비(UE)는 다수의 컴포넌트 캐리어(component carrier; CC)들을 통해 동시에 수신 및/또는 전송할 수 있다. 캐리어는 대역폭 및 중심 주파수에 의해 정의될 수 있다.

[0034] 캐리어 집성(CA) 동작들에 관련이 있는, 상기 물리 계층에서 사용되는 여러 물리 제어 채널들이 존재한다. 물리 다운링크 제어 채널(Physical Downlink Control Channel; PDCCH)은, 사용자 장비(UE)에게, 다운링크 공유 채널(DownLink Shared Channel; DL-SCH)에 관련된 하이브리드 자동 재송 요구(Hybrid Automatic Repeat Request; HARQ)에 관한, 페이징 채널(Paging Channel; PCH) 및 다운링크 공유 채널(DownLink Shared Channel; DL-SCH)의 자원 할당을 알려줄 수 있다. 상기 PDCCH는 상기 사용자 장비(UE)에게 업링크 전송의 자원 할당을 알려주는 업링크 스케줄링 그랜트(uplink scheduling grant)를 운반할 수 있다. 물리 제어 포맷 표시자 채널(Physical Control Format Indicator Channel; PCFICH)은 상기 사용자 장비(UE)에게 상기 PDCCH들용으로 사용되는 OFDM 심볼들의 개수를 알려주고 모든 서브프레임으로 전송된다. 물리 하이브리드 ARQ 표시자 채널(Physical Hybrid ARQ Indicator Channel; PHICH)은 업링크 전송들에 응답하여 HARQ ACK/NAK 신호들을 운반한다. 물리 업링크 제어 채널(Physical Uplink Control Channel; PUCCH)은 다운링크 전송, 스케줄링 요구 및 채널 품질 표시자(Channel Quality Indicator; CQI)에 응답하여 HARQ ACK/NAK 신호들과 같은 업링크 제어 정보를 운반한다. 물리 업링크 공유 채널(Physical Uplink Shared Channel; PUSCH)은 업링크 공유 채널(UpLink Shared Channel; UL-SCH)을 운반한다.

[0035] 캐리어들은 프라이머리 컴포넌트 캐리어(Primary Component Carrier; PCC) 및 세컨더리 컴포넌트 캐리어(Secondary Component Carrier; SCC)로 분할될 수 있다. 상기 프라이머리 컴포넌트 캐리어(PCC)는 일정하게 활성화되는 캐리어를 언급하며 상기 세컨더리 컴포넌트 캐리어(SCC)는 트래픽 상태에 따라 활성화 또는 비활성화될 수 있는 캐리어를 언급한다. 활성화(activation)가 의미하는 것은 트래픽 데이터의 전송 또는 수신이 수행될 수 있고 트래픽 데이터가 관련 컴포넌트 캐리어(CC)를 통한 트래픽 데이터의 전송 또는 수신을 위한 준비가 되어 있음을 나타낸다. 비활성화(deactivation)가 의미하는 것은 트래픽 데이터의 전송 또는 수신이 관련 컴포넌트 캐리어(CC)를 통해 허용되지 않음을 나타낸다. 상기 사용자 장비(UE)는 단일의 프라이머리 컴포넌트 캐리어(PCC)만을 사용하거나 상기 프라이머리 컴포넌트 캐리어(PCC)와 함께 하나 이상의 세컨더리 컴포넌트 캐리어(SCC)들을 사용한다.

[0036] 프라이머리 컴포넌트 캐리어(PCC)는 사용자 장비(UE)와의 트래픽 및 PHY/MAC 제어 시그널링을 교환하도록 eNB에 의해 사용된다. 세컨더리 컴포넌트 캐리어(SCC)들은, 상기 사용자 장비(UE)가 트래픽용으로 단지 상기 프라이머리 컴포넌트 캐리어(PCC)를 통해 수신되는 eNB 전용 명령들 및 규칙들에 의해서만 사용할 수 있는 추가 캐리어



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들이다. 상기 프라이머리 컴포넌트 캐리어(PCC)는 완전히 구성된 캐리어일 수 있고, 이를 통해 대부분의 제어 정보가 eNB 및 UE 사이에서 교환된다. 상기 세컨더리 컴포넌트 캐리어(SCC)는 상기 사용자 장비(UE)의 요구에 따라 또는 상기 eNB의 지시에 따라 할당되는, 완전히 구성된 캐리어 또는 부분적으로 구성된 캐리어일 수 있다. 상기 프라이머리 컴포넌트 캐리어(PCC)는 상기 사용자 장비(UE)가 네트워크로 진입하기 위해서나 또는 상기 세컨더리 컴포넌트 캐리어(SCC)의 할당을 위해 사용될 수 있다. 상기 프라이머리 컴포넌트 캐리어(PCC)는 핸드오버 절차를 통해 변경될 수 있다.

[0037] LTE에서는, 사용자 장비(UE)가 초기 접속 확립 절차를 수행하거나 접속 재확립 절차를 개시하는 프라이머리 주파수에서 동작하는 셀, 또는 핸드오버 절차에서 프라이머리 셀로서 표시된 셀을 포함한다. 상기 사용자 장비(UE)는 또한 보안 기능들을 위한 매개변수들 및 NAS 이동성 정보와 같은 상위 계층 시스템 정보를 위한 매개변수들을 획득하도록 프라이머리 셀(Primary Cell; PCell)을 사용한다. 세컨더리 셀(Secondary Cell; SCell)은 일단 RRC 접속이 확립될 경우에 구성될 수 있고 추가 무선 자원들을 제공하는데 사용될 수 있는 세컨더리 주파수를 통해 동작하는 셀을 포함한다. 관련 SCell에서의 동작 관련 시스템 정보는 SCell이 사용자 장비(UE)의 구성에 추가될 경우에 전용 시그널링을 사용하여 제공되는 것이 전형적이다. 기본적으로는, PCell이 업링크 PCC 및 다운링크 PCC를 포함하지만, 사용자 장비(UE)에 구성된 SCell은 다운링크 SCC를 포함할 수도 있고 다운링크 SCC와 함께 업링크 SCC를 포함할 수도 있다.

[0038] RRC_접속(RRC_CONNECTED) 상태에서, 네트워크는 사용자 장비(UE) 이동성을 제어한다. RRC_CONNECTED 상태에서의 네트워크 제어 이동성의 경우에, UE 이동성은 네트워크에 의해 트리거되는 핸드오버 절차로 실현된다. 상기 네트워크는 먼저, 측정 보고를 수행하도록 상기 사용자 장비(UE)를 구성함으로써 핸드오버를 개시할 수도 있고 상기 사용자 장비(UE)로부터의 수신된 측정 보고들을 지니지 않고 핸드오버를 개시할 수도 있다.

[0039] 사용자 장비(UE)들이 캐리어 집성(CA)을 지원하는 경우에는, E-UTRAN이 *이동성 제어 정보(mobilityControlInfo)*가 포함되어 있는 *RRC 접속 재구성(RRCConnectionReconfiguration)* 메시지를 사용하는 핸드오버 절차로 PCell을 변경할 수 있다. 상기 *RRCConnectionReconfiguration* 메시지는 RRC 접속을 수정하도록 하는 명령이다, 이는 어떠한 관련 전용 NAS 정보 및 보안 구성을 포함하는 (RB들, MAC 메인 구성 및 물리 채널 구성을 포함하는) 측정 구성, 이동성 제어, 무선 자원 구성을 위한 정보를 전달할 수 있다. E-UTRAN은 상기 *이동성 제어 정보(mobilityControlInfo)*를 포함하든 포함하지 않든, 독립적으로 *RRC 접속 재구성(RRCConnectionReconfiguration)* 메시지를 사용하는 RRC 접속 재구성 절차를 통해 SCell들을 추가, 제거 또는 수정할 수 있다.

[0040] 상기 사용자 장비(UE)에 상기 핸드오버 메시지를 송신하기 전에, 소스 eNB 는 먼저 타깃 eNB를 선택한다. 상기 소스 eNB는 또한 셀 리스트를 상기 타깃 eNB에 제공할 수 있다. 상기 타깃 eNB는 어떤 서빙 셀들이 핸드오버 후의 사용을 위해 구성될 지를 판단하는데, 이러한 셀들은 상기 소스 eNB에 의해 표시된 셀들과는 다른 셀들을 포함할 수 있다. 상기 타깃 eNB는 핸드오버를 개시하기 위한, 하나의 PCell을 포함하거나 하나의 PCell과 함께 적어도 하나의 SCell을 포함하는 메시지를 생성한다. 상기 핸드오버 메시지를 수신한 후에, 상기 사용자 장비(UE)는 정의된 랜덤 액세스 자원 선택에 따라 먼저 이용가능한 RACH 상황에서 상기 타깃 PCell을 액세스하도록 시도한다. 상기 핸드오버의 성공적인 완료시, 상기 사용자 장비(UE)는 상기 핸드오버를 확인하도록 하는 메시지를 송신한다.

[0041] 현재, 상이한 eNB들은 어떠한 SCell 구성도 델타 구성(delta configuration)을 위해 상기 타깃 eNB에 전송되지 않도록 캐리어 집성을 위해 동일한 SCell들을 공유하지 못한다. 따라서, 사용자 장비(UE)에 구성된 현재 모든 SCell들은 인터-eNB 핸드오버시 릴리스되어야 한다. 인터-eNB 핸드오버 전에 사용자 장비(UE)에 구성된 SCell들이 릴리스되지 않을 경우에, 새로운 타깃 eNB에 의한 새롭게 구성된 SCell은 동일한 SCell 인덱스를 갖는 기존의 SCell에 대한 수정으로서 상기 사용자 장비(UE)에 의해 고려되는데, 이는 상기 사용자 장비(UE) 및 상기 타깃 eNB 간의 구성들이 일치하지 않는 결과를 초래할 수 있다. 그러므로, 사용자 장비(UE)에 구성된 현재 모든 SCell들이 인터-eNB 핸드오버시 릴리스되어야 한다.

[0042] 그러나, 현재에는 그러한 핸드오버가 인트라-eNB 인지 아니면 인터-eNB 인지를 식별하도록 하는 어떠한 정보도 사용자 장비(UE)를 위한 *RRC 접속 재구성(RRCConnectionReconfiguration)* 메시지 내에 포함되어 있지 않다. 따라서, 상기 사용자 장비(UE)는 핸드오버시 현재 SCell들을 릴리스해야 할 지의 여부를 결정할 수 없다. 그 결과로, 상기 타깃 eNB는, 비록 상기 사용자 장비(UE)에 구성된 어떠한 SCell도 실제로 존재하지 않는 경우라도 잠재적으로 구성된 모든 SCell들을 릴리스하도록 상기 사용자 장비(UE)를 위한 핸드오버 명령에 유효한 모든 SCell 인덱스들을 갖는 *sCellToReleaseList*를 포함시켜야 한다.



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[0043] 현재에는 SCell 인덱스들의 유효한 값들이 7개 존재하며 *sCellToReleaseList* 내의 SCell 인덱스들의 최대 개수가 단지 4이다. 핸드오버 명령에는 상기 사용자 장비(UE)에서 사용될 수 있는 잠재적인 모든 SCell 인덱스들이 포함될 수 없다. 따라서, 하나의 추가 *RRC 접속 재구성(RRCConnectionReconfiguration)* 메시지가 상기 사용자 장비(UE)에서 모든 SCell들을 릴리스하는데 필요하다. 그 결과로, 시그널링 오버헤드는 상당히 증가하게 될 수 있다.

[0044] 본원의 개시내용의 한 실시태양에 의하면, 핸드오버시 위에서 설명한 시그널링 오버헤드를 회피하기 위하여, 인터-eNB 핸드오버 절차시 사용자 장비(UE)에서 SCell 릴리스를 제어하도록 하는 정보가 상기 소스 eNB에 의해 상기 타깃 eNB를 위한 *HandoverPreparationInformation* 메시지에 포함된다. 좀더 구체적으로 기술하면, 그러한 정보는 관련 사용자 장비(UE)에 구성되는 모든 SCell들의 SCell 인덱스들을 표시함으로써, 상기 사용자 장비(UE)가 *sCellToReleaseList*에 따라 상기 SCell(들)을 릴리스할 수 있도록 하기 위해 상기 타깃 eNB가 *RRC 접속 재구성(RRCConnectionReconfiguration)* 메시지에 상기 사용자 장비(UE)에 구성되는 SCell들을 갖는 *sCellToReleaseList*를 포함시키는 것을 허용한다.

[0045] 본원의 개시내용의 다른 한 실시태양에 의하면, 핸드오버시 위에서 설명한 시그널링 오버헤드를 회피하기 위하여, 그러한 핸드오버가 인트라-eNB 인지 아니면 인터-eNB 인지를 식별하도록 하는 표시자가 상기 타깃 eNB에 의해 사용자 장비(UE)를 위한 *RRC 접속 재구성(RRCConnectionReconfiguration)* 메시지에 포함된다. 상기 사용자 장비(UE)는 그러한 핸드오버가 인터-eNB 핸드오버인 경우에 구성된 모든 SCell들을 릴리스한다.

[0046] 위에서 설명한 전형적인 실시예들은 도 6 및 도 7을 참조하여 이하에서 더 상세하게 설명될 것이다.

[0047] 도 6을 참조하면, 한 전형적인 실시예에 따른 핸드오버시 SCell 릴리스를 위한 방법(500)은, 단계(502)에서 소스 eNB에 의해 사용자 장비(UE)에 적어도 하나의 SCell를 구성하는 것과, 단계(504)에서 핸드오버 결정이 내려진 후에, 단계(506)에서 핸드오버시 상기 사용자 장비(UE)에서 SCell 릴리스를 제어하도록 하는 정보를 상기 소스 eNB에 의해 *핸드오버 준비 정보(HandoverPreparationInformation)* 메시지에 포함시키는 것을 포함한다. 상기 포함된 정보는 상기 사용자 장비(UE)에 구성되는 모든 SCell들의 SCell 인덱스들을 표시함으로써, 상기 타깃 eNB가 단계(508)에서 상기 소스 eNB에 송신되는 핸드오버 요구 Ack(Handover Request Ack) 메시지에 담겨져 있는 핸드오버 명령에 상기 사용자 장비(UE)에 구성되는 SCell들을 갖는 *sCellToReleaseList*를 포함시키는 것을 허용한다. *핸드오버 준비 정보(HandoverPreparationInformation)* 메시지는 핸드오버 후에 사용하기 위한 SCell(들)로서 선택하기 위해 상기 타깃 eNB를 위한 *후보 셀 정보 리스트(CandidateCellInfoList)*를 담고 있을 수 있다. 상기 소스 eNB는 그후 단계(510)에서 *이동성 제어 정보(mobilityControlInfo)* 및 *sCellToReleaseList*가 포함된 *RRC 접속 재구성(RRCConnectionReconfiguration)* 메시지를 송신한다. 그에 응답하여, 상기 사용자 장비(UE)는 단계(512)에서 *RRC 접속 재구성 완료(RRCConnectionReconfigurationComplete)* 메시지로써 응답하여 이러한 절차를 완료시킨다. 상기 *sCellToReleaseList*를 기반으로 하여, 상기 사용자 장비(UE)는 단계(514)에서 핸드오버 전에 구성된 SCell(들)을 릴리스한다. 또한, 상기 *RRC 접속 재구성(RRCConnectionReconfiguration)* 메시지에는 상기 사용자 장비(UE)에 새로운 SCell(들)을 구성하도록 *sCellToAddModList*가 포함될 수 있다. *이동성 제어 정보(mobilityControlInfo)*가 포함된 *RRC 접속 재구성(RRCConnectionReconfiguration)* 메시지는 상기 타깃 eNB로부터 수신된 핸드오버 명령에 해당한다.

[0048] 도 7을 참조하면, 한 전형적인 실시예에 따른 핸드오버시 SCell 릴리스를 위한 방법(600)은 단계(602)에서 소스 eNB에 의해 사용자 장비(UE)에 적어도 하나의 SCell을 구성하는 것을 포함한다. 단계(604)에서 핸드오버 결정이 내려진 후에는, 단계(606)에서 핸드오버 후에 사용하도록 하는 SCell(들)로서 선택하도록 상기 타깃 eNB를 위한 *후보 셀 정보 리스트(CandidateCellInfoList)*를 담고 있는 *핸드오버 준비 정보(HandoverPreparationInformation)* 메시지를 송신한다. 상기 타깃 eNB는 그후 구성된 모든 SCell들을 릴리스해야 할 지의 여부를 식별하도록 하는 표시자를 상기 사용자 장비(UE)를 위한 핸드오버 명령에 포함시킨다. 상기 핸드오버 명령은 단계(608)에서 상기 소스 eNB에 송신된 핸드오버 요구 Ack 메시지에 담겨진다. 상기 표시자는 상기 핸드오버가 인트라-eNB 인지 아니면 인터-eNB 인지를 표시할 수 있다. 상기 소스 eNB는 그후 단계(610)에서 상기 사용자 장비(UE)에 *이동성 제어 정보(mobilityControlInfo)*가 포함된 *RRC 접속 재구성(RRCConnectionReconfiguration)* 메시지를 송신한다. 그에 응답하여, 상기 사용자 장비(UE)는 단계(612)에서 *RRC 접속 재구성 완료(RRCConnectionReconfigurationComplete)* 메시지로써 응답하여 이러한 절차를 완료시킨다. 상기 핸드오버가 인터-eNB 핸드오버임을 상기 표시자가 나타내는 경우에 상기 사용자 장비(UE)는 단계(614)에서 핸드오버 전에 구성된 모든 SCell들을 릴리스한다. 또한, 상기 *RRC 접속 재구성(RRCConnectionReconfiguration)* 메시지에는 상기 사용자 장비(UE)에 새로운 SCell(들)을 구성하도록 *sCellToAddModList*가 포함될 수 있다. *이동성 제어 정보(mobilityControlInfo)*가 포함된 *RRC 접속 재구성*



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*(RRCConnectionReconfiguration)* 메시지는 상기 타깃 eNB로부터 수신된 핸드오버 명령에 해당한다.

[0049] 위에서 설명한 실시예들에 의하면, 핸드오버가 인터-eNB 핸드오버인 경우에 상기 사용자 장비(UE) 내의 모든 SCell들이 릴리스된다. 위에서 설명한 바와 같이, 상기 핸드오버가 인터-eNB 핸드오버인 경우에 모든 SCell들을 릴리스시키는 것은 시그널링 오버헤드를 감소시킨다.

[0050] 도 5를 다시 참조하면, 도 5에는 본원에서 설명한 통신 장치들 중 어느 한 통신 장치일 수 있는, 한 전형적인 실시예에 따른 통신 장치가 기능적인 블록 다이어그램으로 도시되어 있는데, 상기 통신 장치(300)는 메모리(310)에 저장된 프로그램 코드(312)를 포함한다. CPU(308)는 위에서 설명한 액션들, 단계들 및/또는 본원에서 설명한 것과는 다른 절차들 중 어느 하나 또는 다수를 수행하도록 상기 프로그램 코드(312)를 실행한다.

[0051] 위에서 본원의 개시내용의 여러 실시태양들이 설명되었다. 여기서 분명히 알아야 할 점은 본원의 개시내용의 교시들이 다양한 여러 형태로 구체화될 수 있으며 본원의 개시내용에서 언급된 임의의 특정 구조, 기능 또는 이들 모두가 단지 대표적인 것뿐이라는 점이다. 본원의 개시내용의 교시들에 기반해서, 당업자라면 본원의 개시내용에 언급된 실시태양이 기타 실시태양들과는 별개로 구현될 수 있으며 이러한 실시태양들 중 2 이상의 실시태양들이 여러 방식으로 조합될 수 있음을 이해할 것이다. 예를 들면, 본원의 개시내용에 언급된 실시태양들을 임의 개수로 사용하여 특정 장치가 구현될 수도 있고 특정 방법이 실시될 수도 있다. 그 외에도, 본원의 개시내용에 언급된 실시태양들 중 하나 이상의 실시태양들에 추가해서나 본원의 개시내용에 언급된 실시태양들 중 하나 이상의 실시태양들과는 달리 다른 구조, 기능, 또는 구조 및 기능을 사용하여 그러한 장치가 구현될 수도 있고 그러한 방법이 실시될 수도 있다. 위에서 언급된 개념들 중 일부에 대한 예로서, 몇몇 실시태양들에서는 병행 채널들이 펄스 반복 주파수들에 기반하여 확립될 수 있다. 몇몇 실시태양들에서는 병행 채널들이 펄스 위치 또는 오프셋들에 기반하여 확립될 수 있다. 몇몇 실시태양들에서는 병행 채널들이 시간 호핑 시퀀스들에 기반하여 확립될 수 있다. 몇몇 실시태양들에서는 병행 채널들이 펄스 반복 주파수들, 펄스 위치들 또는 오프셋들, 및 시간 호핑 시퀀스들에 기반하여 확립될 수 있다.

[0052] 당업자라면 여러 다른 기술들 및 기법들 중 어느 하나를 사용하여 정보 및 신호들이 표현될 수 있다는 점을 이해할 것이다. 예를 들면, 위에서 언급된 내용 전반에 걸쳐 참조될 수 있는 데이터, 명령어들, 명령들, 정보, 신호들, 비트들, 심볼들, 및 칩들은 전압들, 전류들, 전자기파들, 자기장들 또는 입자들, 광학 필드들 또는 입자들, 또는 이들의 조합으로 표현될 수 있다.

[0053] 또한, 당업자라면 본원의 개시내용에 언급된 실시태양들과 연관지어 설명된 여러 예시적인 논리 블록들, 모듈들, 프로세서들, 수단들, 회로들, 및 알고리즘 단계들이 전자 하드웨어(예컨대, 소스 부호화 또는 기타 기법을 사용하여 설계될 수 있는, 디지털 구현, 아날로그 구현, 또는 상기 두가지 구현들의 조합), (편의상 "소프트웨어" 또는 "소프트웨어 모듈"로서 본원의 개시내용에 언급될 수 있는) 명령어들을 합체하고 있는 여러 형태의 프로그램 또는 설계 코드, 또는 이들 모두의 조합으로서 구현될 수 있다는 점을 이해할 것이다. 이러한 하드웨어 및 소프트웨어의 호환성을 명확하게 예시하기 위해, 여러 예시적인 컴포넌트들, 블록들, 모듈들, 회로들, 및 단계들이 그들의 기능에 대해 위에서 일반적으로 설명되었다. 그러한 기능이 소프트웨어로서 구현되는지 하드웨어로서 구현되는지는 전반적인 시스템에 부과된 특정의 애플리케이션 및 설계 제약조건들에 의존한다. 숙련된 기술자들이라면 각각의 특정 애플리케이션에 대해 다양한 방식으로 위에서 설명된 기능을 구현할 수 있지만, 그러한 구현 결정들은 본원의 개시내용의 범위로부터 이탈한 것으로 해석되어선 안된다.

[0054] 그 외에도, 본원의 개시내용에서 언급된 실시태양들과 연관지어 설명된 여러 예시적인 논리 블록들, 모듈들 및 회로들은 집적 회로(integrated circuit; "IC"), 액세스 단말기 또는 액세스 포인트(access point) 내에서 구현될 수도 있고, 집적 회로, 액세스 단말기 또는 액세스 포인트에 의해 수행될 수 있다. 상기 IC는, 본원의 개시내용에서 언급된 기능들을 수행하도록 설계된, 범용 프로세서, 디지털 신호 프로세서(digital signal processor; DSP), 주문형 집적 회로(application specific integrated circuit; ASIC), 필드 프로그램가능 게이트 어레이(field programmable gate array; FPGA) 또는 다른 프로그램가능 논리 장치, 개별 게이트 또는 트랜지스터 로직, 개별 하드웨어 컴포넌트들, 전기 컴포넌트들, 광학 컴포넌트들, 기계 컴포넌트들, 또는 이들의 조합을 포함할 수 있으며, 상기 IC 내부에, 상기 IC 외부에, 또는 상기 IC 내부 및 외부에 상주하는 코드들 또는 명령어들을 실행할 수 있다. 범용 프로세서는 마이크로프로세서일 수 있지만, 변형적으로는, 상기 프로세서가 기존의 어떤 프로세서, 제어기, 마이크로제어기, 또는 상태 기계일 수도 있다. 프로세서는 또한 컴퓨팅 장치들, 예컨대 DSP 및 마이크로프로세서의 조합체, 복수 개의 마이크로프로세서들, DSP 코어와 연관된 하나 이상의 마이크로프로세서들, 또는 기타 그러한 구성으로서 구현될 수도 있다.

[0055] 여기서 이해할 점은 위에서 언급된 어떤 과정에서의 단계들의 어떤 특정 순서나 또는 계층이라도 예시적인 접근



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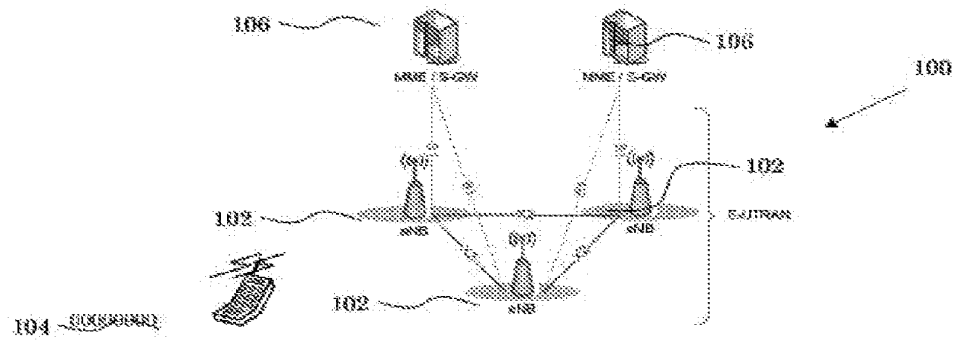
예이라는 점이다. 설계상의 선호들에 기반해서 당업자라면 상기 과정들에서의 단계들의 특정 순서 또는 계층이 본원의 개시내용의 범위 내에 있는 한 재배치될 수 있다는 점을 이해할 것이다. 이에 수반되는 방법의 청구항들은 예시적인 순서로 여러 단계 요소들을 기재하고 있으며, 상기 청구항들에 기재된 특정 순서 또는 계층으로 국한하도록 의미를 부여한 것은 아니다.

[0056] 본원의 개시내용에 언급된 실시태양들과 연관지어 설명된 방법 또는 알고리즘의 단계들은 하드웨어로 직접 구체화될 수도 있고, 프로세서에 의해 실행되는 소프트웨어 모듈로 직접 구체화될 수도 있으며 이들 2가지 모두로 직접 구체화될 수도 있다. (예컨대, 실행가능한 명령어들 및 관련 데이터를 포함하는) 소프트웨어 모듈 및 다른 데이터는 RAM 메모리, 플래시 메모리, ROM 메모리, EPROM 메모리, EEPROM 메모리, 레지스터들, 하드 디스크, 착탈식 디스크, CD-ROM, 또는 당업계에 공지된 기타 형태의 컴퓨터-판독가능 저장 매체와 같은 데이터 메모리에 상주해 있을 수 있다. 예시적인 저장 매체는 예를 들면 상기 저장 매체로부터 정보(예컨대, 코드)를 판독하고 상기 저장 매체에 정보를 기록할 수 있도록 하는 컴퓨터/프로세서(편의상 "프로세서"라고 본원의 개시내용에 언급될 수 있음)와 같은 기계에 연결될 수 있다. 예시적인 저장 매체는 상기 프로세에 합체되어 있을 수도 있다. 상기 프로세서 및 상기 저장 매체는 ASIC에 상주해 있을 수 있다. 상기 ASIC는 사용자 장비에 상주해 있을 수 있다. 변형적으로는, 상기 프로세서 및 상기 저장 매체는 사용자 장비 내의 개별 컴포넌트들로서 상주해 있을 수 있다. 더욱이, 일부 실시태양들에서는, 적합한 어떤 컴퓨터-프로그램 제품이 본원의 개시내용의 실시태양들 중 하나 이상의 실시태양들에 관한 코드들을 포함하는 컴퓨터-판독가능 매체를 포함할 수 있다. 일부 실시태양들에서는, 컴퓨터 프로그램 제품이 포장재(packaging materials)를 포함할 수 있다.

[0057] 지금까지 본 발명이 여러 실시태양들과 연관지어 설명되었지만, 여기서 이해할 점은 본 발명에서 부가적인 수정들이 가능하다는 점이다. 본원은 일반적으로 본 발명의 원리들을 따르고 본 발명에 속하는 기술분야에서 공지되고 관례적인 실시에 부속되는 그러한 본원의 개시내용으로부터의 이탈을 포함하는 발명의 임의의 변경들, 이용들 또는 개조를 포괄하고자 한 것이다.

도면

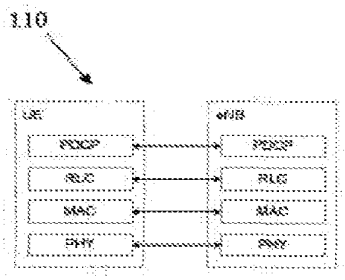
도면1



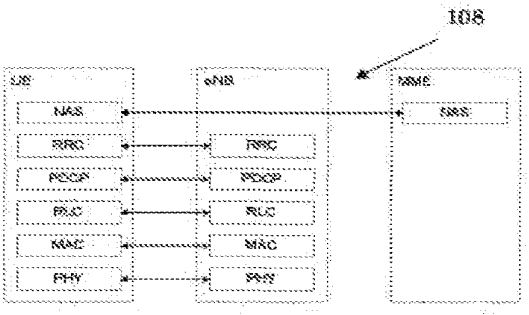



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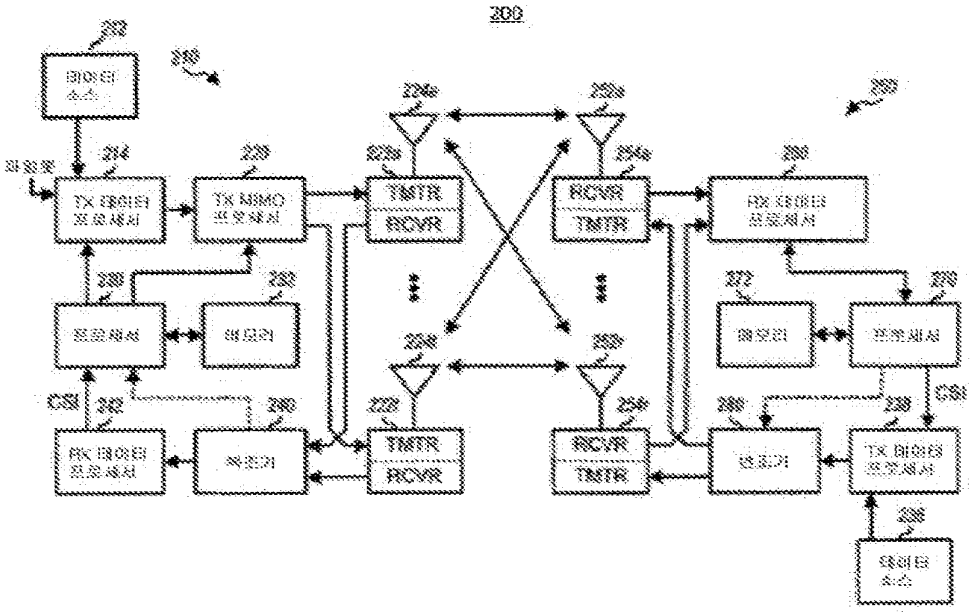
도면2




도면3



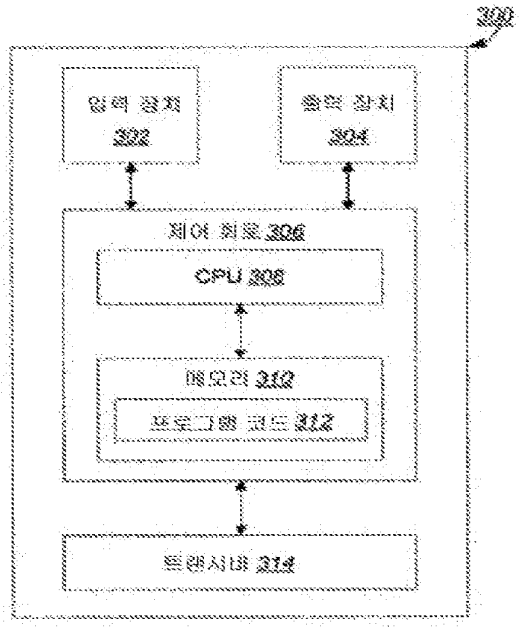

도면4






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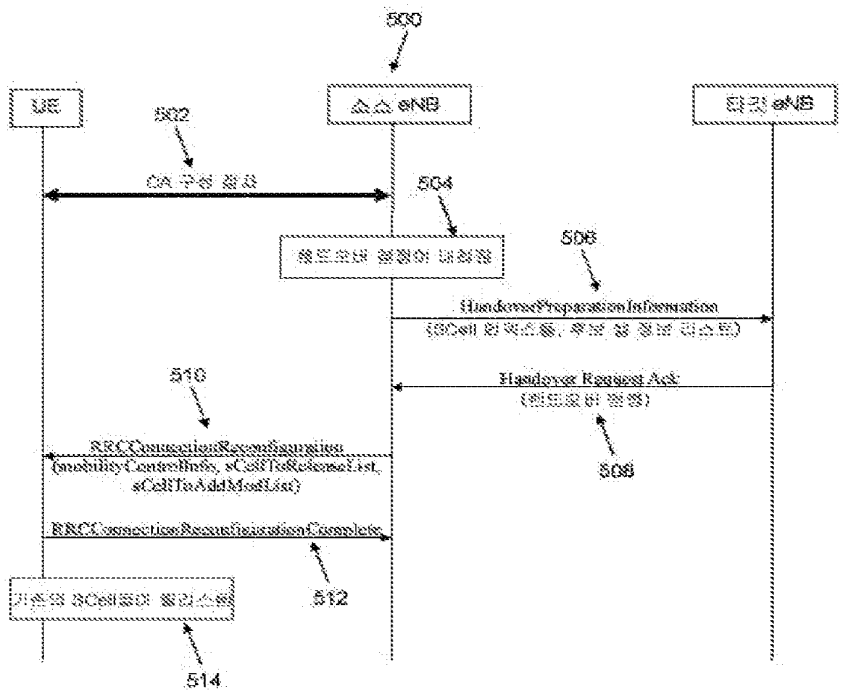
도 3






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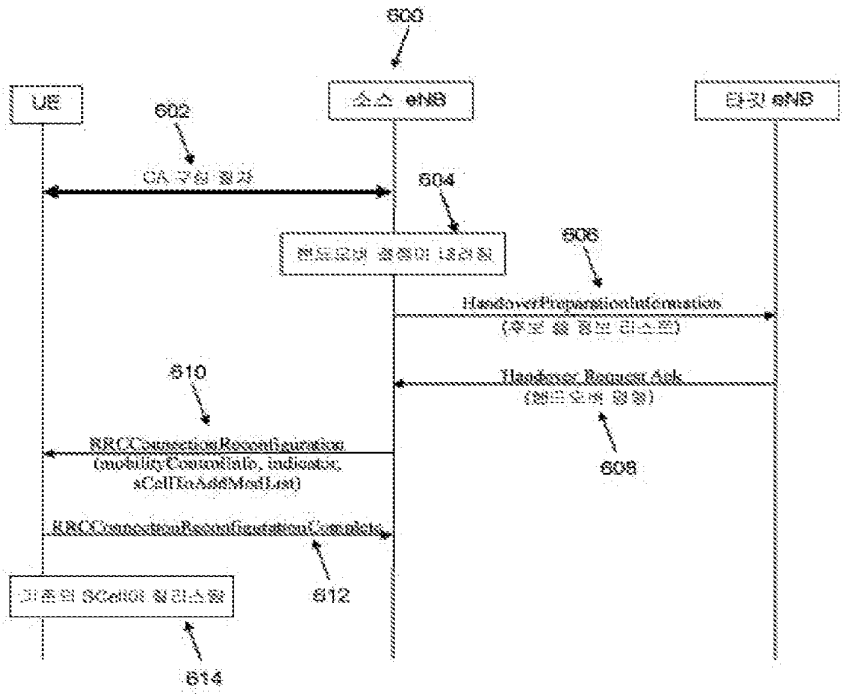
도면8





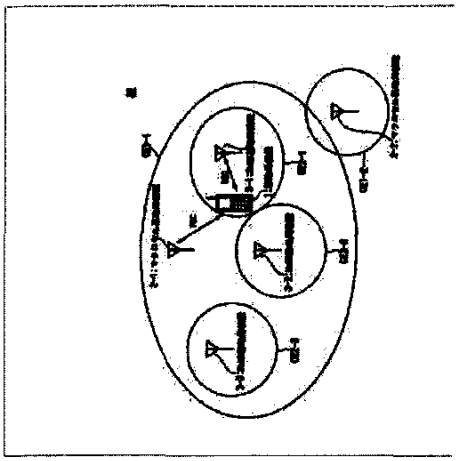

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도 6


600
UE
602
소스 eNB
타겟 eNB
CA 구성 동작
604
핸드오버 결정에 대한 내부적
606
HandoverPreparationInformation
(후보 셀 정보 리스트)
610
Handover Request Ack
(핸드오버 응답)
RRCConnectionReconfiguration
(mobilityControlInfo, indicator,
sCellToAddModList)
608
RRCConnectionReconfigurationComplete
612
고려된 SCell에 활성화
614

Lega


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|---|---|
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| **(71)Applicant** | SHARP CORP |
| **(72)Inventor** | ISHIKURA KATSUTOSHI<br>SAWADA SHINICHI<br>SUZUKI SHIGETO<br>TAKAGI YUSUKE<br>FUSE SHUNPEI |

**(54)RADIO COMMUNICATION SYSTEM, RADIO COMMUNICATION METHOD, MOBILE STATION DEVICE, BASE STATION DEVICE, PROGRAM, AND RECORDING MEDIUM**


**(57)Abstract**

PROBLEM TO BE SOLVED: To provide a radio communication system which has excellent communication speed.

SOLUTION: A radic communication system comprises: a first base station device; a second base station device; and a mobile station device which communicates with the first base station device by using a first component carrier (CC) and communicates with the second base station device by using a second CC. The first base station device transmits disconnection preparation request of the second CC to the second base station device. A carrier aggregation communication determination unit of the first base station device determines disconnection of the second CC when a measurement result of information indicating an amount of communication is equal to or less than a threshold. When the carrier aggregation communication determination unit determines disconnection of the second CC, a disconnection preparation request unit of the first base station device transmits the disconnection preparation request to the second base station device. On the basis of the disconnection preparation request, the second base station device transmits disconnection request to the mobile station device to disconnect the second CC. In response to reception of the disconnection request, the mobile station device disconnects the second CC.




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| H04W 16/32 | (2009.01) | H04Q | 7/00 | 238 | |

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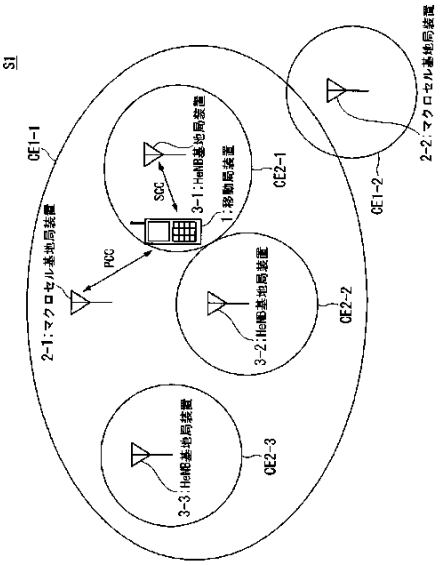
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最終頁に続く

(54)【発明の名称】無線通信システム、無線通信方法、移動局装置、基地局装置、プログラム、および記憶媒体

(57)【要約】
【課題】優れた通信速度を有する無線通信システムを提供できる。
【解決手段】第１の基地局装置と、第２の基地局装置と、前記第１の基地局装置と第１のコンポーネントキャリア（ＣＣ）を用いて通信し、前記第２の基地局装置と第２のＣＣを用いて通信する移動局装置と、を具備する無線通信システムである。第１の基地局装置は、第２のＣＣの切断準備要求を、第２の基地局装置に送信する。第１の基地局装置のキャリアアグリゲーション通信判定部は、通信量を表す情報の測定結果が閾値以下である場合、前記第２のＣＣを切断することを決定する。切断準備要求部は、前記キャリアアグリゲーション通信判定部が切断することを決定したとき、切断準備要求の送信を行い、切断準備要求に基づいて、第２のＣＣを切断させる切断要求を移動局装置に送信する。移動局装置は、切断要求を受信すると、第２のＣＣを切断する。
【選択図】図１



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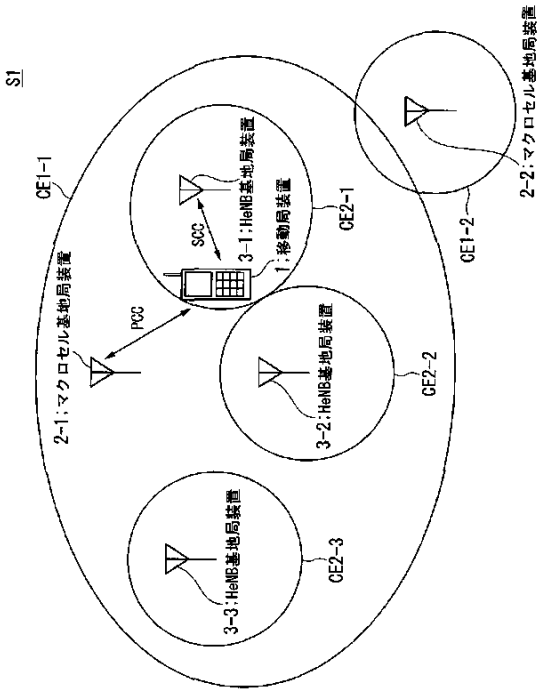
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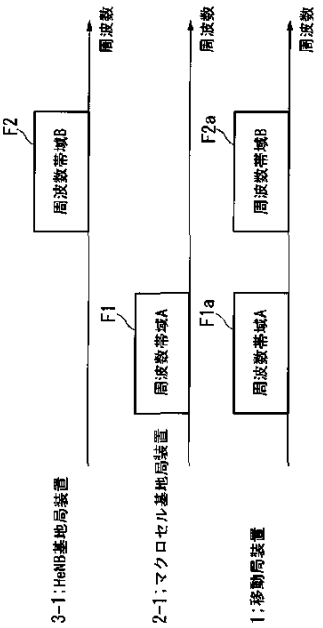
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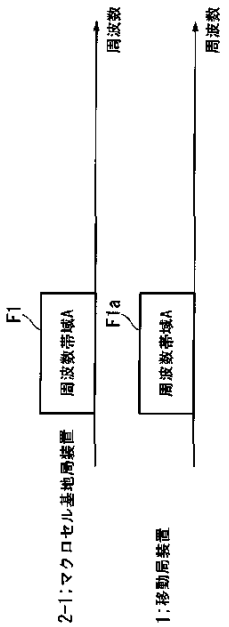
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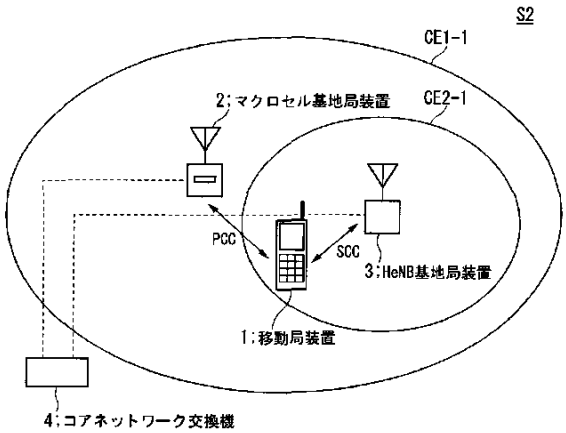
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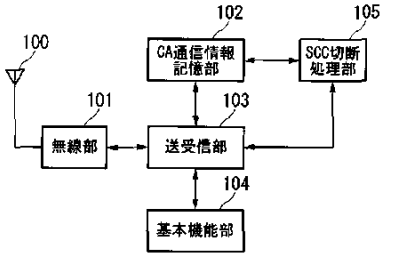
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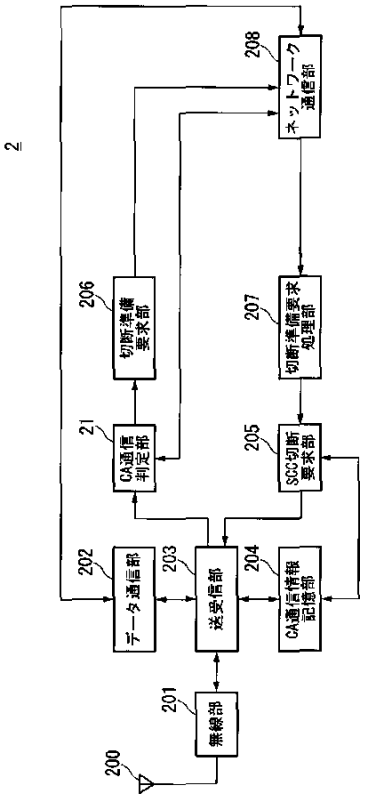

S1
CE1-1
2-1;マクロセル基地局装置
PCC
SCC
3-1;HeNB基地局装置
1;移動局装置
CE2-1
3-2;HeNB基地局装置
CE2-2
3-3;HeNB基地局装置
CE2-3
CE1-2
2-2;マクロセル基地局装置

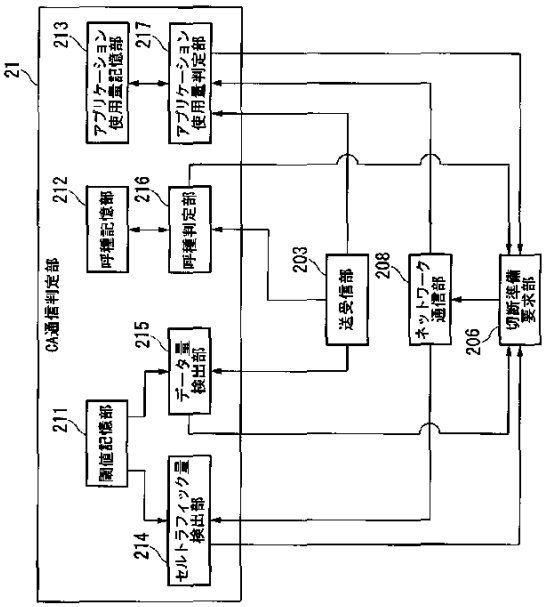

周波数
F2
周波数帯域B
F1
周波数帯域A
F2a
周波数帯域B
F1a
周波数帯域A
3-1;HeNB基地局装置
2-1;マクロセル基地局装置
1;移動局装置

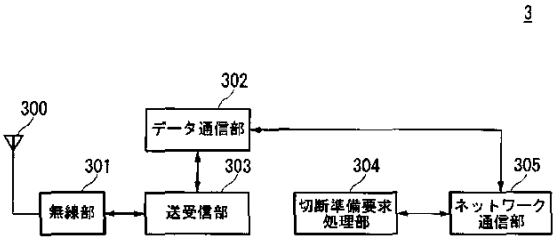

周波数
F1
周波数帯域A
F1a
周波数帯域A
2-1;マクロセル基地局装置
1;移動局装置


S2
CE1-1
2;マクロセル基地局装置
CE2-1
PCC
SCC
3;HeNB基地局装置
1;移動局装置
4;コアネットワーク交換機


1
100
101
無線部
102
CA通信情報記憶部
103
送受信部
104
基本機能部
105
SCC切断処理部


2
200
201
無線部
202
データ通信部
203
送受信部
204
CA通信情報記憶部
205
SCC切断要求部
206
切断準備要求部
207
切断準備要求処理部
208
ネットトワーク通信部
21
CA通信判定部


21
CA通信判定部
203
送受信部
206
切断準備要求部
208
ネットワーク通信部
211
閾値記憶部
212
閾種記憶部
213
アプリケーション使用量記憶部
214
セルトラフィック量検出部
215
データ量検出部
216
閾種判定部
217
アプリケーション使用量判定部

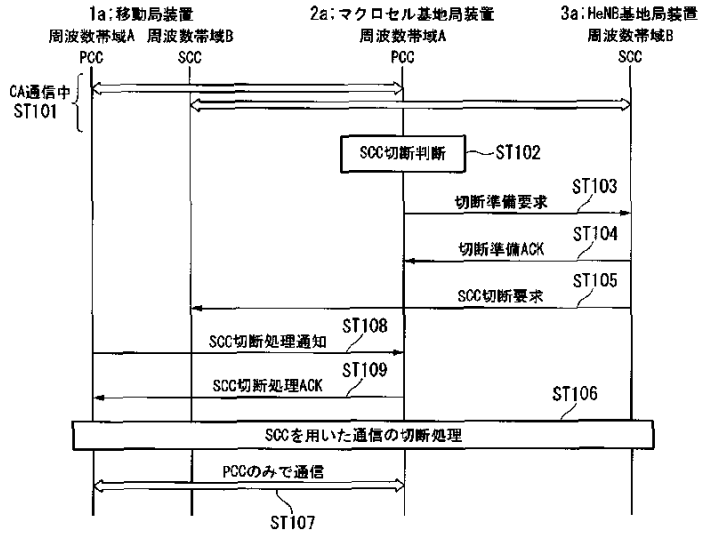

3
300
301
無線部
302
データ通信部
303
送受信部
304
切断準備要求処理部
305
ネットワーク通信部

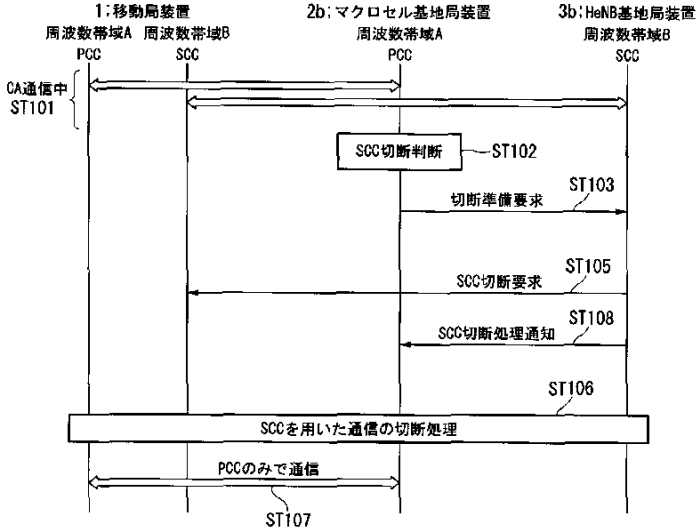
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周波数帯域A 周波数帯域B
PCC
SCC
2;マクロセル基地局装置
周波数帯域A
PCC
3;HeNB基地局装置
周波数帯域B
SCC
CA通信中
ST101
SCC切断判断
ST102
ST103
切断準備要求
ST104
切断準備ACK
ST105
SCC切断要求
ST106
SCCを用いた通信の切断処理
PCCのみで通信
ST107

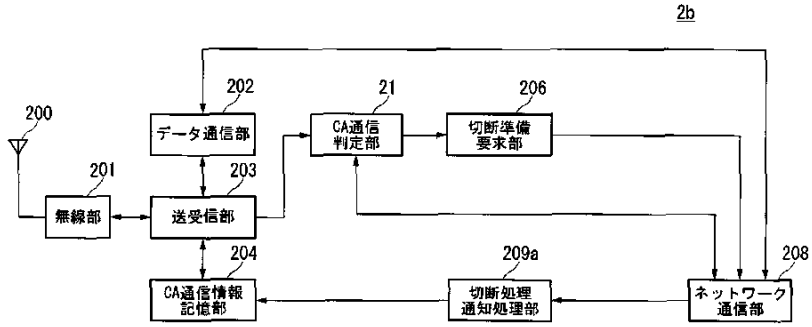

2a
200
202
データ通信部
21
CA通信
判定部
206
切断準備
要求部
201
無線部
203
送受信部
切断処理通知
処理部
209a
204
CA通信情報
記憶部
207
切断準備要求
処理部
208
ネットワーク
通信部

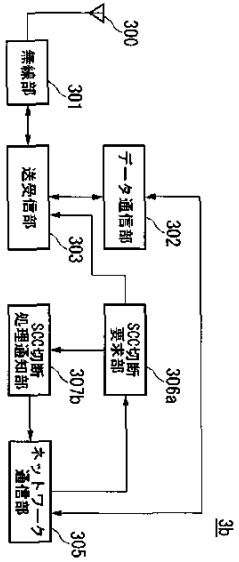

100
無線部
101
基本機能部
104
送受信部
103
CA通信情報
記憶部
102
切断処理
通知部
106a
1a

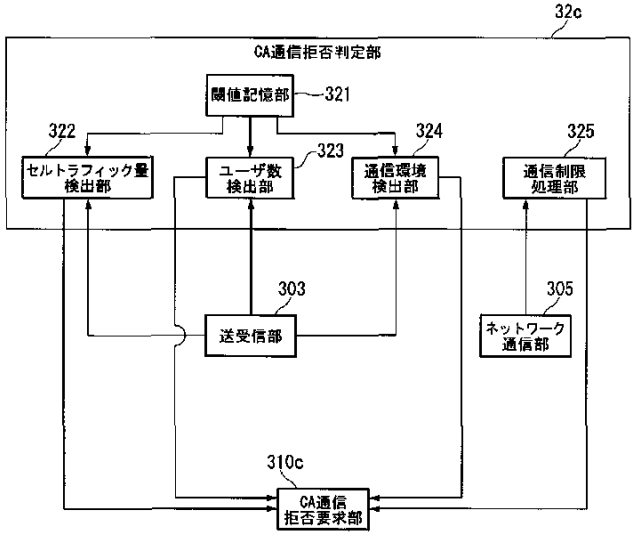

300
無線部
301
送受信部
303
データ通信部
302
切断準備
要求処理部
304
SCC切断
要求部
306a
ネットワーク
通信部
305
3a

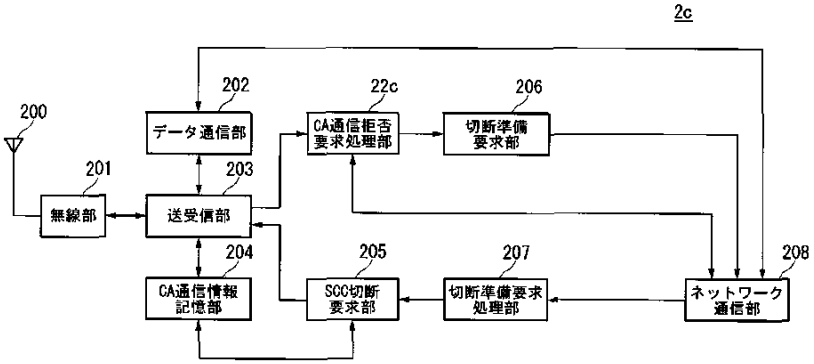

1a:移動局装置
周波数帯域A 周波数帯域B
PCC SCC
2a:マクロセル基地局装置
周波数帯域A
PCC
3a:HeNB基地局装置
周波数帯域B
SCC
CA通信中
ST101
SCC切断判断
ST102
ST103
切断準備要求
ST104
切断準備ACK
ST105
SCC切断要求
ST108
SCC切断処理通知
ST109
SCC切断処理ACK
ST106
SCCを用いた通信の切断処理
PCCのみで通信
ST107

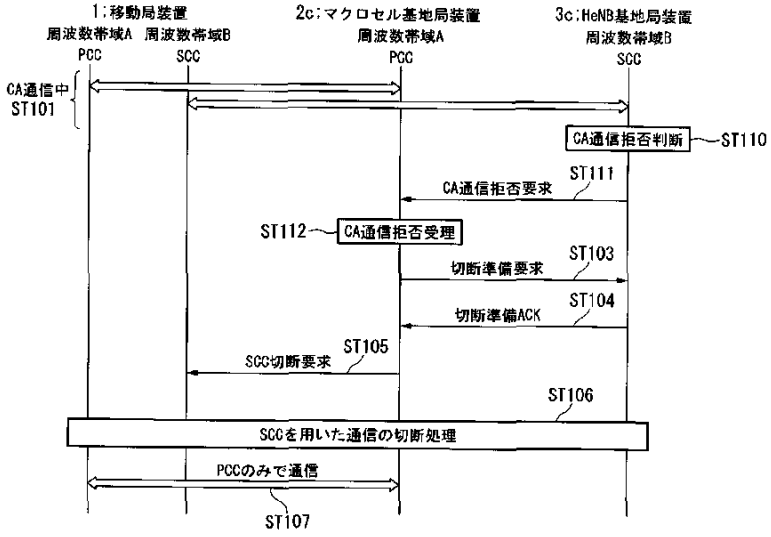

1:移動局装置
周波数帯域A 周波数帯域B
PCC SCC
2b:マクロセル基地局装置
周波数帯域A
PCC
3b:HeNB基地局装置
周波数帯域B
SCC
CA通信中
ST101
SCC切断判断
ST102
ST103
切断準備要求
ST105
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ST106
SCCを用いた通信の切断処理
PCCのみで通信
ST107

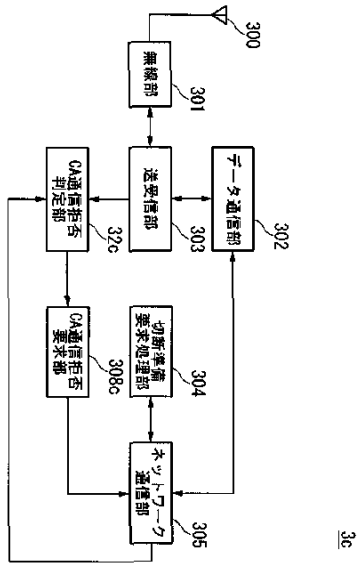

2b
200
201
無線部
202
データ通信部
203
送受信部
204
CA通信情報
記憶部
21
CA通信
判定部
206
切断準備
要求部
209a
切断処理
通知処理部
208
ネットワーク
通信部

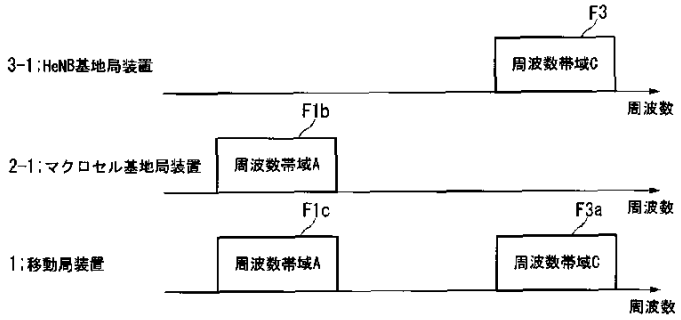

300
無線部
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送受信部
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処理通知部
307b
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要求部
306a
ネットワーク
通信部
305
3b

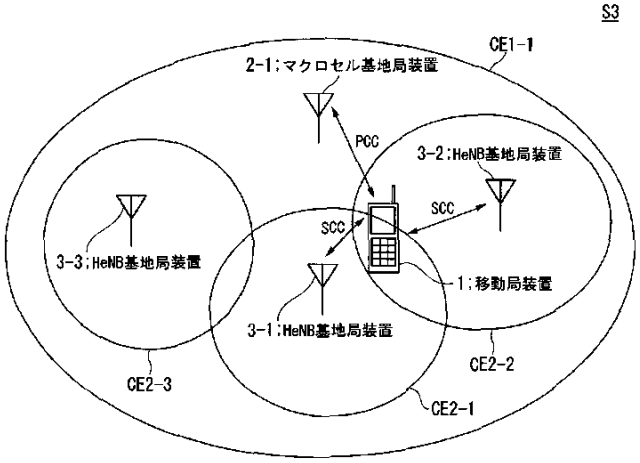

32c
CA通信拒否判定部
閾値記憶部
321
322
323
324
325
セルトラフィック量検出部
ユーザ数検出部
通信環境検出部
通信制限処理部
303
305
送受信部
ネットワーク通信部
310c
CA通信拒否要求部

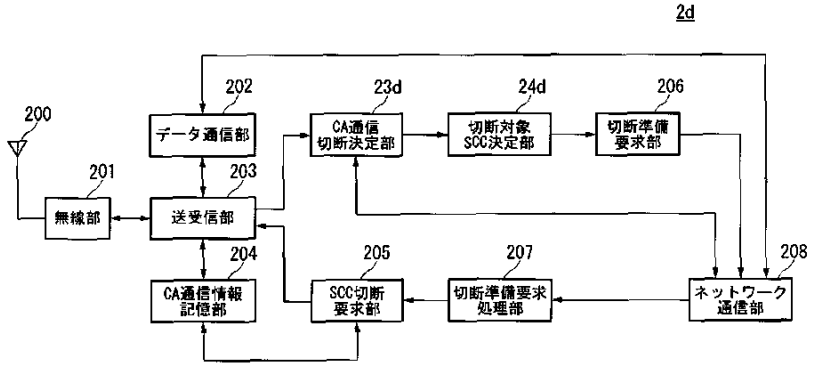

2c
200
201
202
203
204
205
207
208
22c
206
データ通信部
無線部
送受信部
CA通信情報記憶部
SCC切断要求部
切断準備要求処理部
ネットワーク通信部
CA通信拒否要求処理部
切断準備要求部

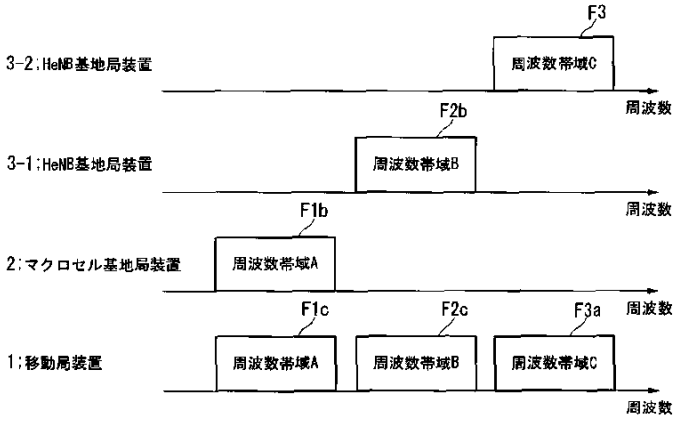

1:移動局装置
周波数帯域A 周波数帯域B
PCC
SCC
2c:マクロセル基地局装置
周波数帯域A
3c:HeNB基地局装置
周波数帯域B
CA通信中
ST101
CA通信拒否判断
ST110
ST111
CA通信拒否要求
ST112
CA通信拒否受理
ST103
切断準備要求
ST104
切断準備ACK
ST105
SCC切断要求
ST106
SCCを用いた通信の切断処理
PCCのみで通信
ST107


300
無線部
301
CA通信拒否判定部
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送受信部
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データ通信部
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308c
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ネットワーク通信部
305
3c



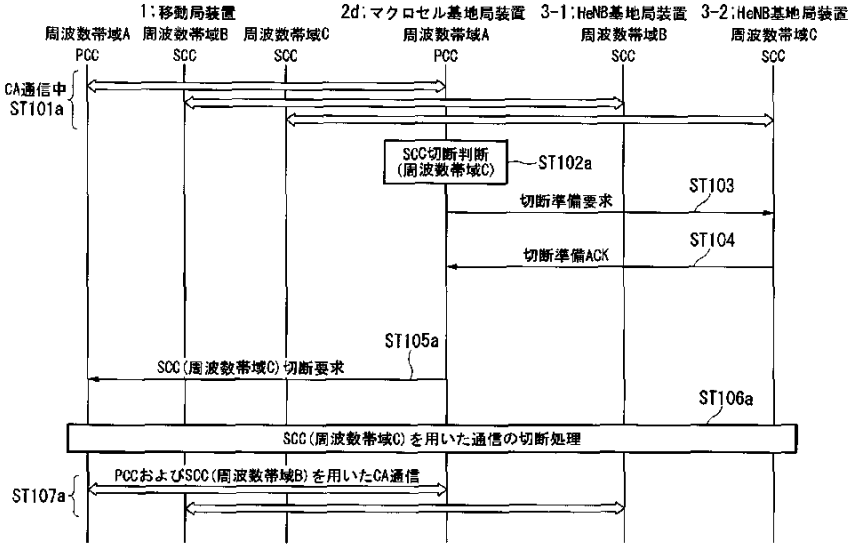



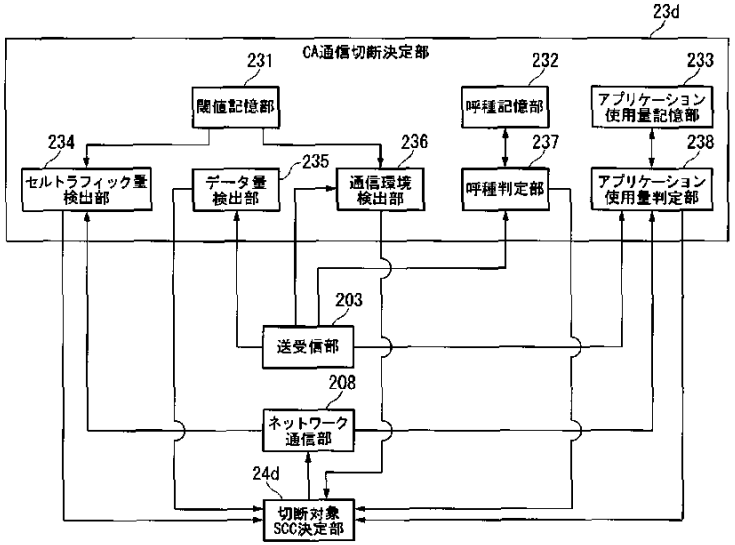



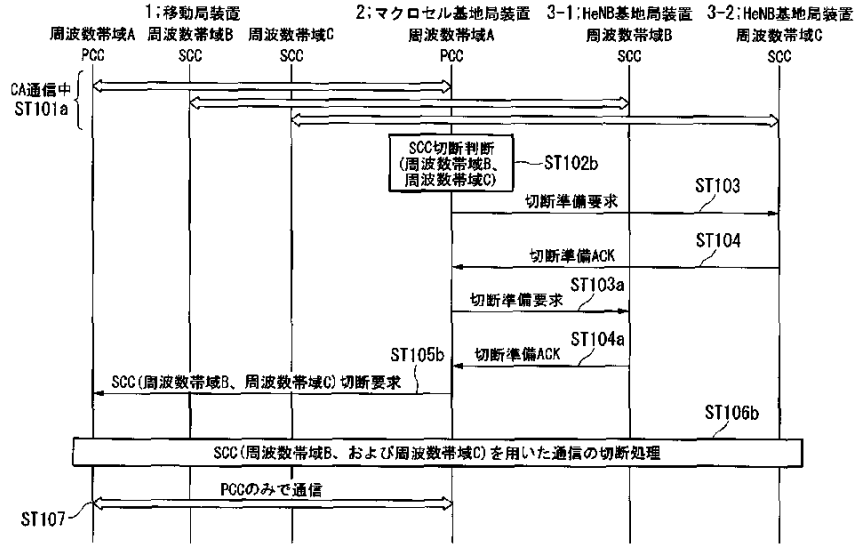



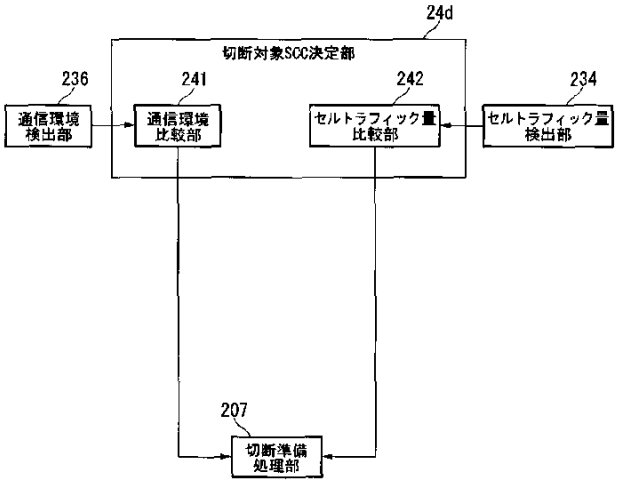



Petitioners' Exhibit 1002, p. 130
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991






Petitioners' Exhibit 1002, p. 131
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

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Ｆターム(参考) 5K067 AA33　BB04　BB21　CC24　EE02　EE10　EE24　HH22

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : **2014-022895**
(43)Date of publication of application : **03.02.2014**

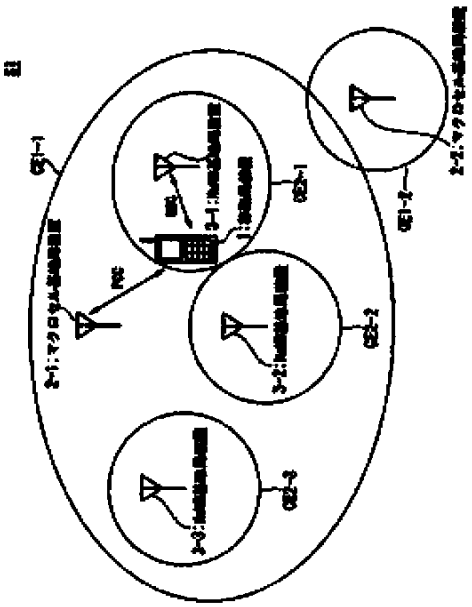
(51)Int.Cl. *H04W 72/04 (2009.01)*
*H04W 16/32 (2009.01)*

(21)Application number : **2012-158998**
(22)Date of filing : **17.07.2012**

(71)Applicant : **SHARP CORP**
(72)Inventor : **ISHIKURA KATSUTOSHI**
**SAWADA SHINICHI**
**SUZUKI SHIGETO**
**TAKAGI YUSUKE**
**FUSE SHUNPEI**

## (54) RADIO COMMUNICATION SYSTEM, RADIO COMMUNICATION METHOD, MOBILE STATION DEVICE, BASE STATION DEVICE, PROGRAM, AND RECORDING MEDIUM

(57)Abstract:



PROBLEM TO BE SOLVED: To provide a radio communication system which has excellent communication speed.

SOLUTION: A radio communication system comprises: a first base station device; a second base station device; and a mobile station device which communicates with the first base station device by using a first component carrier (CC) and communicates with the second base station device by using a second CC. The first base station device transmits disconnection preparation request of the second CC to the second base station device. A carrier aggregation communication determination unit of the first base station device determines disconnection of the second CC when a measurement result of information indicating an amount of communication is equal to or less than a threshold. When the carrier aggregation communication determination unit determines disconnection of the second CC, a disconnection preparation request unit of the first base station device transmits the disconnection preparation request to the second base station device. On the basis of the disconnection preparation request, the second base station device transmits disconnection request to the mobile station device to disconnect the second CC. In response to reception of the disconnection request, the mobile station device disconnects the second CC.

Petitioners' Exhibit 1002, p. 133
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 22550210 |
| **Application Number:** | 14167405 |
| **International Application Number:** | |
| **Confirmation Number:** | 6471 |
| **Title of Invention:** | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| **First Named Inventor/Applicant Name:** | Yu-Hsuan Guo |
| **Customer Number:** | 106622 |
| **Filer:** | Sang N. Dang/Sandy Kim |
| **Filer Authorized By:** | Sang N. Dang |
| **Attorney Docket Number:** | 1291-235.101 |
| **Receipt Date:** | 05-JUN-2015 |
| **Filing Date:** | 29-JAN-2014 |
| **Time Stamp:** | 14:26:19 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

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|---|---|
| Submitted with Payment | no |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Information Disclosure Statement (IDS) Form (SB08) | 1291-235-101--IDSasFiled06052015.pdf | 55781<br>7338b86d15523f18ace9d7154a9e4a648e7cfa40 | no | 2 |

| | |
|---|---|
| **Warnings:** | |
| **Information:** | |

| This is not an USPTO supplied IDS fillable form | | | | | |
|---|---|---|---|---|---|
| 2 | Foreign Reference | KR10-2012-0046692.pdf | 2636698<br>82936b12ef7ce33926c083e8e83292c05101d5de | no | 18 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 3 | Non Patent Literature | LTE-Advanced-AnOperatarPerspective.pdf | 213091<br>4f436f254b025a00f8ab33765482ace524032c26 | no | 11 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 4 | Non Patent Literature | JPOfficeAction-20150106.pdf | 223942<br>c35c9a76d4c6b4dfe235aafde3933067895c1acb | no | 8 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 5 | Non Patent Literature | KROfficeAction-20150121.pdf | 168947<br>e117567b3f17a578bbcdee42895344c560589c93 | no | 9 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 6 | Foreign Reference | JP2014-013920v2.pdf | 1067725<br>fffd7126d11361663016b7ab575d7df646776946 | no | 40 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| | | **Total Files Size (in bytes):** | 4366184 | | |

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**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

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United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 14/167,405 | 01/29/2014 | Yu-Hsuan Guo | 1291-235.101 | 6471 |

106622 7590 07/01/2015

Blue Capital Law Firm, P.C.
611 Anton Blvd., Suite 1050
Costa Mesa, CA 92626

| EXAMINER |
|---|
| REYES ORTIZ, HECTOR E |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2472 | |

| NOTIFICATION DATE | DELIVERY MODE |
|---|---|
| 07/01/2015 | ELECTRONIC |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@bluecapitallaw.com



**Petitioners' Exhibit 1002, p. 136**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

| Office Action Summary | Application No. 14/167,405 | Applicant(s) GUO ET AL. | |
|---|---|---|---|
| | Examiner HECTOR REYES | Art Unit 2472 | AIA (First Inventor to File) Status No |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *01/29/2014*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims***

5)☒ Claim(s) *1-20* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☐ Claim(s) _____ is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☒ Claim(s) *1-20* are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

**Application Papers**

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.



**Petitioners' Exhibit 1002, p. 137**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

## DETAILED ACTION

## RESPONSE

This Office action is in response to the application No. 14/167,405 filed 01/29/2014.

Claims 1-20 are pending

## NOTICE OF PRE-AIA OR AIA STATUS

The present application is being examined under the pre-AIA first to invent provisions.

## ELECTION/RESTRICTIONS

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-5, drawn to handling inter-node connectivity aggregation, classified in H04W72/042.

II. Claims 6-20, drawn to handling inter-node connectivity path selection, classified in H04W40/02.

Inventions I and II are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (I) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (II) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the subcombination I has separate utility such as aggregating a secondary cell based on a plurality of factors, while subcombination II has separate utility such as the selecting a different path based on a plurality of factors.

The examiner has required restriction between combination and subcombination inventions. Where applicant elects a subcombination, and claims thereto are subsequently found allowable, any claim(s) depending from or otherwise requiring all the limitations of the allowable subcombination will be examined for patentability in accordance with 37 CFR 1.104. See MPEP § 821.04(a). Applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and/or examination burden if restriction were not required because one or more of the following reasons apply:

(a) the inventions require a different field of search (for example, searching different classes/subclasses or electronic resources, or employing different search queries);

(b) the prior art applicable to one invention would not likely be applicable to another invention;

and/or 35 U.S.C. 112, first paragraph.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of an invention to be examined even though the requirement may be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103 or pre-AIA 35 U.S.C. 103(a) of the other invention.

A telephone call was made on June 25, 2015 to request an oral election to the above restriction requirement, but did not result in an election being made.

## CONCLUSION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Héctor Reyes whose telephone number is (571) 270-0239 and the fax number is (571) 483-7161. The examiner can normally be reached on (Mon-Fri) 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on (571) 272-3088. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at (866) 217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call (800) 786-9199 (IN USA OR CANADA) or (571) 272-1000.

/H. R./

Examiner, Art Unit 2472

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | |
|---|---|
| Appl. No. | : 14/167,405 |
| Confirmation No. | : 6471 |
| Applicant | : Yu-Hsuan Guo |
| Filed | : January 29, 2014 |
| Title | : METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| TC/A.U. | : 2472 |
| Examiner | : Hector E. Reyes Ortiz |
| Docket No. | : 1291-235.101 (IS 1020044-US-D1) |
| Customer No. | : 106622 |

**RESPONSE TO RESTRICTION REQUIREMENT**

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In the Restriction Requirement of July 1, 2015, the Examiner has required election in the present application between:

Group I, claims 1-5, drawn to handling inter-node connectivity aggregation, classified in H04W72/042.

Group II, claims 6-20, drawn to handling inter-node connectivity path selection, classified in H04W40/02.

For the purpose of examination of the present application, Applicant elects without traverse Group II, claims 6-20.



**Petitioners' Exhibit 1002, p. 143**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

Should the Examiner find it necessary to speak with Applicant's attorney, he is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

Sang N. Dang

**BLUE CAPITAL LAW FIRM, P.C.**

Dated: August 31, 2015

/Sang N. Dang/

Reg. No. 51,186

Tel.: (714) 839-3800



**Petitioners' Exhibit 1002, p. 144**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | | |
|---|---|---|
| Applicants: | Yu-Hsuan Guo and Meng-Hui Ou | |
| Title: | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM | |
| Serial No.: | 14/167,405 | Filed: January 29, 2014 |
| Examiner: | Hector E. Reyes Ortiz | Group Art Unit: 2472 |
| Attorney Docket No.: | 1291-235.101 (IS102004-US-D1) | |

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**CERTIFICATE OF EFS-WEB TRANSMISSION**
**UNDER 37 CFR § 1.8**

I hereby certify that the enclosed 2 Page Amendment Transmittal; and 2 Page Response to Restriction Requirement are being transmitted to the United States Patent and Trademark Office via EFS-Web on August 31, 2015.

Date: August 31, 2015 /Sandy Kim/
Sandy Kim

Mailing Address:

**BLUE CAPITAL LAW FIRM, P.C. (Customer No.: 106622)**
611 Anton Blvd., Suite 1050
Costa Mesa, California 92626
Tel: 714-839-3800
Fax: 714-795-2995

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 23357853 |
| **Application Number:** | 14167405 |
| **International Application Number:** | |
| **Confirmation Number:** | 6471 |
| **Title of Invention:** | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| **First Named Inventor/Applicant Name:** | Yu-Hsuan Guo |
| **Customer Number:** | 106622 |
| **Filer:** | Sang N. Dang/Sandy Kim |
| **Filer Authorized By:** | Sang N. Dang |
| **Attorney Docket Number:** | 1291-235.101 |
| **Receipt Date:** | 31-AUG-2015 |
| **Filing Date:** | 29-JAN-2014 |
| **Time Stamp:** | 15:31:53 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | no |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | | 1291-235-101--ResponsetoRRasFiled08312015.pdf | 74975<br>5a5e3954d90c84b14591a797b4e24af020e45152 | yes | 5 |

| | Multipart Description/PDF files in .zip description | | |
|---|---|---|---|
| | **Document Description** | **Start** | **End** |
| | Transmittal Letter | 1 | 2 |
| | Response to Election / Restriction Filed | 3 | 4 |
| | Miscellaneous Incoming Letter | 5 | 5 |
| **Warnings:** | | | |
| **Information:** | | | |
| | **Total Files Size (in bytes):** | 74975 | |

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**
**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**
**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**
**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

# Amendment Transmittal Letter

| Docket Number |
|---|
| 1291-235.101 |

**Address To**
**Commissioner for Patents**
**P.O. Box 1450**
**Alexandria, Virginia 22313-1450**

**Title of Invention**

METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM

| | |
|---|---|
| First Named Inventor | Yu-Hsuan Guo |
| Application No. | 14/167,405 |
| Filing Date | January 29, 2014 |
| Examiner | Hector E. Reyes Ortiz |
| Art Unit | 2472 |

Transmitted herewith is an amendment in the above-identified application.

The fee has been calculated and is transmitted as shown below.

☐ **Applicant claims Small Entity Status.** See 37 CFR 1.27.

**Fee Calculation**

Claims as Amended

| For | #Filed | #Previously Paid For | #Extra | Rate | Fee |
|---|---|---|---|---|---|
| Total Claims | 15 | - 20 = | | x 80 = | |
| Total Indep. Claims | 2 | - 3 = | | x 420 = | |
| Multiple Dependent Claims (check if applicable) ☐ | | | | | |
| | | | | TOTAL | $0 |

**Method of Payment**

☐ Deposit Account ☐ Credit Card ☐ Check ☐ Money Order ☐ Other: _____

Deposit Account Number

**For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)**

☐ Charge the fee(s) set forth above
☐ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17
☐ Charge fee(s) indicated above, **except for the filing fee**
☐ Credit any overpayments

**WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on form PTO-2038.**

Amount Grand Total $0



**Petitioners' Exhibit 1002, p. 148**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

# Amendment Transmittal Letter

| Docket Number |
|---|
| 1291-235.101 |

## Correspondence Address

| | | | |
|---|---|---|---|
| Customer Number | 106622 | | |
| -OR- | | | |
| Name | | | |
| Address | | | |
| City | | State | |
| Country | | Postal Code | |
| Phone Number | | | |
| E-mail Address | | | |

## Certificate of Mailing by Express Mail

I hereby certify that this Amendment, accompanying documents, and fee (if appropriate) are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on the date indicated below:

*(Date of Mailing)*

*(Typed or Printed Name of Person Mailing Correspondence)*

*(Signature of Person Mailing Correspondence)*

*("Express Mail" Mailing Label Number)*

## Certificate of Mailing by First Class Mail

I hereby certify that this Amendment, accompanying documents, and fee (if appropriate) are being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on the date indicated below:

*(Date of Mailing)* *(Name of Person Mailing Correspondence)*

*(Signature of Person Mailing Correspondence)*

## Certificate of Transmission

I hereby certify that this Amendment, accompanying documents, and fee (if appropriate) authorization are being facsimile transmitted to the United States Patent and Trademark Office on the date indicated below:

*(Date of Transmission)* *(Name of Person Transmitting Correspondence)*

*(Signature of Person Transmitting Correspondence)*

## Signature Instructions

Select the name of the person who will electronically sign the Amendment from the drop-down box below.

If a practitioner is not present in the drop-down list, you must close this form and select 'Add Practitioner...' in the Form Manager's Utility menu.

**Verify that the signatory information is correct and press the 'eSign' button to electronically sign the submission. If you prefer to sign the form manually, simply do not click the 'eSign' button; just print and manually sign.**

**Signatory Drop-Down Box** Sang N. Dang

| | | | | | |
|---|---|---|---|---|---|
| Name | Sang N. Dang | | | Registration Number | 51,186 |
| Signatory Capacity | Attorney for Applicant(s) | E-mail Address | sdang@bluecapitallaw.com | | |
| eSign | /Sang N. Dang/ | | | Date Signed | 08/31/2015 |



Petitioners' Exhibit 1002, p. 149
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 14/167,405 | 01/29/2014 | Yu-Hsuan Guo | 1291-235.101 | 6471 |

106622 7590 10/07/2015

Blue Capital Law Firm, P.C.
611 Anton Blvd., Suite 1050
Costa Mesa, CA 92626

| EXAMINER |
|---|
| REYES ORTIZ, HECTOR E |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2472 | |

| NOTIFICATION DATE | DELIVERY MODE |
|---|---|
| 10/07/2015 | ELECTRONIC |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@bluecapitallaw.com



**Petitioners' Exhibit 1002, p. 150**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

| Office Action Summary | Application No. 14/167,405 | Applicant(s) GUO ET AL. | |
|---|---|---|---|
| | Examiner HECTOR REYES | Art Unit 2472 | AIA (First Inventor to File) Status No |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *08/31/2015*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims***

5)☒ Claim(s) *1-20* is/are pending in the application.

5a) Of the above claim(s) *1-5* is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *6-20* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

**Application Papers**

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *01/29/2014* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.



**Petitioners' Exhibit 1002, p. 151**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

## DETAILED ACTION

## ELECTION/RESTRICTIONS

Applicant's election without traverse of Group II, claims 6-20, in the reply filed on 08/31/2015 is acknowledged.

## RESPONSE

This Non-Final Office action is in response to application No. 14/167,405 filed on 01/29/2014. The application has being modified to conform to the restriction response cited above and filed on 08/31/2015.

Claims 1-5 have been withdrawn.

Claims 6-20 are pending.

## NOTICE OF PRE-AIA OR AIA STATUS

The present application is being examined under the pre-AIA first to invent provisions.

## INFORMATION DISCLOSURE STATEMENT

The Information Disclosure Statement (IDS) communication(s) submitted on 06/05/2015 and 10/17/2014 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the IDS communication(s) cited references have been considered in the examination of the claims now pending.

## OBJECTION

**Abstract** is objected to because the length exceeds the 150 words limit. Appropriate correction is required. See MPEP § 608.01(b).

**Claims 1-5** are objected to because the response to restriction fails to indicate that the claims are withdrawn from examination. Appropriate correction is required.

**REJECTION**

Claims 6-20 are rejected as follows.

***Claim Rejections - 35 USC § 102***

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

**Claims 6-7 and 12** are rejected under pre-AIA 35 U.S.C. 102(b) as being anticipated by Sambhwani et al. (US Publication No. 2013/0303224; based on provisional application No. 61/646,233 the effective filing date is May 2012; hereinafter referred to as Sambhwani).

**Regarding Claim 6,** Sambhwani discloses *transmitting a request from a first network node, which controls a first serving cell of a UE (User Equipment), to a second network node, which controls a second serving cell of the UE, to change a data path corresponding to a first type of transmission and/or reception of the UE from a first path to a different path* (A UE establish a first/second flow with a first/second network entity; see Figure 2, ¶ 0031-0032. Furthermore, the first entity RNC transmit a request to the second entity RNC to setup a multiflow leg; see ¶ 0033);

*wherein the first path is via the first network node and used as the data path corresponding to the first type of transmission and/or reception of the UE* (A user equipment establish a first flow with a first network entity; see Figure 2, ¶ 0031.)*, and*

*a second path is via the second network node and used as a data path corresponding to a second type of transmission and/or reception of the UE (*A user equipment establish a second flow with a second network entity; see Figure 2, ¶ 0032.).

**Regarding Claim 7,** Sambhwani discloses that *the different path is the second path (*A user equipment establish a second flow with a second network entity; see Figure 2, ¶ 0032.).

**Regarding Claim 12,** Sambhwani discloses that *the first network node is an eNB (evolved Node B) controlling the first serving cell or SCell (Secondary Cell) of the UE, and the second network node is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE* (A UE establish a first/second flow with a first/second network entity; see Figure 2, ¶ 0031-0032. Furthermore, the network entity is a base station or nodeB; see ¶ 0031).

## *Claim Rejections - 35 USC § 103*

**The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:**

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

**Claim 8** is rejected under pre-AIA 35 U.S.C. 103 as being unpatentable over Sambhwani et al. (US Publication No. 2013/0303224; based on provisional application No. 61/646,233 the effective filing date is May 2012; hereinafter referred to as Sambhwani) in view of Kakani et al. (US Publication No. 2011/0065440, hereinafter referred to as Kakani).

**Regarding Claim 8,** Sambhwani fails to disclose that *the first path is used as a data path corresponding to a third type of transmission and/or reception of the UE, and the request does not indicate to change the data path corresponding to the third type of transmission and/or reception of the UE.* However, in analogous art, Kakani discloses that the request include an information element that contain data stream ID for each stream to be switched; see ¶ 0006. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to in order to seamlessly transfer during a communication session without perceptible interruption in the delivery of content.

**Claim 9** is rejected under pre-AIA 35 U.S.C. 103 as being unpatentable over Sambhwani et al. (US Publication No. 2013/0303224; based on provisional application No. 61/646,233 the effective filing date is May 2012; hereinafter referred to as Sambhwani) in view of Sun et al. (US Publication No. 2014/0219198; effective filling date is August 2012 based on provisional application 61/523,196 and application 13/572,196; hereinafter referred to as Sun-II).

**Regarding Claim 9,** Sambhwani fails to disclose that *the first type of transmission and/or reception, the second type of transmission and/or reception, and the third type of transmission and/or reception are differentiated based on service type, radio bearer, logical channel, and/or QoS (Quality of Service) level.* However, in analogous art, Sun-II discloses that the bearer is associated with a different QoS depending on the application; see ¶ 0043. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to reduce mobility signaling and improve battery life.

**Claim 10** is rejected under pre-AIA 35 U.S.C. 103 as being unpatentable over Sambhwani et al. (US Publication No. 2013/0303224; based on provisional application No. 61/646,233 the effective filing date is May 2012; hereinafter referred to as Sambhwani) in view of Sun et al. (US Publication No. 2014/0177446; based on provisional application No. 61/515,763 the effective filing date is August 2011; hereinafter referred to as Sun).

**Regarding Claim 10,** Sambhwani fails to disclose *that the UE has multiple paths via different network nodes after the data path change*. However, in analogous art, Sun discloses the distribution of flow between to different networks; see Figure 1. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to lower the cost of transmission by allowing dual radio terminal to offload traffic.

**Claim 11** is rejected under pre-AIA 35 U.S.C. 103 as being unpatentable over Sambhwani et al. (US Publication No. 2013/0303224; based on provisional application No. 61/646,233 the effective filing date is May 2012; hereinafter referred to as Sambhwani) in view of Lindoff et al. (US Publication No. 2011/0111785, hereinafter referred to as Lindoff).

**Regarding Claim 11,** Sambhwani fails to disclose that *the request is triggered based on factors including a loading of a cell controlled by the first network node, and/or whether or not a QoS (Quality of Service) corresponding to the first type of transmission and/or reception of the UE could be guaranteed.* However, in analogous art, Lindoff discloses that the base station decide to transfer the data to a second carrier based on the quality or the capacity of the second carrier; see ¶ 0050-0051. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to minimizes power consumption on the user equipment in a multicarrier environment that.

**Claim 13** is rejected under pre-AIA 35 U.S.C. 103 as being unpatentable over Sambhwani et al. (US Publication No. 2013/0303224; based on provisional application No. 61/646,233 the effective filing date is May 2012; hereinafter referred to as

Sambhwani) in view of Kakani et al. (US Publication No. 2011/0065440, hereinafter referred to as Kakani).

**Regarding Claim 13,** Sambhwani discloses *transmitting a request from a first network node to a core network node to change a data path corresponding to a first type of transmission and/or reception of a UE (User Equipment) from a first path to a different path* (A UE establish a first/second flow with a first/second network entity; see Figure 2, ¶ 0031-0032. Furthermore, the first entity RNC transmit a request to the second entity RNC to setup a multiflow leg; see ¶ 0033)*;*

*wherein the first path is via the first network node and used as the data path corresponding to the first type and a third type of transmission and/or reception of the UE* (A user equipment establish a first flow with a first network entity; see Figure 2, ¶ 0031.)*,*

*a second path is via a second network node and used as a data path corresponding to a second type of transmission and/or reception of the UE* (A user equipment establish a second flow with a second network entity; see Figure 2, ¶ 0032.)*.*

Sambhwani fails to disclose that *the request does not indicate to change the data path corresponding to the third type of transmission and/or reception of the UE.* However, in analogous art, Kakani discloses that the request include an information element that contain data stream ID for each stream to be switched; see ¶ 0006. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to in order to seamlessly

transfer during a communication session without perceptible interruption in the delivery of content.

**Regarding Claim 14,** Sambhwani discloses that *the different path is the second path (*A user equipment establish a second flow with a second network entity; see Figure 2, ¶ 0032.).

**Regarding Claim 15,** Sambhwani discloses that *the request is not transmitted due to handover* (See Figure 2, ¶ 0033).

**Regarding Claim 19,** Sambhwani discloses that *the first network node is an eNB (evolved Node B) controlling a serving cell or SCell (Secondary Cell) of the UE, and the second network node is an eNB controlling a serving cell or PCell (Primary Cell) of the UE* (A UE establish a first/second flow with a first/second network entity; see Figure 2, ¶ 0031-0032. Furthermore, the network entity is a base station or nodeB; see ¶ 0031).

**Claims 16 and 20** are rejected under pre-AIA 35 U.S.C. 103 as being unpatentable over Sambhwani in view of Kakani and further in view of Sun et al. (US Publication No. 2014/0219198; effective filling date is August 2012 based on provisional application 61/523,196 and application 13/572,196; hereinafter referred to as Sun-II).

**Regarding Claim 16,** Sambhwani fails to disclose that *the first type of transmission and/or reception, the second type of transmission and/or reception, and the third type of transmission and/or reception are differentiated based on service type, radio bearer, logical channel, and/or QoS (Quality of Service) level.* However, in analogous art, Sun-II discloses that the bearer is associated with a different QoS depending on the application; see ¶ 0043. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to reduce mobility signaling and improve battery life.

**Regarding Claim 20,** Sambhwani fails to disclose that the *core network node is a MME (Mobility Management Entity) or a S-GW (Service Gateway).* However, in analogous art, Sun-II discloses that the eNodeB is controlled by the MME/S-GW; see Figure 2. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to reduce mobility signaling and improve battery life.

**Claim 17** is rejected under pre-AIA 35 U.S.C. 103 as being unpatentable over Sambhwani in view of Kakani and further in view of Sun et al. (US Publication No. 2014/0177446; based on provisional application No. 61/515,763 the effective filing date is August 2011; hereinafter referred to as Sun).

**Regarding Claim 17,** Sambhwani fails to disclose that *the UE has multiple paths via different network nodes after the data path change.* However, in analogous art, Sun discloses the distribution of flow between to different networks; see Figure 1. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to lower the cost of transmission by allowing dual radio terminal to offload traffic.

**Claim 18** is rejected under pre-AIA 35 U.S.C. 103 as being unpatentable over Sambhwani in view of Kakani and further in view of Lindoff et al. (US Publication No. 2011/0111785, hereinafter referred to as Lindoff).

**Regarding Claim 18,** Sambhwani fails to disclose that *the request is triggered based on factors including a loading of a cell controlled by the first network node, and/or whether or not a QoS (Quality of Service) corresponding to the first type of transmission and/or reception of the UE could be guaranteed.* However, in analogous art, Lindoff discloses that the base station decide to transfer the data to a second carrier based on the quality or the capacity of the second carrier; see ¶ 0050-0051. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to minimizes power consumption on the user equipment in a multicarrier environment that.

## CONCLUSION

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Please see PTO-892 form for considered prior art for record.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Héctor Reyes whose telephone number is (571) 270-0239 and the fax number is (571) 483-7161. The examiner can normally be reached on (Mon-Fri) 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on (571) 272-3088. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at (866) 217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call (800) 786-9199 (IN USA OR CANADA) or (571) 272-1000.

/H. R./

Examiner, Art Unit 2472

/ANH-VU LY/

Primary Examiner, Art Unit 2472

| Notice of References Cited | Application/Control No. 14/167,405 | Applicant(s)/Patent Under Reexamination GUO ET AL. | |
|---|---|---|---|
| | Examiner HECTOR REYES | Art Unit 2472 | Page 1 of 1 |

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| * | B | US-2011/0111785 A1 | 05-2011 | Lindoff; Bengt | H04W40/16 | 455/513 |
| * | C | US-2013/0176988 A1 | 07-2013 | Wang; Carl | H04W28/08 | 370/331 |
| * | D | US-2013/0303224 A1 | 11-2013 | SAMBHWANI; Sharad Deepak | H04W28/10 | 455/517 |
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| * | F | US-2014/0204777 A1 | 07-2014 | Huang; Anpeng | H04W36/28 | 370/252 |
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| | I | US- | | | | |
| | J | US- | | | | |
| | K | US- | | | | |
| | L | US- | | | | |
| | M | US- | | | | |

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| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Country | Name | CPC Classification |
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| * | | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

| Search Notes | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 14167405 | GUO ET AL. |
| | Examiner | Art Unit |
| | HECTOR REYES ORTIZ | 2472 |

| CPC- SEARCHED | | |
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| Symbol | Date | Examiner |
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| CPC COMBINATION SETS - SEARCHED | | |
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| Symbol | Date | Examiner |
| | | |

| US CLASSIFICATION SEARCHED | | | |
|---|---|---|---|
| Class | Subclass | Date | Examiner |
| | | | |

| SEARCH NOTES | | |
|---|---|---|
| Search Notes | Date | Examiner |
| Consulted Restriction | 9/29/2015 | HR |
| Consulted CPC | 9/29/2015 | HR |
| Consulted Search Strategy | 9/29/2015 | HR |
| Performed Double Patenting search | 9/29/2015 | HR |
| Performed NPL search | 9/29/2015 | HR |
| Performed text search in combination with the following CPC groups: H04W76/025, 064; H04L5/0096; H04W92/20; H04W36/385, 30, 04-08; H04W28/10,12 -- See EAST printout | 9/29/2015 | HR |

| INTERFERENCE SEARCH | | | |
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| US Class/ CPC Symbol | US Subclass / CPC Group | Date | Examiner |
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| /H.R./<br>Examiner.Art Unit 2472 | |

PTO/SB/08a (07-10)
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# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

**( Not for submission under 37 CFR 1.99)**

| | |
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| Application Number | 14167405 |
| Filing Date | 2014-01-29 |
| First Named Inventor | Yu-Hsuan Guo |
| Art Unit | 2472 |
| Examiner Name | Kizou, Hassan /Hector Reyes Ortiz/ |
| Attorney Docket Number | 1291-235.101 |

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| Examiner Initial* | Cite No | Patent Number | Kind Code[1] | Issue Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear |
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|---|---|---|---|

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Petitioners' Exhibit 1002, p. 167
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

| Receipt date: 10/17/2014 | Application Number | 14167405 14167405 - GAU: 2472 |
|---|---|---|
| **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** ( **Not for submission under 37 CFR 1.99**) | Filing Date | 2014-01-29 |
| | First Named Inventor | Yu-Hsuan Guo |
| | Art Unit | 2472 |
| | Examiner Name | Kizou, Hassan /Hector Reyes Ortiz/ |
| | Attorney Docket Number | 1291-235.101 |

| | | | |
|---|---|---|---|
| | 1 | 3GPP TS 36.321 V11.0.0 (2012-09) | ☐ |
| | 2 | Search Report on corresponding EP Patent Application No. 14152813.3 dated July 30, 2014 | ☐ |

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**EXAMINER SIGNATURE**

| Examiner Signature | /Hector Reyes Ortiz/ | Date Considered | 09/29/2015 |
|---|---|---|---|

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

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**EAST Search History**

**EAST Search History (Prior Art)**

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|---|---|---|---|---|---|---|
| S3 | 1 | (APP-000) \| 14/167405.APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:22 |
| S4 | 4 | (FMID-000) \| ("50002584".FMID.) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:22 |
| S5 | 99 | (INV-000) \| ( ((Yu \| Hsuan) near2 (Guo)).INV. & (( Meng \| Hui) near2 (Ou)).INV. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:24 |
| S6 | 23 | (INV-000) \| ( ((Yu \| Hsuan) near2 (Guo)).INV. & (( Meng \| Hui) near2 (Ou)).INV. ) & ( (cell).CLM. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:25 |
| S7 | 1 | (INV-000) \| ( ((Yu \| Hsuan) near2 (Guo)).INV. & (( Meng \| Hui) near2 (Ou)).INV. ) & ( (path).CLM. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:27 |
| S8 | 798 | (AS-000) \| ( (INNOVATIVE NEAR2 SONIC).AS. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:28 |
| S9 | 26 | (AS-000) \| ( (INNOVATIVE NEAR2 SONIC).AS. ) & ( path ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:28 |
| S10 | 256 | (CLM-000) \| ( (path).CLM. NEAR5 (different | US-PGPUB; | ADJ | ON | 2015/09/10 |

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| | | \| ((first \| primary) & second$3) \| multi$3).CLM. ) SAME ( (differentiated \| service type \| QoS \| quality of service).CLM. ) | USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | | | 17:15 |
| S11 | 27 | (CLM-000) \| ( (path).CLM. NEAR5 (different \| ((first \| primary) & second$3) \| multi$3).CLM. ) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!).CLM. ) & ( (differentiated \| service type \| QoS \| quality of service).CLM. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 17:54 |
| S15 | 15 | (IDS-000) \| ( (US "20120106511") \| (EP "2448325" \| US "20120106510") \| (JP "2014022895" \| US "20150195837") \| ("1020120046692" \| KR "20120046692" \| US "20120106510") ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 18:57 |
| S18 | 176 | (CPC-Classification) \| ( (path).CLM. NEAR5 (different \| ((first \| primary) & second$3) \| multi$3) ) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) & ( (differentiated \| service type \| QoS \| quality of service) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 20:08 |
| S19 | 2058 | (CPC-Classification) \| ( (path) NEAR5 (different \| ((first \| primary) & second$3) \| multi$3) ) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) & ( (differentiated \| service type \| QoS \| quality of service) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 20:08 |
| S20 | 4 | (CPC-000-CAT) \| ( (H04W76/064 & H04L5/0096 & H04W92/20 & H04W36/28).cpc. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 20:24 |
| S21 | 4 | (CPC-000-CAT) \| ( (H04W76/064 & H04L5/0096 & H04W92/20 ).cpc. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 20:24 |
| S22 | 22 | (CPC-000-CAT) \| ( (H04W76/064 & H04L5/0096).cpc. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 20:25 |
| S23 | 3208 | (CPC-000-CarrierAggregation-Schedulling-ConnectionManagement) \| ( (H04L5/$ \| H04L5/009$ \| H04L5/0096).CPC. & (H04W72/$ \| H04W72/12$ \| H04W72/0406 \| H04W72/042).CPC. & (H04W76/$ \| H04W76/06$ \| | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; | ADJ | ON | 2015/09/17 10:10 |

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|---|---|---|---|---|---|---|
| | | H04E76/064).CPC. ) | IBM_TDB | | | |
| S24 | 56 | (CPC-000-CarrierAggregation-Schedulling-ConnectionManagement) \| ( (H04L5/009$ \| H04L5/0096).CPC. & (H04W72/12$ \| H04W72/0406 \| H04W72/042).CPC. & (H04W76/06$ \| H04E76/064).CPC. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 10:10 |
| S25 | 217 | (CPC-000-CarrierAggregation-ConnectionManagement) \| ( (H04L5/009$ \| H04L5/0096).CPC. & (H04W76/06$ \| H04E76/064).CPC. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 10:25 |
| S27 | 133 | (CPC-000-CarrierAggregation) \| ( (H04L5/$).CPC. & (rerout$3 \| re rout$3) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 10:41 |
| S32 | 2458 | H04W$/$.CPC. & ( (path \| carrier \| CC \| componet ) NEAR5 (different \| ((first \| primary) & second$3) \| multi$3) ) NEAR10 ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) SAME10 ( (differentiated \| service type \| QoS \| quality of service \| quality) ) & (carrier aggregation \| CA! \| component carrier \| CC! \| multicomponent \| multicarrier) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 14:03 |
| S33 | 1732 | H04W$/$.CPC. & ( (path \| carrier \| CC \| componet ) NEAR5 (different \| ((first \| primary) & second$3) \| multi$3) ) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) SAME (carrier aggregation \| CA! \| component carrier \| CC! \| multicomponent \| multicarrier) ) SAME10 ( (differentiated \| service type \| QoS \| quality of service \| quality) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 14:13 |
| S34 | 195 | H04W76/$.CPC. & ( (path \| carrier \| CC \| componet ) NEAR5 (different \| ((first \| primary) & second$3) \| multi$3) ) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) SAME (carrier aggregation \| CA! \| component carrier \| CC! \| multicomponent \| multicarrier) ) SAME10 ( (differentiated \| service type \| QoS \| quality of service \| quality) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 14:14 |
| S35 | 1469 | H04W$/$.CPC. & ( ( (first \| primary \| serving \| PCC \| PCell) & (second$3 \| SCC \| SCell) ) NEAR5 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) SAME10 ( (differentiated \| service type \| QoS \| quality of service \| quality) & (carrier aggregation \| CA! \| component carrier \| CC! \| multicomponent \| multicarrier) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/18 10:19 |

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| S36 | 1 | ("2009/0191881").URPN. | USPAT | ADJ | ON | 2015/09/18 11:34 |
| S37 | 29 | ("20010016493" \| "20010030953" \| "20020091326" \| "20040043767" \| "20040053614" \| "20040203784" \| "20050153743" \| "20070129075" \| "20070293226" \| "20090052330" \| "20090061878" \| "20090117900" \| "20090191881" \| "20100167744" \| "20100173626" \| "20100178920" \| "20100190451" \| "20100267378" \| "20100291931" \| "20110064016" \| "20110256871" \| "20120094706" \| "4045794" \| "5095500" \| "5805666" \| "6611688" \| "8457638" \| "8472359" \| "8515415").PN. OR ("8971871").URPN. | US-PGPUB; USPAT; USOCR | ADJ | ON | 2015/09/18 11:35 |
| S38 | 4312 | H04W$/$.CPC. & ( (carrier \| CC!) NEAR5 (quality) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/18 11:41 |
| S39 | 90 | H04W$/$.CPC. & ( (carrier \| CC!) NEAR5 (quality) SAME degradat$3 ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/18 11:42 |
| S40 | 11 | (NPL-000) \|( ("8706124".pn.) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/18 13:19 |
| S41 | 27 | ("20020055343" \| "20040171384" \| "20050021885" \| "20050117601" \| "20050163093" \| "20050243849" \| "20060114813" \| "20070060082" \| "20070153729" \| "20070214490" \| "20070262913" \| "20080076353" \| "20090137206" \| "20090175374" \| "20090318075" \| "20100122284" \| "20100142416" \| "20100208633" \| "20100259682" \| "20100332822" \| "20110053521" \| "6760772" \| "7590426" \| "7639706" \| "8045922" \| "8102853" \| "8218654").PN. OR ("8706124").URPN. | US-PGPUB; USPAT; USOCR | ADJ | ON | 2015/09/18 13:20 |
| S44 | 396 | H04W76/$.CPC. & ( (path \| carrier \| CC \| componet) SAME ((first \| primary) & second$3)) SAME10 (carrier aggregation \| CA! \| component carrier \| CC! \| multicomponent \| multicarrier \| multiband \| multichannel) SAME10 ( (differentiated \| service type \| QoS \| quality of service \| quality) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/23 11:51 |
| S45 | 5 | (EDAN-14433541) \| ( ("20120094608" \| "20120236801").PN. ) | US-PGPUB; USPAT; USOCR; FPRS; | ADJ | ON | 2015/09/23 13:21 |



**Petitioners' Exhibit 1002, p. 172**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

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|---|---|---|---|---|---|---|
| | | | EPO; JPO; DERWENT; IBM_TDB | | | |
| S46 | 5 | ("2011/0103327").URPN. | USPAT | ADJ | ON | 2015/09/23 14:35 |
| S47 | 46 | H04W76/$.CPC. & ( (datapath \| path \| $3carrier \| CC \| component \| pdn ) NEAR5 (first \| primary \| serving \| second$3) ) SAME (inter (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| node) ) & ( (differentiated \| service type \| QoS \| quality of service \| quality) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 14:43 |
| S48 | 25 | H04W76/$.CPC. & H04W36/$.CPC. & H04W28/$.CPC. & (inter (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| node)) & (differentiated \| service type \| QoS \| quality of service \| quality) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 14:45 |
| S49 | 25 | (H04W76/064.CPC. \| H04W36/385.CPC. \| H04W28/0268.CPC. \| H04W40/12.CPC) & (inter (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| node)) & (differentiated \| service type \| QoS \| quality of service \| quality) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 14:56 |
| S50 | 2265 | (CPC-000-ReleaseConnection-ReselectionCore-TrafficMGMT-PathFinding) \| (H04W76/064.CPC. & (H04W36/385.CPC. \| H04W36/30 \| H04W36/04-08) \| (H04W28/0268.CPC. \| H04W40/12.CPC)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 15:48 |
| S52 | 91 | (CPC-000-ReleaseConnection-ReselectionCore-TrafficMGMT-PathFinding) \| (H04W76/064.CPC. & (H04W36/385.CPC. \| H04W36/30 \| H04W36/04-08) \| (H04W28/0268.CPC. \| H04W40/12.CPC)) & (carrier aggregation \| component carrier \| multicomponent \| multicarrier \| multiband \| multichannel) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 15:52 |
| S54 | 175 | (CPC-000-ReleaseConnection-ReselectionCore-TrafficMGMT-PathFinding) \| ((H04W36/385.CPC. \| H04W36/30 \| H04W36/04-08)) & (carrier aggregation \| component carrier \| multicomponent \| multicarrier \| multiband \| multichannel) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 16:04 |
| S55 | 1219 | (H04W76/$) & (carrier aggregation \| component carrier \| multicomponent \| multicarrier \| multiband \| multichannel) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 16:14 |
| S56 | 178 | (H04W76/$) & (carrier aggregation \| component carrier \| multicomponent \| multicarrier \| multiband \| multichannel) & (differentiated \| service type \| QoS \| | US-PGPUB; USPAT; USOCR; FPRS; | ADJ | ON | 2015/09/24 16:15 |



**Petitioners' Exhibit 1002, p. 173**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

| | | | | | | |
|---|---|---|---|---|---|---|
| | | quality of service \| quality) NOT ( (handover \| handoff \| hand (over \|off)) ) | EPO; JPO; DERWENT; IBM_TDB | | | |
| S59 | 308 | H04W$/$.CPC. & (inter (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| node)) SAME request SAME5 ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 16:42 |
| S60 | 3 | ("2013/0176988").URPN. | USPAT | ADJ | ON | 2015/09/24 16:55 |
| S61 | 144 | H04W$/$.CPC. & ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) SAME (reconfigur$5) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) WITH (request$3) WITH (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 19:19 |
| S62 | 520 | H04W76/$.CPC. & ( ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| first \| primary \| serving) NEAR10 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| second$3 \| serving \| other \| neighbor$5) SAME (request$3) ) SAME10 ( (quality \| service type \| differentiated \| QOS \| QOE \| CQI \| CSI \| TOS ) ) ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 20:25 |
| S63 | 8 | (EDAN-000-14224825) \|( ("20090253426" \| "20120005177" \| "20090253426" \| "20120005177" \| "20080167041" \| "20080167041").PN. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 20:57 |
| S64 | 65 | H04W28/10-12.CPC. & ( ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 21:34 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | station \| BS! \| BTS! \| first \| primary \| serving) NEAR10 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| second$3 \| serving \| other \| neighbor$5) SAME (request$3) ) SAME10 ( (quality \| service type \| differentiated \| QOS \| QOE \| CQI \| CSI \| TOS ) ) ) NOT ( (handover \| handoff \| hand (over \|off)) ) | | | | |
| S65 | 207 | (H04W28/$.CPC. & H04W76/$.CPC. & H04W36/$.CPC. & H04W92/20.CPC.) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 21:41 |
| S66 | 5 | (H04W28/10,12.CPC. & H04W76/$.CPC. & H04W36/$.CPC. & H04W92/20.CPC.) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 22:13 |
| S67 | 30 | ( H04W76/$.CPC. & H04W36/16,22,28.CPC. & H04W28/10,12.CPC. ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 22:15 |
| S68 | 356 | ( H04W76/025,064.CPC. &( H04W36/16,22,28.CPC. \| H04W28/10,12.CPC.) ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 22:19 |
| S69 | 293 | ( (H04W76/025,064.CPC. \| H04W36/16,22,28.CPC.) & H04W28/10,12.CPC. ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 22:19 |
| S70 | 413 | ( (H04W76/025,064.CPC. \| H04W28/10,12.CPC.) & H04W36/16,22,28.CPC. ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 22:20 |
| S71 | 724 | H04W76/$.CPC. & ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ADJ5 (request$3) ADJ5 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/28 18:29 |
| S72 | 51 | H04W76/$.CPC. & ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) | US-PGPUB; USPAT; | ADJ | ON | 2015/09/28 19:00 |



**Petitioners' Exhibit 1002, p. 175**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

| | | | | | | |
|---|---|---|---|---|---|---|
| | | \| base station \| BS! \| BTS!) ADJ5 (reallocat$3 \| reconfigur$5) ADJ5 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | | | |
| S73 | 322 | H04W$/$.CPC. & ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ADJ5 (reallocat$3 \| reconfigur$5) ADJ5 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/28 19:20 |
| S75 | 2 | (EAST-000-9084152) \| ( "20130303224".did. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/28 20:02 |
| S78 | 2 | "20140177446".did. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/28 21:21 |
| S79 | 2 | (EAST-000-2013022219) \| ( "20140177446".did. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/28 21:22 |
| S80 | 115 | (US-20140211759-$ or US-20080109695-$ or US-20020069238-$ or US-20020181395-$ or US-20030039246-$ or US-20030103465-$ or US-20030110290-$ or US-20060182119-$ or US-20070101018-$ or US-20070171816-$ or US-20070291648-$ or US-20080165683-$ or US-20080291827-$ or US-20140362829-$ or US-20150020157-$ or US-20120106511-$ or US-20150195837-$ or US-20120039200-$ or US-20070211658-$ or US-20090191881-$ or US-20110034175-$ or US-20110039593-$ or US-20110051685-$ or US-20110103221-$ or US-20110134774-$ or US-20110212693-$).did. or (US-20110317552-$ or US-20120039252-$ or US-20120082082-$ or US-20120099464-$ or US-20120213207-$ or US-20110053521-$ or US-20050163093-$ or US-20150264612-$ or US-20150263846-$ or US-20150172032-$ or US-20150133126-$ or US-20150124743-$ or US-20150110048-$ or US-20150094073-$ or US-20150055621-$ or US-20150016323-$ or US-20100303039-$ or US-20150004981-$ or US-20150003402-$ | US-PGPUB; USPAT; FPRS; DERWENT | ADJ | ON | 2015/09/28 21:46 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | or US-20140092787-$ or US-20140307622-$ or US-20140204777-$ or US-20130301439-$ or US-20130331077-$ or US-20130010716-$ or US-20120163205-$ or US-20110103327-$).did. or (US-20150009826-$ or US-20140050184-$ or US-20140044087-$ or US-20130183970-$ or US-20110269442-$ or US-20150156780-$ or US-20130217382-$ or US-20130176988-$ or US-20120057544-$ or US-20140295856-$ or US-20110105140-$ or US-20150201410-$ or US-20150201418-$ or US-20150117292-$ or US-20140301201-$ or US-20090253426-$ or US-20110111785-$ or US-20130329550-$ or US-20150124735-$ or US-20140321267-$ or US-20140269575-$ or US-20150140999-$ or US-20130303224-$ or US-20140177446-$).did. or (US-8724544-$ or US-8971871-$ or US-8706124-$).did. or (CN-103974459-$ or KR-20140097996-$ or EP-2448325-$ or EP-2770661-$ or WO-2014070347-$ or WO-2014171888-$ or WO-2013022219-$ or WO-2014169117-$ or WO-2014048294-$ or WO-2014003899-$ or WO-2012165893-$ or WO-2015065855-$ or EP-1418782-$).did. or (EP-2448325-$ or WO-2013191084-$ or US-20120106511-$ or EP-2257113-$ or US-20120236801-$ or WO-2014000610-$ or WO-2013022220-$ or WO-2014015734-$ or WO-2013153442-$ or WO-2013022219-$ or WO-2012006744-$ or WO-2011149081-$ or US-20140307622-$ or US-20130303224-$ or US-20110267978-$ or US-20040125748-$ or US-20150133122-$ or WO-2014017872-$ or WO-2014017874-$).did. | | | | |
| S81 | 100 | S80 & ( type \| channel \| carrier \| qos \| quality) | US-PGPUB; USPAT; FPRS; DERWENT | ADJ | ON | 2015/09/28 21:48 |
| S84 | 3 | (EAST-000-8706124) \| ( "20110065440".did. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/29 12:45 |
| S87 | 618 | (H04W76/$) & ( type \| channel \| carrier \| qos \| quality) NEAR5 (stream \| flow) SAME5 ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) | US-PGPUB; USPAT; FPRS; DERWENT | ADJ | ON | 2015/09/29 14:53 |
| S88 | 327 | (H04W76/$) & ( type \| channel \| carrier \| qos \| quality) NEAR5 (stream \| flow) SAME ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) | US-PGPUB; USPAT; FPRS; DERWENT | ADJ | ON | 2015/09/29 18:36 |



**Petitioners' Exhibit 1002, p. 177**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

| | | | | | | |
|---|---|---|---|---|---|---|
| | | (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) & (@ad \| @rlad )<= "20130130" | | | | |

**9/ 29/ 2015 7:01:12 PM**
**C:\ Users\ hreyes\ Desktop\ Applications\ 14167405_Carrier Aggregation - Path selection_RET_NF\ 14167405_EAST.wsp**

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# BIB DATA SHEET

**CONFIRMATION NO. 6471**

| SERIAL NUMBER | FILING or 371(c) DATE<br>RULE | CLASS | GROUP ART UNIT | ATTORNEY DOCKET NO. |
|---|---|---|---|---|
| 14/167,405 | 01/29/2014 | 370 | 2472 | 1291-235.101 |

**APPLICANTS**
INNOVATIVE SONIC CORPORATION, Taipei City, TAIWAN;

**INVENTORS**
Yu-Hsuan Guo, Taipei City, TAIWAN;
Meng-Hui Ou, Taipei City, TAIWAN;

**** CONTINUING DATA ***************************
This appln claims benefit of 61/758,418 01/30/2013
and claims benefit of 61/768,761 02/25/2013

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****
02/12/2014

| Foreign Priority claimed ☐ Yes ☑ No<br>35 USC 119(a-d) conditions met ☐ Yes ☑ No<br>Verified and Acknowledged /HECTOR E REYES ORTIZ/ Examiner's Signature | ☐ Met after Allowance<br>Initials | STATE OR COUNTRY | SHEETS DRAWINGS | TOTAL CLAIMS | INDEPENDENT CLAIMS |
|---|---|---|---|---|---|
| | | TAIWAN | 6 | 20 | 3 |

**ADDRESS**

Blue Capital Law Firm, P.C.
611 Anton Blvd., Suite 1050
Costa Mesa, CA 92626
UNITED STATES

**TITLE**

METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM

| FILING FEE RECEIVED | | |
|---|---|---|
| 1600 | FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following: | ☐ All Fees<br>☐ 1.16 Fees (Filing)<br>☐ 1.17 Fees (Processing Ext. of time)<br>☐ 1.18 Fees (Issue)<br>☐ Other _____<br>☐ Credit |

# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

**( Not for submission under 37 CFR 1.99)**

| | |
|---|---|
| Application Number | 14167405 |
| Filing Date | 2014-01-29 |
| First Named Inventor | Yu-Hsuan Guo |
| Art Unit | 2464 |
| Examiner Name | NGO, RICKY QUOC /Hector Reyes Ortiz/ |
| Attorney Docket Number | 1291-235.101 |

**U.S.PATENTS**

| Examiner Initial* | Cite No | Patent Number | Kind Code[1] | Issue Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|---|
| | 1 | | | | | |

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**U.S.PATENT APPLICATION PUBLICATIONS**

| Examiner Initial* | Cite No | Publication Number | Kind Code[1] | Publication Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear |
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**FOREIGN PATENT DOCUMENTS**

| Examiner Initial* | Cite No | Foreign Document Number[3] | Country Code[2] i | Kind Code[4] | Publication Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear | T[5] |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2014022895 | JP | A | 2014-02-03 | Sharpp Corp. | | ☐ |
| | 2 | 1020120046692 | KR | A | 2012-05-10 | Innovative Sonic Corporation | | ☐ |

If you wish to add additional Foreign Patent Document citation information please click the Add button

**NON-PATENT LITERATURE DOCUMENTS**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.R./



Petitioners' Exhibit 1002, p. 180
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

| Receipt date: 06/05/2015 | Application Number | 14167405 14167405 - GAU: 2472 |
|---|---|---|
| **INFORMATION DISCLOSURE STATEMENT BY APPLICANT** ( **Not for submission under 37 CFR 1.99**) | Filing Date | 2014-01-29 |
| | First Named Inventor | Yu-Hsuan Guo |
| | Art Unit | 2464 |
| | Examiner Name | NGO, RICKY QUOC /Hector Reyes Ortiz/ |
| | Attorney Docket Number | 1291-235.101 |

| Examiner Initials* | Cite No | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published. | T[5] |
|---|---|---|---|
| | 1 | LTE-Advanced: An Operator Perspective | ☐ |
| | 2 | Office Action on corresponding JP Patent Application No. 2014-013920 dated January 6, 2015 | ☐ |
| | 3 | Office Action on corresponding KR Patent Application No. 10-2014-0009620 dated January 21, 2015 | ☐ |

If you wish to add additional non-patent literature document citation information please click the Add button

**EXAMINER SIGNATURE**

| Examiner Signature | /Hector Reyes Ortiz/ | Date Considered | 09/29/2015 |
|---|---|---|---|

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.R./

| Index of Claims | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 14167405 | GUO ET AL. |
| | **Examiner** | **Art Unit** |
| | HECTOR REYES ORTIZ | 2472 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

| CLAIM | | DATE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Final | Original | 09/29/2015 | | | | | | | | |
| | 1 | N | | | | | | | | |
| | 2 | N | | | | | | | | |
| | 3 | N | | | | | | | | |
| | 4 | N | | | | | | | | |
| | 5 | N | | | | | | | | |
| | 6 | ✓ | | | | | | | | |
| | 7 | ✓ | | | | | | | | |
| | 8 | ✓ | | | | | | | | |
| | 9 | ✓ | | | | | | | | |
| | 10 | ✓ | | | | | | | | |
| | 11 | ✓ | | | | | | | | |
| | 12 | ✓ | | | | | | | | |
| | 13 | ✓ | | | | | | | | |
| | 14 | ✓ | | | | | | | | |
| | 15 | ✓ | | | | | | | | |
| | 16 | ✓ | | | | | | | | |
| | 17 | ✓ | | | | | | | | |
| | 18 | ✓ | | | | | | | | |
| | 19 | ✓ | | | | | | | | |
| | 20 | ✓ | | | | | | | | |



**Petitioners' Exhibit 1002, p. 182**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | | |
|---|---|---|
| Appl. No. | : | 14/167,405 |
| Confirmation No. | : | 6471 |
| Applicant | : | Yu-Hsuan Guo |
| Filed | : | January 29, 2014 |
| Title | : | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| TC/A.U. | : | 2472 |
| Examiner | : | Hector E. Reyes Ortiz |
| Docket No. | : | 1291-235.101 (IS 1020044-US-D1) |
| Customer No. | : | 106622 |

Dear Sir:

In response to the non-final Office Action mailed on October 7, 2015, having a three-month period for filing a response to **January 7, 2016**, please amend the above-identified application as follows:

**Claims** begin on page 2.

**Remarks** begin on page 7.



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**IPR2024-00991**

**IN THE CLAIMS:**

Claims 1-5 (Withdrawn)

6. (Currently Amended) A method for handling inter-node connectivity in a wireless communication system, comprising:

receiving, by a first network node, a first request from a second network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment);

transmitting an accept message from the first network node to the second network node in response to the first request; and

transmitting a second request from [[a]] the first network node, which controls a first serving cell of [[a]] the UE ~~(User Equipment)~~, to [[a]] the second network node, which controls a second serving cell of the UE, to change a data path for a first radio bearer ~~corresponding to a first type of transmission and/or reception~~ of the UE ~~from a first path to a different path~~;

wherein [[the]] a first path is via the first network node and used as the data path for the first radio bearer before changing the data path for the first radio bearer. ~~corresponding to the first type of transmission and/or reception of the UE, and~~

~~a second path is via the second network node and used as a data path corresponding to a second type of transmission and/or reception of the UE.~~

7. (Currently Amended) The method of claim 6, wherein the ~~different path is the second path~~ data path for the first radio bearer is changed to a second path, wherein the second path is via the second network node and used as a data path for a second radio bearer of the UE.

8. (Currently Amended) The method of claim 6, wherein the first path is used as a data path ~~corresponding to a third type of transmission and/or reception of the UE~~ for a third radio bearer of the UE, and the second request does not indicate to change the data path ~~corresponding to the third type of transmission and/or reception of the UE~~ for the third radio bearer.

9. (Currently Amended) The method of claim 6, wherein the second request includes a cause for data path changing. ~~the first type of transmission and/or reception, the second type of~~



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~~transmission and/or reception, and the third type of transmission and/or reception are differentiated based on service type, radio bearer, logical channel, and/or QoS (Quality of Service) level.~~

10. (Currently Amended) The method of claim 6, wherein the UE has multiple paths via different network nodes after the data path for the first radio bearer change.

11. (Currently Amended) The method of claim 6, further comprising:

receiving, by the first network node, a confirmation message from the second network node for changing the data path for the first radio bearer.

~~wherein the request is triggered based on factors including a loading of a cell controlled by the first network node, and/or whether or not a QoS (Quality of Service) corresponding to the first type of transmission and/or reception of the UE could be guaranteed.~~

12. (Currently Amended) The method of claim 6, wherein the first network node is an eNB (evolved Node B) controlling the first serving cell or the SCell ~~(Secondary Cell)~~ of the UE, and the second network node is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE.

13. (Currently Amended) A method for handling inter-node connectivity in a wireless communication system, comprising:

transmitting a first request from a second network node to a first network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment);

receiving, by the second network node, an accept message from the first network node in response to the first request;

~~transmitting~~ receiving, by the second network node which controls a second serving cell of the UE, a second request from [[a]] the first network node which controls a first serving cell of the UE ~~to a core network node to change a data path corresponding to a first type of transmission and/or reception of a UE (User Equipment) from a first path to a different path~~; and

changing a data path for a first radio bearer of the UE based on the second request;



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wherein [[the]] a first path is via the first network node and used as the data path for the first radio bearer before changing the data path for the first radio bearer. ~~corresponding to the first type and a third type of transmission and/or reception of the UE,~~

~~a second path is via a second network node and used as a data path corresponding to a second type of transmission and/or reception of the UE, and~~

~~the request does not indicate to change the data path corresponding to the third type of transmission and/or reception of the UE.~~

14. (Currently Amended) The method of claim 13, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the second network node and used as a data path for a second radio bearer of the UE ~~different path is the second path~~.

15. (Currently Amended) The method of claim 13, wherein the first path is used as a data path for a third radio bearer of the UE, and the second network node does not change the data path for the third radio bearer based on the second request ~~request is not transmitted due to handover~~.

16. (Currently Amended) The method of claim 13, further comprising:

transmitting a confirmation message from the second network node to the first network node for changing the data path for the first radio bearer.

~~wherein the first type of transmission and/or reception, the second type of transmission and/or reception, and the third type of transmission and/or reception are differentiated based on service type, radio bearer, logical channel, and/or QoS (Quality of Service) level.~~

17. (Currently Amended) The method of claim 13, wherein the UE has multiple paths via different network nodes after the data path for the first radio bearer change.

18. (Canceled)

19. (Currently Amended) The method of claim 13, wherein the first network node is an eNB (evolved Node B) controlling [[a]] the first serving cell or the SCell ~~(Secondary Cell)~~ of



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the UE, and the second network node is an eNB controlling [[a]] the second serving cell or PCell (Primary Cell) of the UE.

20. (Canceled)

21. (New) The method of claim 6, wherein the first network node terminates transmission and/or reception of the first radio bearer when receiving a confirmation message for the second request.

22. (New) A communication device to handle inter-node connectivity in a wireless communication system, comprising:

a control circuit;

a processor installed in the control circuit;

a memory installed in the control circuit and operatively coupled to the processor;

wherein the processor is configured to execute a program code stored in the memory to handle inter-node connectivity by:

receiving, by the communication device, a first request from a network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment);

transmitting an accept message from the communication device to the network node in response to the first request;

transmitting a second request from the communication device, which controls a first serving cell of the UE, to the network node, which controls a second serving cell of the UE, to change a data path for a first radio bearer of the UE;

wherein a first path is via the communication device and used as the data path for the first radio bearer before changing the data path for the first radio bearer.

23. (New) The communication device of claim 22, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the second network node and used as a data path for a second radio bearer of the UE.



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24. (New) The communication device of claim 22, wherein the first path is used as a data path for a third radio bearer of the UE, and the second request does not indicate to change the data path for the third radio bearer.

25. (New) The communication device of claim 22, wherein the second request includes a cause for data path changing.

26. (New) The communication device of claim 22, wherein the UE has multiple paths via different network nodes after the data path for the first radio bearer change.

27. (New) The communication device of claim 22, further comprising: receiving, by the communication device, a confirmation message from the network node for changing the data path for the first radio bearer.

28. (New) The communication device of claim 22, wherein the communication device is an eNB (evolved Node B) controlling the first serving cell or the SCell of the UE, and the network node is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE.

29. (New) The communication device of claim 22, wherein the communication device terminates transmission and/or reception of the first radio bearer when receiving a confirmation message for the second request.

30. (New) A communication device to handle inter-node connectivity in a wireless communication system, comprising:

a control circuit;

a processor installed in the control circuit;

a memory installed in the control circuit and operatively coupled to the processor;

wherein the processor is configured to execute a program code stored in the memory to handle inter-node connectivity by:

transmitting a first request from the communication device to a network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment);



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receiving, by the communication device, an accept message from the network node in response to the first request;

receiving, by the communication device which controls a second serving cell of the UE, a second request from the network node which controls a first serving cell of the UE; and

changing a data path for a first radio bearer of the UE based on the second request;

wherein a first path is via the network node and used as the data path for the first radio bearer before changing the data path for the first radio bearer.

31. (New) The communication device of claim 30, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the communication device and used as a data path for a second radio bearer of the UE.

32. (New) The communication device of claim 30, wherein the first path is used as a data path for a third radio bearer of the UE, and the communication device does not change the data path for the third radio bearer based on the second request.

33. (New) The communication device of claim 30, further comprising: transmitting a confirmation message from the communication device to the network node for changing the data path for the first radio bearer.

34. (New) The communication device of claim 30, wherein the UE has multiple paths via different network nodes after the data path for the first radio bearer change.

35. (New) The communication device of claim 30, wherein the network node is an eNB (evolved Node B) controlling the first serving cell or the SCell of the UE, and the communication device is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE.



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## REMARKS

Claims 6-20 are pending in the application.

### I. Objections

The Office Action objects to the Abstract because the length exceeds the 150-word limit. *See* Office Action, Page 3. Applicant respectfully submits a revised Abstract in conjunction with this Response for consideration.

The Office Action objects to claims 1-5 because the response to restriction fails to indicate that the claims are withdrawn from examination. *See* Office Action, Page 3. Applicant respectfully withdraws claims 1-5 from examination in response to the Restriction Requirement dated July 1, 2015.

### II. Claim Rejections

Claims 6-20 stand rejected as follows:

- Claims 6-7 and 12 stand rejected under 35 U.S.C. § 102 as being anticipated by Sambhwani (U.S. Patent Publication No. 2013/0303224). *See* Office Action, Page 4.

- Claims 8, 13-15, and 19 stand rejected under 35 U.S.C. § 103 based on the combination of Sambhwani and Kakani (U.S. Patent Publication No. 2011/0065440). *See* Office Action, Pages 6 and 9.

- Claim 9 stands rejected under 35 U.S.C. § 103 based on the combination of Sambhwani and Sun I (U.S. Patent Publication No. 2014/0219198). *See* Office Action, Page 6.

- Claim 10 stands rejected under 35 U.S.C. § 103 based on the combination of Sambhwani and Sun II (U.S. Patent Publication No. 2014/0177446). *See* Office Action, Page 7.

- Claim 11 stands rejected under 35 U.S.C. § 103 based on the combination of Sambhwani and Lindoff (U.S. Patent Publication No. 2011/0111785). *See* Office Action, Pages 8 and 10.

- Claims 16 and 20 stand rejected under 35 U.S.C. § 103 based on the combination of Sambhwani, Kakani, and Sun I. *See* Office Action, Page 10.

- Claim 17 stands rejected under 35 U.S.C. § 103 based on the combination of Sambhwani,



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Kakani, and Sun II. *See* Office Action, Page 11.

- Claim 18 stands rejected under 35 U.S.C. § 103 based on the combination of Sambhwani, Kakani, and Lindoff. *See* Office Action, Page 12.

Claims 18 and 20 have been cancelled. Claims 6-17 and 19 have been amended. The claim amendments are supported at least by Paragraphs [0040], [0042]-[0043], [0047], [0049], and [0051]-[0054] of the present application. New claims 21-35 have been added. In particular, claims 22-29 are apparatus claims corresponding to method claims 6-12 and 21, while claims 30-35 are apparatus claims corresponding to method claims 13-17 and 19. No new matter has been added. Applicant respectfully requests reconsideration of the claims as amended and added.

Claims 6 and 22 are directed to a transmitter of the request. Claim 6 recites "receiving, by a first network node, a first request from a second network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment)" and "transmitting an accept message from the first network node to the second network node in response to the first request". Similarly, claim 22 recites "receiving, by the communication device, a first request from a network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment)" and "transmitting an accept message from the communication device to the network node in response to the first request."

Claims 13 and 30 are directed to a receiver of the request. Claim 13 recites "transmitting a first request from a second network node to a first network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment)" and "receiving, by the second network node, an accept message from the first network node in response to the first request. Similarly, claim 30 recites "transmitting a first request from the communication device to a network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment)" and "receiving, by the communication device, an accept message from the network node in response to the first request".

The Office Action suggests that cites to Paragraphs [0031]-[0033] of Sambhwani in rejecting the claims. *See* Office Action, Page 4. As recited in the claims, the second network node is the one to decide to add a cell of the first network node to serve the UE. Paragraph [0033] of Sambhwani discloses that a radio link setup request is transmitted from S-RNC to D-RNC. Therefore, the second network node recited in the claims may correspond to S-RNC disclosed in Sambhwani, and the first network node recited in the claims may correspond to D-RNC disclosed in Sambhwani.



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In addition, claim 6 recites "transmitting a second request from ~~a~~ the first network node, which controls a first serving cell of the UE, to the second network node, which controls a second serving cell of the UE, to change a data path for a first radio bearer of the UE; wherein a first path is via the first network node and used as the data path for the first radio bearer before changing the data path for the first radio bearer." Similarly, claim 22 recites "transmitting a second request from the communication device, which controls a first serving cell of the UE, to the network node, which controls a second serving cell of the UE, to change a data path for a first radio bearer of the UE; wherein a first path is via the communication device and used as the data path for the first radio bearer before changing the data path for the first radio bearer."

As discussed above, claims 13 and 30 are directed to a receiver of the request. Claim 13 recites "receiving, by the second network node which controls a second serving cell of the UE, a second request from the first network node which controls a first serving cell of the UE" and "changing a data path for a first radio bearer of the UE based on the second request; wherein a first path is via the first network node and used as the data path for the first radio bearer before changing the data path for the first radio bearer." Similarly, claim 30 recites "receiving, by the communication device which controls a second serving cell of the UE, a second request from the network node which controls a first serving cell of the UE" and "changing a data path for a first radio bearer of the UE based on the second request; wherein a first path is via the network node and used as the data path for the first radio bearer before changing the data path for the first radio bearer."

Applicant respectfully submits that the cited prior art references do not disclose the noted limitations of claims 6, 13, 22, and 30. In particular, based on the noted limitations, the first network node can transmit a request to the second network node to move a radio bearer away from the first network node (for example, back to the second network node as recited in claims 7 and 23).

In contrast, Sambhwani fails to disclose that D-RNC (which may correspond to the first network node recited in claim 6) could transmit a request to S-RNC (which may correspond to the second network node recited in claim 6) to move a radio bearer away from the D-RNC. Sambhwani also fails to disclose any incentives to do so.

For the reasons discussed above, Applicant respectfully submits that claims 6-17 and 19 and new claims 22-35 are patentable over any combination of Sambhwani, Kakani, Sun I, Sun II,



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and/or Lindoff.

In view of the foregoing it is respectfully submitted that the pending claims are in condition for allowance. Reconsideration of the rejections is requested. Allowance of the claims at an early date is solicited. The Examiner is invited to contact Applicant's undersigned counsel by telephone at (714) 839-3800 to expedite the prosecution of this case should there be any unresolved matters remaining.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made.

Respectfully submitted,
Sang N. Dang
**BLUE CAPITAL LAW FIRM, P.C.**

Dated: January 7, 2016

/Sang N. Dang/
Reg. No. 51,186
Tel.: (714) 839-3800
Tel.: (714) 839-3800



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**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | | |
|---|---|---|
| Applicants: | Yu-Hsuan Guo and Meng-Hui Ou | |
| Title: | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM | |
| Serial No.: | 14/167,405 | Filed: January 29, 2014 |
| Examiner: | Hector E. Reyes Ortiz | Group Art Unit: 2472 |
| Attorney Docket No.: | 1291-235.101 (IS102004-US-D1) | |

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**CERTIFICATE OF EFS-WEB TRANSMISSION**
**UNDER 37 CFR § 1.8**

I hereby certify that the enclosed 2 Page Amendment Transmittal; and 11 Page Amendment are being transmitted to the United States Patent and Trademark Office via EFS-Web on January 7, 2016.

Date: January 7, 2016 /Sandy Kim/
Sandy Kim

Mailing Address:

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Costa Mesa, California 92626
Tel: 714-839-3800
Fax: 714-795-2995

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | 14167405 |
| **Filing Date:** | 29-Jan-2014 |
| **Title of Invention:** | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| **First Named Inventor/Applicant Name:** | Yu-Hsuan Guo |
| **Filer:** | Sang N. Dang/Sandy Kim |
| **Attorney Docket Number:** | 1291-235.101 |

Filed as Large Entity

**Filing Fees for Utility under 35 USC 111(a)**

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| **Pages:** | | | | |
| **Claims:** | | | | |
| Claims in Excess of 20 | 1202 | 8 | 80 | 640 |
| Independent claims in excess of 3 | 1201 | 1 | 420 | 420 |
| **Miscellaneous-Filing:** | | | | |
| **Petition:** | | | | |
| **Patent-Appeals-and-Interference:** | | | | |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Post-Allowance-and-Post-Issuance:** | | | | |
| **Extension-of-Time:** | | | | |
| **Miscellaneous:** | | | | |
| | | **Total in USD ($)** | | **1060** |

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 24556833 |
| **Application Number:** | 14167405 |
| **International Application Number:** | |
| **Confirmation Number:** | 6471 |
| **Title of Invention:** | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| **First Named Inventor/Applicant Name:** | Yu-Hsuan Guo |
| **Customer Number:** | 106622 |
| **Filer:** | Sang N. Dang/Sandy Kim |
| **Filer Authorized By:** | Sang N. Dang |
| **Attorney Docket Number:** | 1291-235.101 |
| **Receipt Date:** | 07-JAN-2016 |
| **Filing Date:** | 29-JAN-2014 |
| **Time Stamp:** | 14:25:41 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | no |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | | 1291-235-101--ROAof10072015asFiled01072016.pdf | 128174<br>5521cbd60b8f6cf869da4138853f63eb91bccb6f | yes | 14 |

| | Multipart Description/PDF files in .zip description | | |
|---|---|---|---|
| | **Document Description** | **Start** | **End** |
| | Transmittal Letter | 1 | 2 |
| | Amendment/Req. Reconsideration-After Non-Final Reject | 3 | 3 |
| | Claims | 4 | 9 |
| | Applicant Arguments/Remarks Made in an Amendment | 10 | 13 |
| | Miscellaneous Incoming Letter | 14 | 14 |

| | | | | | |
|---|---|---|---|---|---|
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 2 | Fee Worksheet (SB06) | fee-info.pdf | 32351<br>c79173e6ac4f22b51d37472974d8557b00d3540e | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| | | **Total Files Size (in bytes):** | 160525 | | |

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

# Amendment Transmittal Letter

| Docket Number |
|---|
| 1291-235.101 |

**Address To**
**Commissioner for Patents**
**P.O. Box 1450**
**Alexandria, Virginia 22313-1450**

**Title of Invention**

**METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM**

| | |
|---|---|
| First Named Inventor | **Yu-Hsuan Guo** |
| Application No. | **14/167,405** |
| Filing Date | **January 29, 2014** |
| Examiner | **Hector E. Reyes Ortiz** |
| Art Unit | **2472** |

Transmitted herewith is an amendment in the above-identified application.

The fee has been calculated and is transmitted as shown below.

☐ **Applicant claims Small Entity Status.** See 37 CFR 1.27.

**Fee Calculation**

Claims as Amended

| For | #Filed | #Previously Paid For | #Extra | Rate | Fee |
|---|---|---|---|---|---|
| Total Claims | 28 | - 20 = | 8 | x 80 = | $640 |
| Total Indep. Claims | 4 | - 3 = | 1 | x 420 = | $420 |
| Multiple Dependent Claims (check if applicable) ☐ | | | | | |
| | | | | TOTAL | $1060 |

**Method of Payment**

☐ Deposit Account ☒ Credit Card ☐ Check ☐ Money Order ☐ Other: _____

Deposit Account Number

**For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)**

☐ Charge the fee(s) set forth above
☐ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17
☐ Charge fee(s) indicated above, **except for the filing fee**
☐ Credit any overpayments

**WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on form PTO-2038.**

Amount Grand Total $1060



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**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

# Amendment Transmittal Letter

| Docket Number |
|---|
| 1291-235.101 |

| Correspondence Address | | | |
|---|---|---|---|
| Customer Number | 106622 | | |
| -OR- | | | |
| Name | | | |
| Address | | | |
| City | | State | |
| Country | | Postal Code | |
| Phone Number | | | |
| E-mail Address | | | |

## Certificate of Mailing by Express Mail

I hereby certify that this Amendment, accompanying documents, and fee (if appropriate) are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on the date indicated below:

*(Date of Mailing)*

*(Typed or Printed Name of Person Mailing Correspondence)*

*(Signature of Person Mailing Correspondence)*

*("Express Mail" Mailing Label Number)*

## Certificate of Mailing by First Class Mail

I hereby certify that this Amendment, accompanying documents, and fee (if appropriate) are being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on the date indicated below:

*(Date of Mailing)* *(Name of Person Mailing Correspondence)*

*(Signature of Person Mailing Correspondence)*

## Certificate of Transmission

I hereby certify that this Amendment, accompanying documents, and fee (if appropriate) authorization are being facsimile transmitted to the United States Patent and Trademark Office on the date indicated below:

*(Date of Transmission)* *(Name of Person Transmitting Correspondence)*

*(Signature of Person Transmitting Correspondence)*

### Signature Instructions

Select the name of the person who will electronically sign the Amendment from the drop-down box below.

If a practitioner is not present in the drop-down list, you must close this form and select 'Add Practitioner...' in the Form Manager's Utility menu.

**Verify that the signatory information is correct and press the 'eSign' button to electronically sign the submission. If you prefer to sign the form manually, simply do not click the 'eSign' button; just print and manually sign.**

**Signatory Drop-Down Box** Sang N. Dang

| Name | Sang N. Dang | | Registration Number | 51,186 |
|---|---|---|---|---|
| Signatory Capacity | Attorney for Applicant(s) | E-mail Address | sdang@bluecapitallaw.com | |
| eSign | /Sang N. Dang/ | | Date Signed | 01/07/2016 |



Petitioners' Exhibit 1002, p. 200
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | 14167405 |
| **Filing Date:** | 29-Jan-2014 |
| **Title of Invention:** | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| **First Named Inventor/Applicant Name:** | Yu-Hsuan Guo |
| **Filer:** | Sang N. Dang/Sandy Kim |
| **Attorney Docket Number:** | 1291-235.101 |

Filed as Large Entity

**Filing Fees for Utility under 35 USC 111(a)**

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| **Pages:** | | | | |
| **Claims:** | | | | |
| Claims in Excess of 20 | 1202 | 8 | 80 | 640 |
| Independent claims in excess of 3 | 1201 | 1 | 420 | 420 |
| **Miscellaneous-Filing:** | | | | |
| **Petition:** | | | | |
| **Patent-Appeals-and-Interference:** | | | | |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Post-Allowance-and-Post-Issuance:** | | | | |
| **Extension-of-Time:** | | | | |
| **Miscellaneous:** | | | | |
| | | **Total in USD ($)** | | **1060** |

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 24557088 |
| **Application Number:** | 14167405 |
| **International Application Number:** | |
| **Confirmation Number:** | 6471 |
| **Title of Invention:** | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| **First Named Inventor/Applicant Name:** | Yu-Hsuan Guo |
| **Customer Number:** | 106622 |
| **Filer:** | Sang N. Dang/Sandy Kim |
| **Filer Authorized By:** | Sang N. Dang |
| **Attorney Docket Number:** | 1291-235.101 |
| **Receipt Date:** | 07-JAN-2016 |
| **Filing Date:** | 29-JAN-2014 |
| **Time Stamp:** | 14:31:43 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | yes |
| Payment Type | Credit Card |
| Payment was successfully received in RAM | $1060 |
| RAM confirmation Number | 889 |
| Deposit Account | |
| Authorized User | |

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Fee Worksheet (SB06) | fee-info.pdf | 32351<br>1928df1f9d016f96fbf40a9bd24b21fb908ad80f | no | 2 |

**Warnings:**

**Information:**

| Total Files Size (in bytes): | 32351 |
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**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

UNITED STATES PATENT AND TRADEMARK OFFICE

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106622 e 2016-02-03

Blue Capital Law Firm, P.C.
611 Anton Blvd., Suite 1050
Costa Mesa, CA 92626

**Paper No.**

| | | | |
|---|---|---|---|
| **Application No.:** | **14/167,405** | **Date Mailed:** | **2016-02-03**<br>**ELECTRONIC** |
| First Named Inventor: | Yu-Hsuan Guo | Examiner: | REYES ORTIZ, HECTOR E |
| Attorney Docket No.: | 1291-235.101 | Art Unit: | 2472 |
| Confirmation No.: | 6471 | Filing Date: | 01/29/2014 |

**Please find attached an Office communication concerning this application or proceeding.**

**Commissioner for Patents**

PTO-90c (Rev.08-06)

| Notice of Non-Compliant Amendment (37 CFR 1.121) | Application No. 14/167,405 | Applicant(s) GUO ET AL. |
|---|---|---|
| | | Art Unit OPES |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

The amendment document filed on *07 January, 2016* is considered non-compliant because it has failed to meet the requirements of 37 CFR 1.121 or 1.4. In order for the amendment document to be compliant, correction of the following item(s) is required.

THE FOLLOWING MARKED (X) ITEM(S) CAUSE THE AMENDMENT DOCUMENT TO BE NON-COMPLIANT:

- ☐ 1. Amendments to the specification:
  - ☐ A. Amended paragraph(s) do not include markings.
  - ☐ B. New paragraph(s) should not be underlined.
  - ☐ C. Other _____.
- ☐ 2. Abstract:
  - ☐ A. Not presented on a separate sheet. 37 CFR 1.72.
  - ☐ B. Other _____.
- ☐ 3. Amendments to the drawings:
  - ☐ A. The drawings are not properly identified in the top margin as "Replacement Sheet," "New Sheet," or "Annotated Sheet" as required by 37 CFR 1.121(d).
  - ☐ B. The practice of submitting proposed drawing correction has been eliminated. Replacement drawings showing amended figures, without markings, in compliance with 37 CFR 1.84 are required.
  - ☐ C. Other _____.
- ☒ 4. Amendments to the claims:
  - ☐ A. A complete listing of all of the claims is not present.
  - ☒ B. The listing of claims does not include the text of all pending claims (including withdrawn claims)
  - ☐ C. Each claim has not been provided with the proper status identifier, and as such, the individual status of each claim cannot be identified. Note: the status of every claim must be indicated after its claim number by using one of the following status identifiers: (Original), (Currently amended), (Canceled), (Previously presented), (New), (Not entered), (Withdrawn) and (Withdrawn-currently amended).
  - ☐ D. The claims of this amendment paper have not been presented in ascending numerical order.
  - ☐ E. Other: _____.
- ☐ 5. Other (e.g., the amendment is unsigned or not signed in accordance with 37 CFR 1.4): For further explanation of the amendment format required by 37 CFR 1.121, see MPEP § 714.

TIME PERIODS FOR FILING A REPLY TO THIS NOTICE:

1. Applicant is given **no new time period if the non-compliant amendment is an** after-final amendment or an amendment filed after allowance, or a drawing submission (only) If applicant wishes to resubmit the non-compliant after-final amendment with corrections, the **entire corrected amendment** must be resubmitted.

2. Applicant is given **two months** from the mail date of this notice to supply the correction, if the non-compliant amendment is one of the following: a preliminary amendment, a non-final amendment (including a submission for a request for continued examination (RCE) under 37 CFR 1.114), a supplemental amendment filed within a suspension period under 37 CFR 1.103(a) or (c), and an amendment filed in response to a Quayle action. If any of above boxes 1 to 4 are checked, the correction required is only the corrected section of the non-compliant amendment in compliance with 37 CFR 1.121.

**Extensions of time** are available under 37 CFR 1.136(a) only if the non-compliant amendment is a non-final amendment or an amendment filed in response to a *Quayle* action.

**Failure to timely respond** to this notice will result in:

**Abandonment** of the application if the non-compliant amendment is a non-final amendment or an amendment filed in response to a *Quayle* action; or

**Non-entry** of the amendment if the non-compliant amendment is a preliminary amendment or supplemental amendment.

Legal Instruments Examiner (LIE), if applicable /PARTHENIA D. MERRILL/ Telephone No: (571)272-1636

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

| PATENT APPLICATION FEE DETERMINATION RECORD<br>Substitute for Form PTO-875 | Application or Docket Number<br>14/167,405 | Filing Date<br>01/29/2014 | ☐ To be Mailed |
|---|---|---|---|

**ENTITY**: ☒ LARGE ☐ SMALL ☐ MICRO

## APPLICATION AS FILED – PART I

| FOR | (Column 1) NUMBER FILED | (Column 2) NUMBER EXTRA | RATE ($) | FEE ($) |
|---|---|---|---|---|
| ☐ BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | |
| ☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | N/A | |
| ☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | minus 20 = | * | X $ = | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | minus 3 = | * | X $ = | |
| ☐ APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | |
| ☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | |

## APPLICATION AS AMENDED – PART II

AMENDMENT

| 01/07/2016 | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|
| Total (37 CFR 1.16(i)) | * 28 | Minus | ** 20 | = 8 | X $80 = | 640 |
| Independent (37 CFR 1.16(h)) | * 4 | Minus | ***3 | = 1 | X $420 = | 420 |
| ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | TOTAL ADD'L FEE | 1060 |

AMENDMENT

| | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|
| Total (37 CFR 1.16(i)) | * | Minus | ** | = | X $ = | |
| Independent (37 CFR 1.16(h)) | * | Minus | *** | = | X $ = | |
| ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | TOTAL ADD'L FEE | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/PARTHENIA D. MERRILL/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | | |
|---|---|---|
| Appl. No. | : | 14/167,405 |
| Confirmation No. | : | 6471 |
| Applicant | : | Yu-Hsuan Guo |
| Filed | : | January 29, 2014 |
| Title | : | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| TC/A.U. | : | 2472 |
| Examiner | : | Hector E. Reyes Ortiz |
| Docket No. | : | 1291-235.101 (IS 1020044-US-D1) |
| Customer No. | : | 106622 |

Dear Sir:

In response to the Notice of Non-Compliant Amendment mailed on February 3, 2016, please amend the above-identified application as follows:

**Claims** begin on page 2.

**Remarks** begin on page 9.



**Petitioners' Exhibit 1002, p. 209**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

**IN THE CLAIMS:**

1. (Withdrawn) A method for handling inter-node connectivity in a wireless communication system, comprising:

transmitting a request from a first network node to a second network node to stop aggregating a SCell (Secondary Cell) for a UE (User Equipment);

wherein the first network node controls the SCell and the second network node controls PCell (Primary Cell) of the UE.

2. (Withdrawn) The method of claim 1, wherein the request is a SCell release request message.

3. (Withdrawn) The method of claim 1, wherein the first network node and the second network node are eNBs (evolved Node B).

4. (Withdrawn) The method of claim 1, wherein the SCell is a small cell and the PCell is a macro cell.

5. (Withdrawn) The method of claim 1, wherein the request is triggered based on factors including a loading of the SCell and/or whether or not a QoS for the UE could be guaranteed.

6. (Currently Amended) A method for handling inter-node connectivity in a wireless communication system, comprising:

receiving, by a first network node, a first request from a second network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment);

transmitting an accept message from the first network node to the second network node in response to the first request; and

transmitting a second request from [[a]] the first network node, which controls a first serving cell of [[a]] the UE ~~(User Equipment)~~, to [[a]] the second network node, which controls a second serving cell of the UE, to change a data path for a first radio bearer ~~corresponding to a first type of transmission and/or reception~~ of the UE ~~from a first path to a different path~~;



**Petitioners' Exhibit 1002, p. 210**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

wherein [[the]] a first path is via the first network node and used as the data path for the first radio bearer before changing the data path for the first radio bearer. ~~corresponding to the first type of transmission and/or reception of the UE, and~~

~~a second path is via the second network node and used as a data path corresponding to a second type of transmission and/or reception of the UE.~~

7. (Currently Amended) The method of claim 6, wherein the ~~different path is the second path~~ data path for the first radio bearer is changed to a second path, wherein the second path is via the second network node and used as a data path for a second radio bearer of the UE.

8. (Currently Amended) The method of claim 6, wherein the first path is used as a data path ~~corresponding to a third type of transmission and/or reception of the UE~~ for a third radio bearer of the UE, and the second request does not indicate to change the data path ~~corresponding to the third type of transmission and/or reception of the UE~~ for the third radio bearer.

9. (Currently Amended) The method of claim 6, wherein the second request includes a cause for data path changing. ~~the first type of transmission and/or reception, the second type of transmission and/or reception, and the third type of transmission and/or reception are differentiated based on service type, radio bearer, logical channel, and/or QoS (Quality of Service) level.~~

10. (Currently Amended) The method of claim 6, wherein the UE has multiple paths via different network nodes after the data path for the first radio bearer change.

11. (Currently Amended) The method of claim 6, further comprising:

receiving, by the first network node, a confirmation message from the second network node for changing the data path for the first radio bearer.

~~wherein the request is triggered based on factors including a loading of a cell controlled by the first network node, and/or whether or not a QoS (Quality of Service) corresponding to the first type of transmission and/or reception of the UE could be guaranteed.~~



Petitioners' Exhibit 1002, p. 211
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

12. (Currently Amended) The method of claim 6, wherein the first network node is an eNB (evolved Node B) controlling the first serving cell or the SCell ~~(Secondary Cell)~~ of the UE, and the second network node is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE.

13. (Currently Amended) A method for handling inter-node connectivity in a wireless communication system, comprising:

transmitting a first request from a second network node to a first network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment);

receiving, by the second network node, an accept message from the first network node in response to the first request;

~~transmitting~~ receiving, by the second network node which controls a second serving cell of the UE, a second request from [[a]] the first network node which controls a first serving cell of the UE ~~to a core network node to change a data path corresponding to a first type of transmission and/or reception of a UE (User Equipment) from a first path to a different path~~; and

changing a data path for a first radio bearer of the UE based on the second request;

wherein [[the]] a first path is via the first network node and used as the data path for the first radio bearer before changing the data path for the first radio bearer. ~~corresponding to the first type and a third type of transmission and/or reception of the UE,~~

~~a second path is via a second network node and used as a data path corresponding to a second type of transmission and/or reception of the UE, and~~

~~the request does not indicate to change the data path corresponding to the third type of transmission and/or reception of the UE.~~

14. (Currently Amended) The method of claim 13, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the second network node and used as a data path for a second radio bearer of the UE ~~different path is the second path~~.

15. (Currently Amended) The method of claim 13, wherein the first path is used as a data path for a third radio bearer of the UE, and the second network node does not change the data path for the third radio bearer based on the second request ~~request is not transmitted due to handover~~.



**Petitioners' Exhibit 1002, p. 212**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

16. (Currently Amended) The method of claim 13, further comprising:

transmitting a confirmation message from the second network node to the first network node for changing the data path for the first radio bearer.

~~wherein the first type of transmission and/or reception, the second type of transmission and/or reception, and the third type of transmission and/or reception are differentiated based on service type, radio bearer, logical channel, and/or QoS (Quality of Service) level.~~

17. (Currently Amended) The method of claim 13, wherein the UE has multiple paths via different network nodes after the data path for the first radio bearer change.

18. (Canceled)

19. (Currently Amended) The method of claim 13, wherein the first network node is an eNB (evolved Node B) controlling [[a]] the first serving cell or the SCell ~~(Secondary Cell)~~ of the UE, and the second network node is an eNB controlling [[a]] the second serving cell or PCell (Primary Cell) of the UE.

20. (Canceled)

21. (New) The method of claim 6, wherein the first network node terminates transmission and/or reception of the first radio bearer when receiving a confirmation message for the second request.

22. (New) A communication device to handle inter-node connectivity in a wireless communication system, comprising:

a control circuit;

a processor installed in the control circuit;

a memory installed in the control circuit and operatively coupled to the processor;

wherein the processor is configured to execute a program code stored in the memory to handle inter-node connectivity by:



**Petitioners' Exhibit 1002, p. 213**
**AT&T et al v. Innovative Sonic & Celerity**
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receiving, by the communication device, a first request from a network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment);

transmitting an accept message from the communication device to the network node in response to the first request;

transmitting a second request from the communication device, which controls a first serving cell of the UE, to the network node, which controls a second serving cell of the UE, to change a data path for a first radio bearer of the UE;

wherein a first path is via the communication device and used as the data path for the first radio bearer before changing the data path for the first radio bearer.

23. (New) The communication device of claim 22, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the second network node and used as a data path for a second radio bearer of the UE.

24. (New) The communication device of claim 22, wherein the first path is used as a data path for a third radio bearer of the UE, and the second request does not indicate to change the data path for the third radio bearer.

25. (New) The communication device of claim 22, wherein the second request includes a cause for data path changing.

26. (New) The communication device of claim 22, wherein the UE has multiple paths via different network nodes after the data path for the first radio bearer change.

27. (New) The communication device of claim 22, further comprising: receiving, by the communication device, a confirmation message from the network node for changing the data path for the first radio bearer.

28. (New) The communication device of claim 22, wherein the communication device is an eNB (evolved Node B) controlling the first serving cell or the SCell of the UE, and the network node is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE.



**Petitioners' Exhibit 1002, p. 214**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

29. (New) The communication device of claim 22, wherein the communication device terminates transmission and/or reception of the first radio bearer when receiving a confirmation message for the second request.

30. (New) A communication device to handle inter-node connectivity in a wireless communication system, comprising:

a control circuit;

a processor installed in the control circuit;

a memory installed in the control circuit and operatively coupled to the processor;

wherein the processor is configured to execute a program code stored in the memory to handle inter-node connectivity by:

transmitting a first request from the communication device to a network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment);

receiving, by the communication device, an accept message from the network node in response to the first request;

receiving, by the communication device which controls a second serving cell of the UE, a second request from the network node which controls a first serving cell of the UE; and

changing a data path for a first radio bearer of the UE based on the second request;

wherein a first path is via the network node and used as the data path for the first radio bearer before changing the data path for the first radio bearer.

31. (New) The communication device of claim 30, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the communication device and used as a data path for a second radio bearer of the UE.

32. (New) The communication device of claim 30, wherein the first path is used as a data path for a third radio bearer of the UE, and the communication device does not change the data path for the third radio bearer based on the second request.

33. (New) The communication device of claim 30, further comprising: transmitting a confirmation message from the communication device to the network node for changing the data path for the first radio bearer.



**Petitioners' Exhibit 1002, p. 215**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

34. (New) The communication device of claim 30, wherein the UE has multiple paths via different network nodes after the data path for the first radio bearer change.

35. (New) The communication device of claim 30, wherein the network node is an eNB (evolved Node B) controlling the first serving cell or the SCell of the UE, and the communication device is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE.



**Petitioners' Exhibit 1002, p. 216**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

## REMARKS

Claims 6-20 are pending in the application.

### I. Objections

The Office Action objects to the Abstract because the length exceeds the 150-word limit. *See* Office Action, Page 3. Applicant respectfully submits a revised Abstract in conjunction with this Response for consideration.

The Office Action objects to claims 1-5 because the response to restriction fails to indicate that the claims are withdrawn from examination. *See* Office Action, Page 3. Applicant respectfully withdraws claims 1-5 from examination in response to the Restriction Requirement dated July 1, 2015.

### II. Claim Rejections

Claims 6-20 stand rejected as follows:

- Claims 6-7 and 12 stand rejected under 35 U.S.C. § 102 as being anticipated by Sambhwani (U.S. Patent Publication No. 2013/0303224). *See* Office Action, Page 4.

- Claims 8, 13-15, and 19 stand rejected under 35 U.S.C. § 103 based on the combination of Sambhwani and Kakani (U.S. Patent Publication No. 2011/0065440). *See* Office Action, Pages 6 and 9.

- Claim 9 stands rejected under 35 U.S.C. § 103 based on the combination of Sambhwani and Sun I (U.S. Patent Publication No. 2014/0219198). *See* Office Action, Page 6.

- Claim 10 stands rejected under 35 U.S.C. § 103 based on the combination of Sambhwani and Sun II (U.S. Patent Publication No. 2014/0177446). *See* Office Action, Page 7.

- Claim 11 stands rejected under 35 U.S.C. § 103 based on the combination of Sambhwani and Lindoff (U.S. Patent Publication No. 2011/0111785). *See* Office Action, Pages 8 and 10.

- Claims 16 and 20 stand rejected under 35 U.S.C. § 103 based on the combination of Sambhwani, Kakani, and Sun I. *See* Office Action, Page 10.

- Claim 17 stands rejected under 35 U.S.C. § 103 based on the combination of Sambhwani,



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AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

Kakani, and Sun II. *See* Office Action, Page 11.

- Claim 18 stands rejected under 35 U.S.C. § 103 based on the combination of Sambhwani, Kakani, and Lindoff. *See* Office Action, Page 12.

Claims 18 and 20 have been cancelled. Claims 6-17 and 19 have been amended. The claim amendments are supported at least by Paragraphs [0040], [0042]-[0043], [0047], [0049], and [0051]-[0054] of the present application. New claims 21-35 have been added. In particular, claims 22-29 are apparatus claims corresponding to method claims 6-12 and 21, while claims 30-35 are apparatus claims corresponding to method claims 13-17 and 19. No new matter has been added. Applicant respectfully requests reconsideration of the claims as amended and added.

Claims 6 and 22 are directed to a transmitter of the request. Claim 6 recites "receiving, by a first network node, a first request from a second network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment)" and "transmitting an accept message from the first network node to the second network node in response to the first request". Similarly, claim 22 recites "receiving, by the communication device, a first request from a network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment)" and "transmitting an accept message from the communication device to the network node in response to the first request."

Claims 13 and 30 are directed to a receiver of the request. Claim 13 recites "transmitting a first request from a second network node to a first network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment)" and "receiving, by the second network node, an accept message from the first network node in response to the first request. Similarly, claim 30 recites "transmitting a first request from the communication device to a network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment)" and "receiving, by the communication device, an accept message from the network node in response to the first request".

The Office Action suggests that cites to Paragraphs [0031]-[0033] of Sambhwani in rejecting the claims. *See* Office Action, Page 4. As recited in the claims, the second network node is the one to decide to add a cell of the first network node to serve the UE. Paragraph [0033] of Sambhwani discloses that a radio link setup request is transmitted from S-RNC to D-RNC. Therefore, the second network node recited in the claims may correspond to S-RNC disclosed in Sambhwani, and the first network node recited in the claims may correspond to D-RNC disclosed in Sambhwani.



**Petitioners' Exhibit 1002, p. 218**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

In addition, claim 6 recites "transmitting a second request from ~~a~~ the first network node, which controls a first serving cell of the UE, to the second network node, which controls a second serving cell of the UE, to change a data path for a first radio bearer of the UE; wherein a first path is via the first network node and used as the data path for the first radio bearer before changing the data path for the first radio bearer." Similarly, claim 22 recites "transmitting a second request from the communication device, which controls a first serving cell of the UE, to the network node, which controls a second serving cell of the UE, to change a data path for a first radio bearer of the UE; wherein a first path is via the communication device and used as the data path for the first radio bearer before changing the data path for the first radio bearer."

As discussed above, claims 13 and 30 are directed to a receiver of the request. Claim 13 recites "receiving, by the second network node which controls a second serving cell of the UE, a second request from the first network node which controls a first serving cell of the UE" and "changing a data path for a first radio bearer of the UE based on the second request; wherein a first path is via the first network node and used as the data path for the first radio bearer before changing the data path for the first radio bearer." Similarly, claim 30 recites "receiving, by the communication device which controls a second serving cell of the UE, a second request from the network node which controls a first serving cell of the UE" and "changing a data path for a first radio bearer of the UE based on the second request; wherein a first path is via the network node and used as the data path for the first radio bearer before changing the data path for the first radio bearer."

Applicant respectfully submits that the cited prior art references do not disclose the noted limitations of claims 6, 13, 22, and 30. In particular, based on the noted limitations, the first network node can transmit a request to the second network node to move a radio bearer away from the first network node (for example, back to the second network node as recited in claims 7 and 23).

In contrast, Sambhwani fails to disclose that D-RNC (which may correspond to the first network node recited in claim 6) could transmit a request to S-RNC (which may correspond to the second network node recited in claim 6) to move a radio bearer away from the D-RNC. Sambhwani also fails to disclose any incentives to do so.

For the reasons discussed above, Applicant respectfully submits that claims 6-17 and 19 and new claims 22-35 are patentable over any combination of Sambhwani, Kakani, Sun I, Sun II,



**Petitioners' Exhibit 1002, p. 219**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

and/or Lindoff.

In view of the foregoing it is respectfully submitted that the pending claims are in condition for allowance. Reconsideration of the rejections is requested. Allowance of the claims at an early date is solicited. The Examiner is invited to contact Applicant's undersigned counsel by telephone at (714) 839-3800 to expedite the prosecution of this case should there be any unresolved matters remaining.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made.

Respectfully submitted,
Sang N. Dang
**BLUE CAPITAL LAW FIRM, P.C.**

Dated: February 3, 2016

/Sang N. Dang/
Reg. No. 51,186
Tel.: (714) 839-3800
Tel.: (714) 839-3800



**Petitioners' Exhibit 1002, p. 220**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | | |
|---|---|---|
| Applicants: | Yu-Hsuan Guo and Meng-Hui Ou | |
| Title: | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM | |
| Serial No.: | 14/167,405 | Filed: January 29, 2014 |
| Examiner: | Hector E. Reyes Ortiz | Group Art Unit: 2472 |
| Attorney Docket No.: | 1291-235.101 (IS102004-US-D1) | |

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**CERTIFICATE OF EFS-WEB TRANSMISSION**
**UNDER 37 CFR § 1.8**

I hereby certify that the enclosed 2 Page Amendment Transmittal; and 12 Page Amendment are being transmitted to the United States Patent and Trademark Office via EFS-Web on February 3, 2016.

Date: February 3, 2016 /Sandy Kim/
Sandy Kim

Mailing Address:

**BLUE CAPITAL LAW FIRM, P.C. (Customer No.: 106622)**
611 Anton Blvd., Suite 1050
Costa Mesa, California 92626
Tel: 714-839-3800
Fax: 714-795-2995

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 24811063 |
| **Application Number:** | 14167405 |
| **International Application Number:** | |
| **Confirmation Number:** | 6471 |
| **Title of Invention:** | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| **First Named Inventor/Applicant Name:** | Yu-Hsuan Guo |
| **Customer Number:** | 106622 |
| **Filer:** | Sang N. Dang/Sandy Kim |
| **Filer Authorized By:** | Sang N. Dang |
| **Attorney Docket Number:** | 1291-235.101 |
| **Receipt Date:** | 03-FEB-2016 |
| **Filing Date:** | 29-JAN-2014 |
| **Time Stamp:** | 15:50:24 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | no |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | | 1291-235-101--ResponsetoNtcofNonCompliantFiled02032016.pdf | 130610<br>8b472bdb20e91bc38df7e3111f90b2a0734ed25a | yes | 15 |

| | Multipart Description/PDF files in .zip description | | |
|---|---|---|---|
| | **Document Description** | **Start** | **End** |
| | Transmittal Letter | 1 | 2 |
| | Amendment/Req. Reconsideration-After Non-Final Reject | 3 | 3 |
| | Claims | 4 | 10 |
| | Applicant Arguments/Remarks Made in an Amendment | 11 | 14 |
| | Miscellaneous Incoming Letter | 15 | 15 |

| | |
|---|---|
| **Warnings:** | |
| **Information:** | |
| **Total Files Size (in bytes):** | 130610 |

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

# Amendment Transmittal Letter

| Docket Number |
|---|
| 1291-235.101 |

**Address To**
**Commissioner for Patents**
**P.O. Box 1450**
**Alexandria, Virginia 22313-1450**

**Title of Invention**

**METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM**

| | |
|---|---|
| First Named Inventor | **Yu-Hsuan Guo** |
| Application No. | **14/167,405** |
| Filing Date | **January 29, 2014** |
| Examiner | **Hector E. Reyes Ortiz** |
| Art Unit | **2472** |

Transmitted herewith is an amendment in the above-identified application.

The fee has been calculated and is transmitted as shown below.

☐ **Applicant claims Small Entity Status.** See 37 CFR 1.27.

**Fee Calculation**

Claims as Amended

| For | #Filed | #Previously Paid For | #Extra | Rate | Fee |
|---|---|---|---|---|---|
| Total Claims | 28 | - 28 = | | x 80 = | |
| Total Indep. Claims | 4 | - 4 = | | x 420 = | |
| Multiple Dependent Claims (check if applicable) ☐ | | | | | |
| | | | | **TOTAL** | **$0** |

**Method of Payment**

☐ Deposit Account ☐ Credit Card ☐ Check ☐ Money Order ☐ Other: _____

Deposit Account Number

**For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)**

☐ Charge the fee(s) set forth above
☐ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17
☐ Charge fee(s) indicated above, **except for the filing fee**
☐ Credit any overpayments

**WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on form PTO-2038.**

Amount Grand Total **$0**



**Petitioners' Exhibit 1002, p. 224**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

# Amendment Transmittal Letter

| Docket Number |
|---|
| 1291-235.101 |

| Correspondence Address | | | |
|---|---|---|---|
| Customer Number | 106622 | | |
| -OR- | | | |
| Name | | | |
| Address | | | |
| City | | State | |
| Country | | Postal Code | |
| Phone Number | | | |
| E-mail Address | | | |

## Certificate of Mailing by Express Mail

I hereby certify that this Amendment, accompanying documents, and fee (if appropriate) are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on the date indicated below:

*(Date of Mailing)*

*(Typed or Printed Name of Person Mailing Correspondence)*

*(Signature of Person Mailing Correspondence)*

*("Express Mail" Mailing Label Number)*

## Certificate of Mailing by First Class Mail

I hereby certify that this Amendment, accompanying documents, and fee (if appropriate) are being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on the date indicated below:

*(Date of Mailing)* *(Name of Person Mailing Correspondence)*

*(Signature of Person Mailing Correspondence)*

## Certificate of Transmission

I hereby certify that this Amendment, accompanying documents, and fee (if appropriate) authorization are being facsimile transmitted to the United States Patent and Trademark Office on the date indicated below:

*(Date of Transmission)* *(Name of Person Transmitting Correspondence)*

*(Signature of Person Transmitting Correspondence)*

### Signature Instructions

Select the name of the person who will electronically sign the Amendment from the drop-down box below.

If a practitioner is not present in the drop-down list, you must close this form and select 'Add Practitioner...' in the Form Manager's Utility menu.

**Verify that the signatory information is correct and press the 'eSign' button to electronically sign the submission. If you prefer to sign the form manually, simply do not click the 'eSign' button; just print and manually sign.**

**Signatory Drop-Down Box** Sang N. Dang

| Name | Sang N. Dang | | Registration Number | 51,186 |
|---|---|---|---|---|
| Signatory Capacity | Attorney for Applicant(s) | E-mail Address | sdang@bluecapitallaw.com | |
| eSign | /Sang N. Dang/ | | Date Signed | 02/03/2016 |



Petitioners' Exhibit 1002, p. 225
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

| PATENT APPLICATION FEE DETERMINATION RECORD<br>Substitute for Form PTO-875 | Application or Docket Number<br>14/167,405 | Filing Date<br>01/29/2014 | ☐ To be Mailed |
|---|---|---|---|

**ENTITY:** ☒ LARGE ☐ SMALL ☐ MICRO

## APPLICATION AS FILED – PART I

| FOR | (Column 1) NUMBER FILED | (Column 2) NUMBER EXTRA | RATE ($) | FEE ($) |
|---|---|---|---|---|
| ☐ BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | |
| ☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | N/A | |
| ☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | minus 20 = | * | X $ = | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | minus 3 = | * | X $ = | |
| ☐ APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | |
| ☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | |

## APPLICATION AS AMENDED – PART II

| AMENDMENT | 02/03/2016 | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|---|
| | Total (37 CFR 1.16(i)) | * 33 | Minus | ** 28 | = 5 | X $80 = | 400 |
| | Independent (37 CFR 1.16(h)) | * 5 | Minus | ***4 | = 1 | X $420 = | 420 |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | | TOTAL ADD'L FEE | 820 |

| AMENDMENT | | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|---|
| | Total (37 CFR 1.16(i)) | * | Minus | ** | = | X $ = | |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | X $ = | |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | | TOTAL ADD'L FEE | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/PARTHENIA D. MERRILL/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | 14167405 |
| **Filing Date:** | 29-Jan-2014 |
| **Title of Invention:** | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| **First Named Inventor/Applicant Name:** | Yu-Hsuan Guo |
| **Filer:** | Sang N. Dang/Sandy Kim |
| **Attorney Docket Number:** | 1291-235.101 |

Filed as Large Entity

**Filing Fees for Utility under 35 USC 111(a)**

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| **Pages:** | | | | |
| **Claims:** | | | | |
| Claims in Excess of 20 | 1202 | 5 | 80 | 400 |
| Independent claims in excess of 3 | 1201 | 1 | 420 | 420 |
| **Miscellaneous-Filing:** | | | | |
| **Petition:** | | | | |
| **Patent-Appeals-and-Interference:** | | | | |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Post-Allowance-and-Post-Issuance:** | | | | |
| **Extension-of-Time:** | | | | |
| **Miscellaneous:** | | | | |
| | | **Total in USD ($)** | | **820** |

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 24995638 |
| **Application Number:** | 14167405 |
| **International Application Number:** | |
| **Confirmation Number:** | 6471 |
| **Title of Invention:** | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| **First Named Inventor/Applicant Name:** | Yu-Hsuan Guo |
| **Customer Number:** | 106622 |
| **Filer:** | Sang N. Dang/Sandy Kim |
| **Filer Authorized By:** | Sang N. Dang |
| **Attorney Docket Number:** | 1291-235.101 |
| **Receipt Date:** | 23-FEB-2016 |
| **Filing Date:** | 29-JAN-2014 |
| **Time Stamp:** | 15:05:31 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | yes |
| Payment Type | Credit Card |
| Payment was successfully received in RAM | $820 |
| RAM confirmation Number | 1619 |
| Deposit Account | |
| Authorized User | |

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | Fee Worksheet (SB06) | fee-info.pdf | 32447<br>0731744254e4452471269dbb093cb88b74d79de1 | no | 2 |

**Warnings:**

**Information:**

| Total Files Size (in bytes): | 32447 |
|---|---|

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**
**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**
**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**
**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 14/167,405 | 01/29/2014 | Yu-Hsuan Guo | 1291-235.101 | 6471 |

106622 7590 04/06/2016

Blue Capital Law Firm, P.C.
611 Anton Blvd., Suite 1050
Costa Mesa, CA 92626

| EXAMINER |
|---|
| REYES ORTIZ, HECTOR E |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2472 | |

| NOTIFICATION DATE | DELIVERY MODE |
|---|---|
| 04/06/2016 | ELECTRONIC |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@bluecapitallaw.com



**Petitioners' Exhibit 1002, p. 231**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

| Office Action Summary | Application No. 14/167,405 | Applicant(s) GUO ET AL. | |
|---|---|---|---|
| | Examiner HECTOR REYES | Art Unit 2472 | AIA (First Inventor to File) Status No |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *02/03/2016*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims***

5)☒ Claim(s) *6-17,19 and 21-35* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *6-17, 19, and 21-35* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

**Application Papers**

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.



**Petitioners' Exhibit 1002, p. 232**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

## DETAILED ACTION

## ELECTION/RESTRICTIONS

Applicant's election without traverse of Group II, claims 6-20, in the reply filed on 08/31/2015 is acknowledged.

## RESPONSE

This Office action is in response to claims and remarks filed on 02/03/2016.

Claims 1-5 have been withdrawn.

Claims 18 and 20 have been canceled.

Claims 21-35 have been newly added.

Claims 6-17, 19, and 21-35 are pending.

## NOTICE OF PRE-AIA OR AIA STATUS

The present application is being examined under the pre-AIA first to invent provisions.

## INFORMATION DISCLOSURE STATEMENT

The Information Disclosure Statement (IDS) communication(s) submitted on 06/05/2015 and 10/17/2014 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the IDS communication(s) cited references have been considered in the examination of the claims now pending.

**REJECTION**

Claims 6-17, 19, and 21-35 are rejected as follows.

***Claim Rejections - 35 USC § 103***

**The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:**

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

**Claims 6-7, 11-12, 21-23, and 27-28** are rejected under pre-AIA 35 U.S.C. 103) as being unpatentable over Sambhwani et al. (US Publication No. 2013/0303224; based on provisional application No. 61/646,233 the effective filing date is May 2012; hereinafter referred to as Sambhwani) in view of Chen et al. (US Publication No. 2013/0183970, hereinafter referred to as Chen).

**Regarding Claims 6 and 22,** Sambhwani discloses

***a control circuit*** **(A controller; see ¶ 0066)*;***

***a processor installed in the control circuit*** **(A processor; see ¶ 0066)*;***

***a memory installed in the control circuit and operatively coupled to the processor*** **(A memory; see ¶ 0066)*;***

***wherein the processor is configured to execute a program code stored in the memory to handle inter-node connectivity by*** **(The memory store data and software; see ¶ 0066)*:***

*transmitting* ***a second*** *request from* ***the*** *first network node, which controls a first serving cell of the UE, to* ***the*** *second network node, which controls a second serving cell of the UE, to change a data path* ***for a first radio bearer*** *the UE* (A UE establish a first/second flow with a first/second network entity; see Figure 2, ¶ 0031-0032. Furthermore, the first entity RNC transmit a request to the second entity RNC to setup a multiflow leg; see ¶ 0033);

*wherein* ***a*** *first path is via the first network node and used as the data path* ***for the first radio bearer before changing the data path for the first radio bearer*** (A user equipment establish a first flow with a first network entity; see Figure 2, ¶ 0031.).

Sambhwani fails to disclose ***receiving, by a first network node, a first request from a second network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment); transmitting an accept message from the first network node to the second network node in response to the first request.*** However, in analogous art, Chen discloses that the source base station (BS) send a switching request to the target BS; see Figure 1. Furthermore, the target BS sends a switching request response; see Figure 1. In addition, the exchange is in order to cooperate with the target base station to configure one or a plurality of Scells; see ¶ 0017. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to in order to efficiently select

secondary service cells according to the transmitted information, and reduces time delay.

**Regarding Claims 7 and 23,** Sambhwani discloses that ***the data path for the first radio bearer is changed to a second path, wherein the second path is via the second network node and used as a data path for a second radio bearer of the UE.*** *(*A user equipment establish a second flow with a second network entity; see Figure 2, ¶ 0032.).

**Regarding Claims 11 and 27,** Sambhwani fails to disclose ***receiving, by the first network node, a confirmation message from the second network node for changing the data path for the first radio bearer.*** However, in analogous art, Chen discloses that the source base station (BS) send a switching request to the target BS; see Figure 1. Furthermore, the target BS sends a switching request response; see Figure 1. In addition, the response carries the switching command information to the UE; see ¶ 0008. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to in order to efficiently select secondary service cells according to the transmitted information, and reduces time delay.

**Regarding Claims 12 and 28,** Sambhwani discloses that *the first network node is an eNB (evolved Node B) controlling the first serving cell or the SCell of the UE, and*

*the second network node is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE* (A UE establish a first/second flow with a first/second network entity; see Figure 2, ¶ 0031-0032. Furthermore, the network entity is a base station or nodeB; see ¶ 0031).

**Regarding Claim 21,** Sambhwani discloses that ***the communication device terminates transmission and/or reception of the first radio bearer when receiving a confirmation message for the second request*** (The respond with a tunnel pointer which is used to direct the communication data flow to the second network entity; see ¶ 0033-34)***.***

**Claims 8 and 24** are rejected under pre-AIA 35 U.S.C. 103 as being unpatentable over Sambhwani, Chen, and further in view of Kakani et al. (US Publication No. 2011/0065440, hereinafter referred to as Kakani).

**Regarding Claims 8 and 24,** Sambhwani fails to disclose that the ***first path is used as a data path for a third radio bearer of the UE, and the second request does not indicate to change the data path for the third radio bearer.*** However, in analogous art, Kakani discloses that the request include an information element that contain data stream ID for each stream to be switched; see ¶ 0006. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to in order to seamlessly transfer during a communication session without perceptible interruption in the delivery of content.

**Claims 9 and 25** are rejected under pre-AIA 35 U.S.C. 103 as being unpatentable over Sambhwani, Chen, and further in view of Sun et al. (US Publication No. 2014/0334427; hereinafter referred to as Sun-II).

**Regarding Claims 9 and 25,** Sambhwani fails to disclose that ***the second request includes a cause for data path changing.*** However, in analogous art, Sun discloses that the message may include a cause value (e.g. insufficient resources); see ¶ 0013. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to reduce mobility signaling and improve battery life.

**Claims 10 and 26** are rejected under pre-AIA 35 U.S.C. 103 as being unpatentable over Sambhwani, Chen, and further view of Sun et al. (US Publication No. 2014/0177446; based on provisional application No. 61/515,763 the effective filing date is August 2011; hereinafter referred to as Sun).

**Regarding Claims 10 and 26,** Sambhwani fails to disclose *that the UE has multiple paths via different network nodes after the data path* ***for the first bearer*** *change*. However, in analogous art, Sun discloses the distribution of flow between to different networks; see Figure 1. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to lower the cost of transmission by allowing dual radio terminal to offload traffic.

**Claims 13-14, 16, 19, 29-31, 33, and 35** are rejected under pre-AIA 35 U.S.C. 103 as being unpatentable over Sambhwani et al. (US Publication No. 2013/0303224; based on provisional application No. 61/646,233 the effective filing date is May 2012; hereinafter referred to as Sambhwani) in view of Chen et al. (US Publication No. 2013/0183970, hereinafter referred to as Chen).

**Regarding Claims 13 and 30,** Sambhwani discloses

***a control circuit*** **(A controller; see ¶ 0066)*;***

***a processor installed in the control circuit*** **(A processor; see ¶ 0066)*;***

***a memory installed in the control circuit and operatively coupled to the processor*** **(A memory; see ¶ 0066)*;***

***wherein the processor is configured to execute a program code stored in the memory to handle inter-node connectivity by*** **(The memory store data and software; see ¶ 0066)*:***

***receiving, by the second network node which controls a second serving cell of the UE, a second request from the first network node which controls a first serving cell of the UE; and changing a data path for a first radio bearer of the UE based on the second request*** (A UE establish a first/second flow with a first/second network entity; see Figure 2, ¶ 0031-0032. Furthermore, the first entity RNC transmit a request to the second entity RNC to setup a multiflow leg; see ¶ 0033)*;*

***wherein a first path is via the first network node and used as the data path for the first radio bearer before changing the data path for the first radio bearer*** (A user equipment establish a first flow with a first network entity; see Figure 2, ¶ 0031.)*.*

Sambhwani fails to disclose ***transmitting a first request from the communication device to a network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment); receiving, by the communication device, an accept message from the network node in response to the first request.*** However, in analogous art, Chen discloses that the source base station (BS) send a switching request to the target BS; see Figure 1. Furthermore, the target BS sends a switching request response; see Figure 1. In addition the exchange is in order to cooperate with the target base station to configure one or a plurality of Scells; see ¶ 0017. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to in order to efficiently select secondary service cells according to the transmitted information, and reduces time delay.

**Regarding Claims 14 and 31,** Sambhwani discloses that ***the data path for the first radio bearer is changed to a second path, wherein the second path is via the second network node and used as a data path for a second radio bearer of the UE*** *(*A user equipment establish a second flow with a second network entity; see Figure 2, ¶ 0032.).

**Claims 15 and 32** are rejected under pre-AIA 35 U.S.C. 103 as being unpatentable over Sambhwani, Chen, and further in view of Kakani et al. (US Publication No. 2011/0065440, hereinafter referred to as Kakani).

**Regarding Claims 15 and 32,** Sambhwani discloses that ***the first path is used as a data path for a third radio bearer of the UE, and the second network node does not change the data path for the third radio bearer based on the second request.*** *However, in analogous art, Kakani discloses that the request include an information element that contain data stream ID for each stream to be switched; see ¶ 0006. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to in order to seamlessly transfer during a communication session without perceptible interruption in the delivery of content.*

**Regarding Claims 16 and 33,** Sambhwani fails to disclose ***transmitting a confirmation message from the second network node to the first network node for changing the data path for the first radio bearer.*** However, in analogous art, Chen discloses that the source base station (BS) send a switching request to the target BS; see Figure 1. Furthermore, the target BS sends a switching request response; see Figure 1. In addition, the response carries the switching command information to the UE; see ¶ 0008. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to in order to efficiently select secondary service cells according to the transmitted information, and reduces time delay.

**Regarding Claims 19 and 35,** Sambhwani discloses that *the first network node is an eNB (evolved Node B) controlling a serving cell or SCell (Secondary Cell) of the UE, and the second network node is an eNB controlling a serving cell or PCell (Primary Cell) of the UE* (A UE establish a first/second flow with a first/second network entity; see Figure 2, ¶ 0031-0032. Furthermore, the network entity is a base station or nodeB; see ¶ 0031).

**Claims 17 and 34** are rejected under pre-AIA 35 U.S.C. 103 as being unpatentable over Sambhwani, Chen, and further in view of Sun et al. (US Publication No. 2014/0177446; based on provisional application No. 61/515,763 the effective filing date is August 2011; hereinafter referred to as Sun).

**Regarding Claims 17 and 34,** Sambhwani fails to disclose that *the UE has multiple paths via different network nodes after the data path change.* However, in analogous art, Sun discloses the distribution of flow between to different networks; see Figure 1. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to lower the cost of transmission by allowing dual radio terminal to offload traffic.

**Regarding Claims 29,** ***wherein the communication device terminates transmission and/or reception of the first radio bearer when receiving a confirmation message for the second request*** (The respond with a tunnel pointer which is used to direct the communication data flow to the second network entity; see ¶ 0033-34)**.**

## RESPONSE TO ARGUMENTS

**Regarding Claims 6 and 22,** Applicant's arguments with respect to claims have been considered but are moot in view of the new grounds of rejection necessitated by the amended claims.

**Regarding Claims 13 and 20,** Applicant's arguments with respect to claims have been considered but are moot in view of the new grounds of rejection necessitated by the amended claims.

## CONCLUSION

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Please see PTO-892 form for considered prior art for record.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Héctor Reyes whose telephone number is (571) 270-0239 or Fax number (571)483-7161. The examiner can normally be reached on (Mon-Fri) 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on (571) 272-3088. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/H. R./

Examiner, Art Unit 2472

/ANH-VU LY/

Primary Examiner, Art Unit 2472

| Notice of References Cited | Application/Control No. 14/167,405 | Applicant(s)/Patent Under Reexamination GUO ET AL. | |
|---|---|---|---|
| | Examiner HECTOR REYES | Art Unit 2472 | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Name | CPC Classification | US Classification |
|---|---|---|---|---|---|---|
| * | A | US-2014/0334427 A1 | 11-2014 | SUN; Li-Hsiang | H04W72/04 | 370/329 |
| * | B | US-2013/0183970 A1 | 07-2013 | Chen; Zhongming | H04W36/30 | 455/436 |
| | C | US- | | | | |
| | D | US- | | | | |
| | E | US- | | | | |
| | F | US- | | | | |
| | G | US- | | | | |
| | H | US- | | | | |
| | I | US- | | | | |
| | J | US- | | | | |
| | K | US- | | | | |
| | L | US- | | | | |
| | M | US- | | | | |

**FOREIGN PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Country | Name | CPC Classification |
|---|---|---|---|---|---|---|
| | N | | | | | |
| | O | | | | | |
| | P | | | | | |
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| | R | | | | | |
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**NON-PATENT DOCUMENTS**

| * | | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
|---|---|---|
| | U | |
| | V | |
| | W | |
| | X | |

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

| Search Notes | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 14167405 | GUO ET AL. |
| | Examiner | Art Unit |
| | HECTOR REYES ORTIZ | 2472 |

| CPC- SEARCHED | | |
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| Symbol | Date | Examiner |
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| CPC COMBINATION SETS - SEARCHED | | |
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| Symbol | Date | Examiner |
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| US CLASSIFICATION SEARCHED | | | |
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| Class | Subclass | Date | Examiner |
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| SEARCH NOTES | | |
|---|---|---|
| Search Notes | Date | Examiner |
| Consulted Restriction | 9/29/2015 | HR |
| Consulted CPC | 9/29/2015 | HR |
| Consulted Search Strategy | 9/29/2015 | HR |
| Performed Double Patenting search | 9/29/2015 | HR |
| Performed NPL search | 9/29/2015 | HR |
| Performed text search in combination with the following CPC groups: H04W76/025, 064; H04L5/0096; H04W92/20; H04W36/385, 30, 04-08; H04W28/10,12 -- See EAST printout | 9/29/2015 | HR |
| Performed search update | 4/1/2016 | HR |

| INTERFERENCE SEARCH | | | |
|---|---|---|---|
| US Class/ CPC Symbol | US Subclass / CPC Group | Date | Examiner |
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| /H.R./<br>Examiner.Art Unit 2472 | |



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IPR2024-00991

**EAST Search History**

**EAST Search History (Prior Art)**

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|---|---|---|---|---|---|---|
| S3 | 1 | (APP-000) \| 14/167405.APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:22 |
| S4 | 4 | (FMID-000) \| ("50002584".FMID.) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:22 |
| S5 | 99 | (INV-000) \| ( ((Yu \| Hsuan) near2 (Guo)).INV. & (( Meng \| Hui) near2 (Ou)).INV. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:24 |
| S6 | 23 | (INV-000) \| ( ((Yu \| Hsuan) near2 (Guo)).INV. & (( Meng \| Hui) near2 (Ou)).INV. ) & ( (cell).CLM. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:25 |
| S7 | 1 | (INV-000) \| ( ((Yu \| Hsuan) near2 (Guo)).INV. & (( Meng \| Hui) near2 (Ou)).INV. ) & ( (path).CLM. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:27 |
| S8 | 798 | (AS-000) \| ( (INNOVATIVE NEAR2 SONIC).AS. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:28 |
| S9 | 26 | (AS-000) \| ( (INNOVATIVE NEAR2 SONIC).AS. ) & ( path ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:28 |
| S10 | 256 | (CLM-000) \| ( (path).CLM. NEAR5 (different | US-PGPUB; | ADJ | ON | 2015/09/10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | \| ((first \| primary) & second$3) \| multi$3).CLM. ) SAME ( (differentiated \| service type \| QoS \| quality of service).CLM. ) | USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | | | 17:15 |
| S11 | 27 | (CLM-000) \| ( (path).CLM. NEAR5 (different \| ((first \| primary) & second$3) \| multi$3).CLM. ) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!).CLM. ) & ( (differentiated \| service type \| QoS \| quality of service).CLM. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 17:54 |
| S15 | 15 | (IDS-000) \| ( (US "20120106511") \| (EP "2448325" \| US "20120106510") \| (JP "2014022895" \| US "20150195837") \| ("1020120046692" \| KR "20120046692" \| US "20120106510") ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 18:57 |
| S18 | 176 | (CPC-Classification) \| ( (path).CLM. NEAR5 (different \| ((first \| primary) & second$3) \| multi$3) ) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) & ( (differentiated \| service type \| QoS \| quality of service) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 20:08 |
| S19 | 2058 | (CPC-Classification) \| ( (path) NEAR5 (different \| ((first \| primary) & second$3) \| multi$3) ) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) & ( (differentiated \| service type \| QoS \| quality of service) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 20:08 |
| S20 | 4 | (CPC-000-CAT) \| ( (H04W76/064 & H04L5/0096 & H04W92/20 & H04W36/28).cpc. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 20:24 |
| S21 | 4 | (CPC-000-CAT) \| ( (H04W76/064 & H04L5/0096 & H04W92/20 ).cpc. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 20:24 |
| S22 | 22 | (CPC-000-CAT) \| ( (H04W76/064 & H04L5/0096).cpc. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 20:25 |
| S23 | 3208 | (CPC-000-CarrierAggregation-Schedulling-ConnectionManagement) \| ( (H04L5/$ \| H04L5/009$ \| H04L5/0096).CPC. & (H04W72/$ \| H04W72/12$ \| H04W72/0406 \| H04W72/042).CPC. & (H04W76/$ \| H04W76/06$ \| | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; | ADJ | ON | 2015/09/17 10:10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | H04E76/064).CPC. ) | IBM_TDB | | | |
| S24 | 56 | (CPC-000-CarrierAggregation-Schedulling-ConnectionManagement) \| ( (H04L5/009$ \| H04L5/0096).CPC. & (H04W72/12$ \| H04W72/0406 \| H04W72/042).CPC. & (H04W76/06$ \| H04E76/064).CPC. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 10:10 |
| S25 | 217 | (CPC-000-CarrierAggregation-ConnectionManagement) \| ( (H04L5/009$ \| H04L5/0096).CPC. & (H04W76/06$ \| H04E76/064).CPC. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 10:25 |
| S27 | 133 | (CPC-000-CarrierAggregation) \| ( (H04L5/$).CPC. & (rerout$3 \| re rout$3) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 10:41 |
| S32 | 2458 | H04W$/$.CPC. & ( (path \| carrier \| CC \| componet ) NEAR5 (different \| ((first \| primary) & second$3) \| multi$3) ) NEAR10 ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) SAME10 ( (differentiated \| service type \| QoS \| quality of service \| quality) ) & (carrier aggregation \| CA! \| component carrier \| CC! \| multicomponent \| multicarrier) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 14:03 |
| S33 | 1732 | H04W$/$.CPC. & ( (path \| carrier \| CC \| componet ) NEAR5 (different \| ((first \| primary) & second$3) \| multi$3) ) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) SAME (carrier aggregation \| CA! \| component carrier \| CC! \| multicomponent \| multicarrier) ) SAME10 ( (differentiated \| service type \| QoS \| quality of service \| quality) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 14:13 |
| S34 | 195 | H04W76/$.CPC. & ( (path \| carrier \| CC \| componet ) NEAR5 (different \| ((first \| primary) & second$3) \| multi$3) ) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) SAME (carrier aggregation \| CA! \| component carrier \| CC! \| multicomponent \| multicarrier) ) SAME10 ( (differentiated \| service type \| QoS \| quality of service \| quality) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 14:14 |
| S35 | 1469 | H04W$/$.CPC. & ( ( (first \| primary \| serving \| PCC \| PCell) & (second$3 \| SCC \| SCell) ) NEAR5 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) SAME10 ( (differentiated \| service type \| QoS \| quality of service \| quality) & (carrier aggregation \| CA! \| component carrier \| CC! \| multicomponent \| multicarrier) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/18 10:19 |

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|---|---|---|---|---|---|---|
| S36 | 1 | ("2009/0191881").URPN. | USPAT | ADJ | ON | 2015/09/18 11:34 |
| S37 | 29 | ("20010016493" \| "20010030953" \| "20020091326" \| "20040043767" \| "20040053614" \| "20040203784" \| "20050153743" \| "20070129075" \| "20070293226" \| "20090052330" \| "20090061878" \| "20090117900" \| "20090191881" \| "20100167744" \| "20100173626" \| "20100178920" \| "20100190451" \| "20100267378" \| "20100291931" \| "20110064016" \| "20110256871" \| "20120094706" \| "4045794" \| "5095500" \| "5805666" \| "6611688" \| "8457638" \| "8472359" \| "8515415").PN. OR ("8971871").URPN. | US-PGPUB; USPAT; USOCR | ADJ | ON | 2015/09/18 11:35 |
| S38 | 4312 | H04W$/$.CPC. & ( (carrier \| CC!) NEAR5 (quality) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/18 11:41 |
| S39 | 90 | H04W$/$.CPC. & ( (carrier \| CC!) NEAR5 (quality) SAME degradat$3 ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/18 11:42 |
| S40 | 11 | (NPL-000) \|( ("8706124".pn.) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/18 13:19 |
| S41 | 27 | ("20020055343" \| "20040171384" \| "20050021885" \| "20050117601" \| "20050163093" \| "20050243849" \| "20060114813" \| "20070060082" \| "20070153729" \| "20070214490" \| "20070262913" \| "20080076353" \| "20090137206" \| "20090175374" \| "20090318075" \| "20100122284" \| "20100142416" \| "20100208633" \| "20100259682" \| "20100332822" \| "20110053521" \| "6760772" \| "7590426" \| "7639706" \| "8045922" \| "8102853" \| "8218654").PN. OR ("8706124").URPN. | US-PGPUB; USPAT; USOCR | ADJ | ON | 2015/09/18 13:20 |
| S44 | 396 | H04W76/$.CPC. & ( (path \| carrier \| CC \| componet) SAME ((first \| primary) & second$3)) SAME10 (carrier aggregation \| CA! \| component carrier \| CC! \| multicomponent \| multicarrier \| multiband \| multichannel) SAME10 ( (differentiated \| service type \| QoS \| quality of service \| quality) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/23 11:51 |
| S45 | 5 | (EDAN-14433541) \| ( ("20120094608" \| "20120236801").PN. ) | US-PGPUB; USPAT; USOCR; FPRS; | ADJ | ON | 2015/09/23 13:21 |

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|---|---|---|---|---|---|---|
| | | | EPO; JPO; DERWENT; IBM_TDB | | | |
| S46 | 5 | ("2011/0103327").URPN. | USPAT | ADJ | ON | 2015/09/23 14:35 |
| S47 | 46 | H04W76/$.CPC. & ( (datapath \| path \| $3carrier \| CC \| component \| pdn ) NEAR5 (first \| primary \| serving \| second$3) ) SAME (inter (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| node) ) & ( (differentiated \| service type \| QoS \| quality of service \| quality) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 14:43 |
| S48 | 25 | H04W76/$.CPC. & H04W36/$.CPC. & H04W28/$.CPC. & (inter (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| node)) & (differentiated \| service type \| QoS \| quality of service \| quality) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 14:45 |
| S49 | 25 | (H04W76/064.CPC. \| H04W36/385.CPC. \| H04W28/0268.CPC. \| H04W40/12.CPC) & (inter (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| node)) & (differentiated \| service type \| QoS \| quality of service \| quality) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 14:56 |
| S50 | 2265 | (CPC-000-ReleaseConnection-ReselectionCore-TrafficMGMT-PathFinding) \| (H04W76/064.CPC. & (H04W36/385.CPC. \| H04W36/30 \| H04W36/04-08) \| (H04W28/0268.CPC. \| H04W40/12.CPC)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 15:48 |
| S52 | 91 | (CPC-000-ReleaseConnection-ReselectionCore-TrafficMGMT-PathFinding) \| (H04W76/064.CPC. & (H04W36/385.CPC. \| H04W36/30 \| H04W36/04-08) \| (H04W28/0268.CPC. \| H04W40/12.CPC)) & (carrier aggregation \| component carrier \| multicomponent \| multicarrier \| multiband \| multichannel) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 15:52 |
| S54 | 175 | (CPC-000-ReleaseConnection-ReselectionCore-TrafficMGMT-PathFinding) \| ((H04W36/385.CPC. \| H04W36/30 \| H04W36/04-08)) & (carrier aggregation \| component carrier \| multicomponent \| multicarrier \| multiband \| multichannel) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 16:04 |
| S55 | 1219 | (H04W76/$) & (carrier aggregation \| component carrier \| multicomponent \| multicarrier \| multiband \| multichannel) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 16:14 |
| S56 | 178 | (H04W76/$) & (carrier aggregation \| component carrier \| multicomponent \| multicarrier \| multiband \| multichannel) & (differentiated \| service type \| QoS \| | US-PGPUB; USPAT; USOCR; FPRS; | ADJ | ON | 2015/09/24 16:15 |



**Petitioners' Exhibit 1002, p. 252**
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**IPR2024-00991**

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|---|---|---|---|---|---|---|
| | | quality of service \| quality) NOT ( (handover \| handoff \| hand (over \|off)) ) | EPO; JPO; DERWENT; IBM_TDB | | | |
| S59 | 308 | H04W$/$.CPC. & (inter (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| node)) SAME request SAME5 ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 16:42 |
| S60 | 3 | ("2013/0176988").URPN. | USPAT | ADJ | ON | 2015/09/24 16:55 |
| S61 | 144 | H04W$/$.CPC. & ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) SAME (reconfigur$5) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) WITH (request$3) WITH (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 19:19 |
| S62 | 520 | H04W76/$.CPC. & ( ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| first \| primary \| serving) NEAR10 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| second$3 \| serving \| other \| neighbor$5) SAME (request$3) ) SAME10 ( (quality \| service type \| differentiated \| QOS \| QOE \| CQI \| CSI \| TOS ) ) ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 20:25 |
| S63 | 8 | (EDAN-000-14224825) \|( ("20090253426" \| "20120005177" \| "20090253426" \| "20120005177" \| "20080167041" \| "20080167041").PN. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 20:57 |
| S64 | 65 | H04W28/10-12.CPC. & ( ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 21:34 |

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|---|---|---|---|---|---|---|
| | | station \| BS! \| BTS! \| first \| primary \| serving) NEAR10 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| second$3 \| serving \| other \| neighbor$5) SAME (request$3) ) SAME10 ( (quality \| service type \| differentiated \| QOS \| QOE \| CQI \| CSI \| TOS ) ) ) NOT ( (handover \| handoff \| hand (over \|off)) ) | | | | |
| S65 | 207 | (H04W28/$.CPC. & H04W76/$.CPC. & H04W36/$.CPC. & H04W92/20.CPC.) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 21:41 |
| S66 | 5 | (H04W28/10,12.CPC. & H04W76/$.CPC. & H04W36/$.CPC. & H04W92/20.CPC.) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 22:13 |
| S67 | 30 | ( H04W76/$.CPC. & H04W36/16,22,28.CPC. & H04W28/10,12.CPC. ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 22:15 |
| S68 | 356 | ( H04W76/025,064.CPC. &( H04W36/16,22,28.CPC. \| H04W28/10,12.CPC.) ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 22:19 |
| S69 | 293 | ( (H04W76/025,064.CPC. \| H04W36/16,22,28.CPC.) & H04W28/10,12.CPC. ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 22:19 |
| S70 | 413 | ( (H04W76/025,064.CPC. \| H04W28/10,12.CPC.) & H04W36/16,22,28.CPC. ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 22:20 |
| S71 | 724 | H04W76/$.CPC. & ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ADJ5 (request$3) ADJ5 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/28 18:29 |
| S72 | 51 | H04W76/$.CPC. & ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) | US-PGPUB; USPAT; | ADJ | ON | 2015/09/28 19:00 |

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|---|---|---|---|---|---|---|
| | | \| base station \| BS! \| BTS!) ADJ5 (reallocat$3 \| reconfigur$5) ADJ5 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | | | |
| S73 | 322 | H04W$/$.CPC. & ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ADJ5 (reallocat$3 \| reconfigur$5) ADJ5 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/28 19:20 |
| S75 | 2 | (EAST-000-9084152) \| ( "20130303224".did. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/28 20:02 |
| S78 | 2 | "20140177446".did. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/28 21:21 |
| S79 | 2 | (EAST-000-2013022219) \| ( "20140177446".did. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/28 21:22 |
| S80 | 115 | (US-20140211759-$ or US-20080109695-$ or US-20020069238-$ or US-20020181395-$ or US-20030039246-$ or US-20030103465-$ or US-20030110290-$ or US-20060182119-$ or US-20070101018-$ or US-20070171816-$ or US-20070291648-$ or US-20080165683-$ or US-20080291827-$ or US-20140362829-$ or US-20150020157-$ or US-20120106511-$ or US-20150195837-$ or US-20120039200-$ or US-20070211658-$ or US-20090191881-$ or US-20110034175-$ or US-20110039593-$ or US-20110051685-$ or US-20110103221-$ or US-20110134774-$ or US-20110212693-$).did. or (US-20110317552-$ or US-20120039252-$ or US-20120082082-$ or US-20120099464-$ or US-20120213207-$ or US-20110053521-$ or US-20050163093-$ or US-20150264612-$ or US-20150263846-$ or US-20150172032-$ or US-20150133126-$ or US-20150124743-$ or US-20150110048-$ or US-20150094073-$ or US-20150055621-$ or US-20150016323-$ or US-20100303039-$ or US-20150004981-$ or US-20150003402-$ | US-PGPUB; USPAT; FPRS; DERWENT | ADJ | ON | 2015/09/28 21:46 |

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|---|---|---|---|---|---|---|
| | | or US-20140092787-$ or US-20140307622-$ or US-20140204777-$ or US-20130301439-$ or US-20130331077-$ or US-20130010716-$ or US-20120163205-$ or US-20110103327-$).did. or (US-20150009826-$ or US-20140050184-$ or US-20140044087-$ or US-20130183970-$ or US-20110269442-$ or US-20150156780-$ or US-20130217382-$ or US-20130176988-$ or US-20120057544-$ or US-20140295856-$ or US-20110105140-$ or US-20150201410-$ or US-20150201418-$ or US-20150117292-$ or US-20140301201-$ or US-20090253426-$ or US-20110111785-$ or US-20130329550-$ or US-20150124735-$ or US-20140321267-$ or US-20140269575-$ or US-20150140999-$ or US-20130303224-$ or US-20140177446-$).did. or (US-8724544-$ or US-8971871-$ or US-8706124-$).did. or (CN-103974459-$ or KR-20140097996-$ or EP-2448325-$ or EP-2770661-$ or WO-2014070347-$ or WO-2014171888-$ or WO-2013022219-$ or WO-2014169117-$ or WO-2014048294-$ or WO-2014003899-$ or WO-2012165893-$ or WO-2015065855-$ or EP-1418782-$).did. or (EP-2448325-$ or WO-2013191084-$ or US-20120106511-$ or EP-2257113-$ or US-20120236801-$ or WO-2014000610-$ or WO-2013022220-$ or WO-2014015734-$ or WO-2013153442-$ or WO-2013022219-$ or WO-2012006744-$ or WO-2011149081-$ or US-20140307622-$ or US-20130303224-$ or US-20110267978-$ or US-20040125748-$ or US-20150133122-$ or WO-2014017872-$ or WO-2014017874-$).did. | | | | |
| S81 | 100 | S80 & ( type \| channel \| carrier \| qos \| quality) | US-PGPUB; USPAT; FPRS; DERWENT | ADJ | ON | 2015/09/28 21:48 |
| S84 | 3 | (EAST-000-8706124) \| ( "20110065440".did. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/29 12:45 |
| S87 | 618 | (H04W76/$) & ( type \| channel \| carrier \| qos \| quality) NEAR5 (stream \| flow) SAME5 ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) | US-PGPUB; USPAT; FPRS; DERWENT | ADJ | ON | 2015/09/29 14:53 |
| S88 | 327 | (H04W76/$) & ( type \| channel \| carrier \| qos \| quality) NEAR5 (stream \| flow) SAME ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) | US-PGPUB; USPAT; FPRS; DERWENT | ADJ | ON | 2015/09/29 18:36 |



**Petitioners' Exhibit 1002, p. 256**
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**IPR2024-00991**

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|---|---|---|---|---|---|---|
| | | (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) & (@ad \| @rlad )<= "20130130" | | | | |
| S92 | 122 | (US-20140211759-$ or US-20080109695-$ or US-20020069238-$ or US-20020181395-$ or US-20030039246-$ or US-20030103465-$ or US-20030110290-$ or US-20060182119-$ or US-20070101018-$ or US-20070171816-$ or US-20070291648-$ or US-20080165683-$ or US-20080291827-$ or US-20140362829-$ or US-20150020157-$ or US-20120106511-$ or US-20150195837-$ or US-20120039200-$ or US-20070211658-$ or US-20090191881-$ or US-20110034175-$ or US-20110039593-$ or US-20110051685-$ or US-20110103221-$ or US-20110134774-$ or US-20110212693-$).did. or (US-20110317552-$ or US-20120039252-$ or US-20120082082-$ or US-20120099464-$ or US-20120213207-$ or US-20110053521-$ or US-20050163093-$ or US-20150264612-$ or US-20150263846-$ or US-20150172032-$ or US-20150133126-$ or US-20150124743-$ or US-20150110048-$ or US-20150094073-$ or US-20150055621-$ or US-20150016323-$ or US-20100303039-$ or US-20150004981-$ or US-20150003402-$ or US-20140092787-$ or US-20140307622-$ or US-20140204777-$ or US-20130301439-$ or US-20130331077-$ or US-20130010716-$ or US-20120163205-$ or US-20110103327-$).did. or (US-20150009826-$ or US-20140050184-$ or US-20140044087-$ or US-20130183970-$ or US-20110269442-$ or US-20150156780-$ or US-20130217382-$ or US-20130176988-$ or US-20120057544-$ or US-20140295856-$ or US-20110105140-$ or US-20150201410-$ or US-20150201418-$ or US-20150117292-$ or US-20140301201-$ or US-20090253426-$ or US-20110111785-$ or US-20130329550-$ or US-20150124735-$ or US-20140321267-$ or US-20140269575-$ or US-20150140999-$ or US-20130303224-$ or US-20140177446-$ or US-20110065440-$ or US-20150264738-$ or US-20150085730-$).did. or (US-20140348081-$ or US-20140334427-$ or US-20140293874-$).did. or (US-8724544-$ or US-8971871-$ or US-8706124-$).did. or (CN-103974459-$ or KR-20140097996-$ or EP-2448325-$ or EP-2770661-$ or WO-2014070347-$ or WO-2014171888-$ or WO-2013022219-$ or WO-2014169117-$ or WO-2014048294-$ or WO-2014003899-$ or WO-2012165893-$ or WO- | US-PGPUB; USPAT; FPRS; DERWENT | ADJ | OFF | 2016/04/01 08:19 |

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|---|---|---|---|---|---|---|
| | | 2015065855-$ or EP-1418782-$).did. or (EP-2448325-$ or WO-2013191084-$ or US-20120106511-$ or EP-2257113-$ or US-20120236801-$ or WO-2014000610-$ or WO-2013022220-$ or WO-2014015734-$ or WO-2013153442-$ or WO-2013022219-$ or WO-2012006744-$ or WO-2011149081-$ or US-20140307622-$ or US-20130303224-$ or US-20110267978-$ or US-20040125748-$ or US-20150133122-$ or WO-2014017872-$ or WO-2014017874-$ or US-20150085730-$).did. | | | | |
| S94 | 19 | S92 & aggregat$3 & Scell | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | OFF | 2016/04/01 08:20 |
| S95 | 35 | S92 & cause | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | OFF | 2016/04/01 09:47 |
| S96 | 16 | S92 & request WITH path | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | OFF | 2016/04/01 09:52 |
| S97 | 1 | (APP-000) \| 14/167405.APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/04/01 09:54 |
| S98 | 1 | S97 & cause | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/04/01 09:54 |

**4/1/2016 11:29:11 AM**
**C:\Users\hreyes\Desktop\Applications\14167405_Carrier Aggregation - Path selection_RET NF F\14167405_EAST.wsp**

| Index of Claims | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 14167405 | GUO ET AL. |
| | Examiner | Art Unit |
| | HECTOR REYES ORTIZ | 2472 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

| CLAIM | | DATE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Final | Original | 09/29/2015 | 04/01/2016 | | | | | | | |
| | 1 | N | N | | | | | | | |
| | 2 | N | N | | | | | | | |
| | 3 | N | N | | | | | | | |
| | 4 | N | N | | | | | | | |
| | 5 | N | N | | | | | | | |
| | 6 | ✓ | ✓ | | | | | | | |
| | 7 | ✓ | ✓ | | | | | | | |
| | 8 | ✓ | ✓ | | | | | | | |
| | 9 | ✓ | ✓ | | | | | | | |
| | 10 | ✓ | ✓ | | | | | | | |
| | 11 | ✓ | ✓ | | | | | | | |
| | 12 | ✓ | ✓ | | | | | | | |
| | 13 | ✓ | ✓ | | | | | | | |
| | 14 | ✓ | ✓ | | | | | | | |
| | 15 | ✓ | ✓ | | | | | | | |
| | 16 | ✓ | ✓ | | | | | | | |
| | 17 | ✓ | ✓ | | | | | | | |
| | 18 | ✓ | - | | | | | | | |
| | 19 | ✓ | ✓ | | | | | | | |
| | 20 | ✓ | - | | | | | | | |
| | 21 | | ✓ | | | | | | | |
| | 22 | | ✓ | | | | | | | |
| | 23 | | ✓ | | | | | | | |
| | 24 | | ✓ | | | | | | | |
| | 25 | | ✓ | | | | | | | |
| | 26 | | ✓ | | | | | | | |
| | 27 | | ✓ | | | | | | | |
| | 28 | | ✓ | | | | | | | |
| | 29 | | ✓ | | | | | | | |
| | 30 | | ✓ | | | | | | | |
| | 31 | | ✓ | | | | | | | |
| | 32 | | ✓ | | | | | | | |
| | 33 | | ✓ | | | | | | | |
| | 34 | | ✓ | | | | | | | |
| | 35 | | ✓ | | | | | | | |



**Petitioners' Exhibit 1002, p. 259**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

# Request for Continued Examination (RCE) Transmittal

| Docket Number |
|---|
| 1291-235.101 |

**Address to:**
**Mail Stop RCE**
**Commissioner for Patents**
**P.O. Box 1450**
**Alexandria, VA 22313-1450**

| Application Information | |
|---|---|
| First Named Inventor | **Yu-Hsuan Guo** |
| Application No. | **14/167,405** |
| Filing Date | **January 29, 2014** |
| Examiner | **Hector E. Reyes Ortiz** |
| Art Unit | **2472** |

**This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.** Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. See Instruction Sheet for RCEs (not to be submitted to the USPTO) on page 2.

1. **Submission required under 37 CFR 1.114**

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

a. ☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

i. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

ii. ☐ Other _____

b. ☒ Enclosed

i. ☒ Amendment/Reply

ii. ☐ Affidavit(s)/Declaration

iii. ☐ Information Disclosure Statement

iv. ☐ Other _____

2. **Miscellaneous**

a. ☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 CFR1.17(i) required)

b. ☐ Other _____



**Petitioners' Exhibit 1002, p. 260**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

# Request for Continued Examination (RCE) Transmittal

| Docket Number |
| --- |
| 1291-235.101 |

**Fee Calculation**

| Request for Continued Examination Fee | | |
| --- | --- | --- |
| ☐ **Applicant Claims Small Entity Status** *See 37 CFR 1.27* | **TOTAL** | **$1200** |

**Method of Payment**

☐ Deposit Account ☒ Credit Card ☐ Check ☐ Money Order ☐ Other: _____

Deposit Account Number

**For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)**

☐ Charge the fee(s) set forth above

☐ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17

☐ Charge fee(s) indicated above, **except for the filing fee**

☐ Credit any overpayments

**WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on form PTO-2038.**

Amount Grand Total **$1200**



**Petitioners' Exhibit 1002, p. 261**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

# Request for Continued Examination (RCE) Transmittal

| Docket Number |
|---|
| 1291-235.101 |

## Correspondence Address

| | | | |
|---|---|---|---|
| Customer Number | 106622 | | |
| -OR- | | | |
| Name | | | |
| Address | | | |
| City | | State | |
| Country | | Postal Code | |
| Phone Number | | | |
| E-mail Address | | | |

## Certificate of Mailing by Express Mail

I hereby certify that this Request for Continued Examination, accompanying documents, and fee are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on the date indicated below:

*(Date of Mailing)*

*(Typed or Printed Name of Person Mailing Correspondence)*

*(Signature of Person Mailing Correspondence)*

*("Express Mail" Mailing Label Number)*

## Certificate of Mailing by First Class Mail

I hereby certify that this Request for Continued Examination, accompanying documents, and fee are being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on the date indicated below:

*(Date of Mailing)* *(Name of Person Mailing Correspondence)*

*(Signature of Person Mailing Correspondence)*

## Certificate of Transmission

I hereby certify that this Request for Continued Examination, accompanying documents, and fee authorization are being facsimile transmitted to the United States Patent and Trademark Office on the date indicated below:

*(Date of Transmission)* *(Name of Person Transmitting Correspondence)*

*(Signature of Person Transmitting Correspondence)*

## Signature Instructions

Select the name of the person who will electronically sign the Request for Continued Examination from the drop-down box below.

If a practitioner is not present in the drop-down list, you must close this form and select 'Add Practitioner...' in the Form Manager's Utility menu.

**Verify that the signatory information is correct and press the 'eSign' button to electronically sign the submission. If you prefer to sign the form manually, simply do not click the 'eSign' button; just print and manually sign.**

**Signatory Drop-Down Box** Sang N. Dang

| | | | | | |
|---|---|---|---|---|---|
| Name | Sang N. Dang | | | Registration Number | 51,186 |
| Signatory Capacity | Attorney for Applicant(s) | | E-mail Address | sdang@bluecapitallaw.com | |
| eSign | /Sang N. Dang/ | | | Date Signed | 07/05/2016 |



Petitioners' Exhibit 1002, p. 262
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

# Amendment Transmittal Letter

| Docket Number |
|---|
| 1291-235.101 |

**Address To**
**Commissioner for Patents**
**P.O. Box 1450**
**Alexandria, Virginia 22313-1450**

**Title of Invention**

**METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM**

| | |
|---|---|
| First Named Inventor | **Yu-Hsuan Guo** |
| Application No. | **14/167,405** |
| Filing Date | **January 29, 2014** |
| Examiner | **Hector E. Reyes Ortiz** |
| Art Unit | **2472** |

Transmitted herewith is an amendment in the above-identified application.

The fee has been calculated and is transmitted as shown below.

☐ **Applicant claims Small Entity Status.** See 37 CFR 1.27.

**Fee Calculation**

Claims as Amended

| For | #Filed | #Previously Paid For | #Extra | Rate | Fee |
|---|---|---|---|---|---|
| Total Claims | 29 | - 33 = | | x 80 = | |
| Total Indep. Claims | 5 | - 5 = | | x 420 = | |
| Multiple Dependent Claims (check if applicable) ☐ | | | | | |
| | | | | **TOTAL** | **$0** |

**Method of Payment**

☐ Deposit Account ☐ Credit Card ☐ Check ☐ Money Order ☐ Other: _____

Deposit Account Number

**For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)**

☐ Charge the fee(s) set forth above
☐ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17
☐ Charge fee(s) indicated above, **except for the filing fee**
☐ Credit any overpayments

**WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on form PTO-2038.**

Amount Grand Total **$0**



**Petitioners' Exhibit 1002, p. 263**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

# Amendment Transmittal Letter

| Docket Number |
|---|
| 1291-235.101 |

| Correspondence Address | | | |
|---|---|---|---|
| Customer Number | 106622 | | |
| -OR- | | | |
| Name | | | |
| Address | | | |
| City | | State | |
| Country | | Postal Code | |
| Phone Number | | | |
| E-mail Address | | | |

## Certificate of Mailing by Express Mail

I hereby certify that this Amendment, accompanying documents, and fee (if appropriate) are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on the date indicated below:

*(Date of Mailing)*

*(Typed or Printed Name of Person Mailing Correspondence)*

*(Signature of Person Mailing Correspondence)*

*("Express Mail" Mailing Label Number)*

## Certificate of Mailing by First Class Mail

I hereby certify that this Amendment, accompanying documents, and fee (if appropriate) are being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on the date indicated below:

*(Date of Mailing)* *(Name of Person Mailing Correspondence)*

*(Signature of Person Mailing Correspondence)*

## Certificate of Transmission

I hereby certify that this Amendment, accompanying documents, and fee (if appropriate) authorization are being facsimile transmitted to the United States Patent and Trademark Office on the date indicated below:

*(Date of Transmission)* *(Name of Person Transmitting Correspondence)*

*(Signature of Person Transmitting Correspondence)*

### Signature Instructions

Select the name of the person who will electronically sign the Amendment from the drop-down box below.

If a practitioner is not present in the drop-down list, you must close this form and select 'Add Practitioner...' in the Form Manager's Utility menu.

**Verify that the signatory information is correct and press the 'eSign' button to electronically sign the submission. If you prefer to sign the form manually, simply do not click the 'eSign' button; just print and manually sign.**

**Signatory Drop-Down Box** Sang N. Dang

| Name | Sang N. Dang | | Registration Number | 51,186 |
|---|---|---|---|---|
| Signatory Capacity | Attorney for Applicant(s) | E-mail Address | sdang@bluecapitallaw.com | |
| eSign | /Sang N. Dang/ | | Date Signed | 07/05/2016 |



Petitioners' Exhibit 1002, p. 264
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | |
|---|---|
| Appl. No. | : 14/167,405 |
| Confirmation No. | : 6471 |
| Applicant | : Yu-Hsuan Guo |
| Filed | : January 29, 2014 |
| Title | : METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| TC/A.U. | : 2472 |
| Examiner | : Hector E. Reyes Ortiz |
| Docket No. | : 1291-235.101 (IS 1020044-US-D1) |
| Customer No. | : 106622 |

**Amendment to Final Office Action**

Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the final Office Action mailed on April 6, 2016, having a three-month period for filing a response to **July 6, 2016**, Applicant respectfully submits the following amendments and remarks along with an RCE.

**Claims** begin on page 2.

**Remarks** begin on page 8.



**Petitioners' Exhibit 1002, p. 265**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

**IN THE CLAIMS:**

1. (Withdrawn) A method for handling inter-node connectivity in a wireless communication system, comprising:

transmitting a request from a first network node to a second network node to stop aggregating a SCell (Secondary Cell) for a UE (User Equipment);

wherein the first network node controls the SCell and the second network node controls PCell (Primary Cell) of the UE.

2. (Withdrawn) The method of claim 1, wherein the request is a SCell release request message.

3. (Withdrawn) The method of claim 1, wherein the first network node and the second network node are eNBs (evolved Node B).

4. (Withdrawn) The method of claim 1, wherein the SCell is a small cell and the PCell is a macro cell.

5. (Withdrawn) The method of claim 1, wherein the request is triggered based on factors including a loading of the SCell and/or whether or not a QoS for the UE could be guaranteed.

6. (Currently Amended) A method for handling inter-node connectivity in a wireless communication system, comprising:

receiving, by a first network node, a first request from a second network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment);

transmitting an accept message from the first network node to the second network node in response to the first request; and

transmitting a second request from the first network node, which controls a first serving cell of the UE, to the second network node, which controls a second serving cell of the UE, to change a data path for a first radio bearer of the UE, wherein the second request does not indicate to change the data path for a third radio bearer of the UE;



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AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

wherein a first path is via the first network node and used as the data path for the first radio bearer and the third radio bearer before changing the data path for the first radio bearer.

7. (Previously Presented) The method of claim 6, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the second network node and used as a data path for a second radio bearer of the UE.

8. (Canceled)

9. (Previously Presented) The method of claim 6, wherein the second request includes a cause for data path changing.

10. (Previously Presented) The method of claim 6, wherein the UE has multiple paths via different network nodes after the data path for the first radio bearer change.

11. (Previously Presented) The method of claim 6, further comprising:

receiving, by the first network node, a confirmation message from the second network node for changing the data path for the first radio bearer.

12. (Previously Presented) The method of claim 6, wherein the first network node is an eNB (evolved Node B) controlling the first serving cell or the SCell of the UE, and the second network node is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE.

13. (Currently Amended) A method for handling inter-node connectivity in a wireless communication system, comprising:

transmitting a first request from a second network node to a first network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment);

receiving, by the second network node, an accept message from the first network node in response to the first request;

receiving, by the second network node which controls a second serving cell of the UE, a second request from the first network node which controls a first serving cell of the UE; and



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IPR2024-00991

changing a data path for a first radio bearer of the UE and not changing a data path for a third radio bearer of the UE based on the second request;

wherein a first path is via the first network node and used as the data path for the first radio bearer and the third radio bearer before changing the data path for the first radio bearer.

14. (Previously Presented) The method of claim 13, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the second network node and used as a data path for a second radio bearer of the UE.

15. (Canceled)

16. (Previously Presented) The method of claim 13, further comprising:

transmitting a confirmation message from the second network node to the first network node for changing the data path for the first radio bearer.

17. (Previously Presented) The method of claim 13, wherein the UE has multiple paths via different network nodes after the data path for the first radio bearer change.

18. (Canceled)

19. (Previously Presented) The method of claim 13, wherein the first network node is an eNB (evolved Node B) controlling the first serving cell or the SCell of the UE, and the second network node is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE.

20. (Canceled)

21. (Previously Presented) The method of claim 6, wherein the first network node terminates transmission and/or reception of the first radio bearer when receiving a confirmation message for the second request.



**Petitioners' Exhibit 1002, p. 268**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

22. (Currently Amended) A communication device to handle inter-node connectivity in a wireless communication system, comprising:

a control circuit;

a processor installed in the control circuit;

a memory installed in the control circuit and operatively coupled to the processor;

wherein the processor is configured to execute a program code stored in the memory to handle inter-node connectivity by:

receiving, by the communication device, a first request from a network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment);

transmitting an accept message from the communication device to the network node in response to the first request;

transmitting a second request from the communication device, which controls a first serving cell of the UE, to the network node, which controls a second serving cell of the UE, to change a data path for a first radio bearer of the UE, wherein the second request does not indicate to change a data path for a third radio bearer of the UE;

wherein a first path is via the communication device and used as the data path for the first radio bearer and the third radio bearer before changing the data path for the first radio bearer.

23. (Currently Amended) The communication device of claim 22, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the ~~second~~ network node and used as a data path for a second radio bearer of the UE.

24. (Canceled)

25. (Previously Presented) The communication device of claim 22, wherein the second request includes a cause for data path changing.

26. (Previously Presented) The communication device of claim 22, wherein the UE has multiple paths via different network nodes after the data path for the first radio bearer change.



**Petitioners' Exhibit 1002, p. 269**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

27. (Currently Amended) The communication device of claim 22, wherein the program code further ~~comprising~~ comprises:

receiving, by the communication device, a confirmation message from the network node for changing the data path for the first radio bearer.

28. (Previously Presented) The communication device of claim 22, wherein the communication device is an eNB (evolved Node B) controlling the first serving cell or the SCell of the UE, and the network node is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE.

29. (Previously Presented) The communication device of claim 22, wherein the communication device terminates transmission and/or reception of the first radio bearer when receiving a confirmation message for the second request.

30. (Currently Amended) A communication device to handle inter-node connectivity in a wireless communication system, comprising:

a control circuit;

a processor installed in the control circuit;

a memory installed in the control circuit and operatively coupled to the processor;

wherein the processor is configured to execute a program code stored in the memory to handle inter-node connectivity by:

transmitting a first request from the communication device to a network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment);

receiving, by the communication device, an accept message from the network node in response to the first request;

receiving, by the communication device which controls a second serving cell of the UE, a second request from the network node which controls a first serving cell of the UE; and

changing a data path for a first radio bearer of the UE and not changing a data path for a third radio bearer of the UE based on the second request;

wherein a first path is via the network node and used as the data path for the first radio bearer and the third radio bearer before changing the data path for the first radio bearer.



**Petitioners' Exhibit 1002, p. 270**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

31. (Previously Presented) The communication device of claim 30, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the communication device and used as a data path for a second radio bearer of the UE.

32. (Canceled)

33. (Currently Amended) The communication device of claim 30, wherein the program code further ~~comprising~~ comprises:

transmitting a confirmation message from the communication device to the network node for changing the data path for the first radio bearer.

34. (Previously Presented) The communication device of claim 30, wherein the UE has multiple paths via different network nodes after the data path for the first radio bearer change.

35. (Previously Presented) The communication device of claim 30, wherein the network node is an eNB (evolved Node B) controlling the first serving cell or the SCell of the UE, and the communication device is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE.



**Petitioners' Exhibit 1002, p. 271**
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**IPR2024-00991**

## REMARKS

Claims 6-17, 19, and 21-35 are pending in the application. In the Office Action, claims 6-7, 11-12, 21-23, and 27-28 stand rejected under 35 U.S.C. § 103(a) based on the combination of Sambhwani (U.S. Patent Publication No. 2013/0303224; based on U.S. Provisional Application Serial No. 61/646,233), and Chen (U.S. Patent Publication No. 2013/0183970). *See* Office Action, Page 3. Claims 13-14, 16, 19, 29-31, 33, and 35 also stand rejected under 35 U.S.C. § 103(a) based on the combination of Sambhwani and Chen. *See* Office Action, Page 8. In addition, claims 8 and 24 and claims 15 and 32 stand rejected under 35 U.S.C. § 103(a) based on the combination of Sambhwani, Chen, and Kakani (U.S. Patent Publication No. 2011/0065440). *See* Office Action, Pages 6 and 10.

Claims 8, 15, and 24, and 32 have been canceled. Claims 6, 13, 22, 23, 27, 30 and 33 have been amended to incorporate limitations recited in claims 8, 15, 24, and 32. No new matter has been added. Applicants respectfully request reconsideration of the claims as amended.

Claim 6 recites "transmitting a second request from the first network node, which controls a first serving cell of the UE, to the second network node, which controls a second serving cell of the UE, to change a data path for a first radio bearer of the UE, wherein the second request does not indicate to change the data path for a third radio bearer of the UE" and "wherein a first path is via the first network node and used as the data path for … the third radio bearer …." Similarly, claim 22 recites "transmitting a second request from the communication device, which controls a first serving cell of the UE, to the network node, which controls a second serving cell of the UE, to change a data path for a first radio bearer of the UE, wherein the second request does not indicate to change the data path for a third radio bearer of the UE" and "wherein a first path is via the communication device and used as the data path for … the third radio bearer …." Furthermore, claim 13 recites "receiving, by the second network node which controls a second serving cell of the UE, a second request from the first network node which controls a first serving cell of the UE", "not changing a data path for a third radio bearer of the UE based on the second request", and "wherein a first path is via the first network node and used as the data path for … the third radio bearer …." In addition, claim 30 recites "receiving, by the communication device which controls a second serving cell of the UE, a second request from the first network node which controls a first serving cell of the UE", "not changing a data path for a third radio bearer of the UE based on the



**Petitioners' Exhibit 1002, p. 272**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

second request", and "wherein a first path is via the network node and used as the data path for … the third radio bearer …." Applicant respectfully submits that no combination of Sambhwani, Chen, and/or Kakani discloses the noted limitations.

The Office Action admits that "Sambhwani fails to disclose that the ***first path is used as a data path for a third radio bearer of the UE, and the second request does not indicate to change the data path for the third radio bearer***." *See e.g.*, Office Action, Page 6, emphasis original. Nevertheless, the Office Action cites to Kakani in rejecting the claims. *See e.g.*, Office Action, Page 6. Applicant respectfully disagrees.

Paragraph [0006] of Kakani discloses that a request includes an information element that contain data stream ID for each stream to be switched. However, the session transfer request, discussed in Paragraph [0006] of Kakani, is transmitted from the transmitting device of the data stream to the receiving device of the data stream. *See* Kakani, Paragraph [0005] and FIG. 1. In other words, the information element containing data stream ID is directly negotiated between the sender and the receiver of the data stream.

In sharp contrast, as recited in claims 6, 13, 22, and 30, the request of data path change is negotiated between the first network node and the second network node even though the data path for a radio bearer is between the UE and a network node. Furthermore, as recited in claims 6, 13, 22, and 30, the first network node and the second network node are ***not*** the sender and the receiver of the data stream respectively.

Based on the foregoing, Applicant respectfully submits that claims 6-7, 9-14, 16-17, 19, 21-23, 25-31, and 33-35 are patentable over any combination of Sambhwani, Chen, and/or Kakani.

In view of the foregoing it is respectfully submitted that the pending claims are in condition for allowance. Reconsideration of the rejections is requested. Allowance of the claims is solicited. The Examiner is invited to contact Applicant's undersigned counsel by telephone at (714) 839-3800 to expedite the prosecution of this case should there be any unresolved matters remaining.



**Petitioners' Exhibit 1002, p. 273**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made.

Respectfully submitted,

Sang N. Dang

**BLUE CAPITAL LAW FIRM, P.C.**

Dated: July 5, 2016

/Sang N. Dang/

Reg. No. 51,186

Tel.: (714) 839-3800



**Petitioners' Exhibit 1002, p. 274**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | | |
|---|---|---|
| Applicants: | Yu-Hsuan Guo and Meng-Hui Ou | |
| Title: | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM | |
| Serial No.: | 14/167,405 | Filed: January 29, 2014 |
| Examiner: | Hector E. Reyes Ortiz | Group Art Unit: 2472 |
| Attorney Docket No.: | 1291-235.101 (IS102004-US-D1) | |

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**CERTIFICATE OF EFS-WEB TRANSMISSION**
**UNDER 37 CFR § 1.8**

I hereby certify that the enclosed 3 Page Request for Continued Examination; 2 Page Amendment Transmittal; and 10 Page Amendment are being transmitted to the United States Patent and Trademark Office via EFS-Web on July 5, 2016.

Date: July 5, 2016 /Sandy Kim/
Sandy Kim

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**BLUE CAPITAL LAW FIRM, P.C. (Customer No.: 106622)**
650 Town Center Drive, Suite 1530
Costa Mesa, California 92626
Tel: 714-839-3800
Fax: 714-795-2995

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | 14167405 |
| **Filing Date:** | 29-Jan-2014 |
| **Title of Invention:** | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| **First Named Inventor/Applicant Name:** | Yu-Hsuan Guo |
| **Filer:** | Sang N. Dang/Sandy Kim |
| **Attorney Docket Number:** | 1291-235.101 |

Filed as Large Entity

**Filing Fees for Utility under 35 USC 111(a)**

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| **Pages:** | | | | |
| **Claims:** | | | | |
| **Miscellaneous-Filing:** | | | | |
| **Petition:** | | | | |
| **Patent-Appeals-and-Interference:** | | | | |
| **Post-Allowance-and-Post-Issuance:** | | | | |
| **Extension-of-Time:** | | | | |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Miscellaneous:** | | | | |
| Request for Continued Examination | 1801 | 1 | 1200 | 1200 |
| | | **Total in USD ($)** | | **1200** |

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 26253653 |
| **Application Number:** | 14167405 |
| **International Application Number:** | |
| **Confirmation Number:** | 6471 |
| **Title of Invention:** | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| **First Named Inventor/Applicant Name:** | Yu-Hsuan Guo |
| **Customer Number:** | 106622 |
| **Filer:** | Sang N. Dang/Sandy Kim |
| **Filer Authorized By:** | Sang N. Dang |
| **Attorney Docket Number:** | 1291-235.101 |
| **Receipt Date:** | 05-JUL-2016 |
| **Filing Date:** | 29-JAN-2014 |
| **Time Stamp:** | 14:17:01 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
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| Submitted with Payment | yes |
| Payment Type | Credit Card |
| Payment was successfully received in RAM | $1200 |
| RAM confirmation Number | 462 |
| Deposit Account | |
| Authorized User | |

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | | 1291-235-101--RFOAwRCEasFiled07052016.pdf | 148325<br>8a5a2a94e5fb098db7653346465ccf1f5eb2f285 | yes | 16 |

| | Multipart Description/PDF files in .zip description | | |
|---|---|---|---|
| | **Document Description** | **Start** | **End** |
| | Request for Continued Examination (RCE) | 1 | 3 |
| | Transmittal Letter | 4 | 5 |
| | Amendment Submitted/Entered with Filing of CPA/RCE | 6 | 6 |
| | Claims | 7 | 12 |
| | Applicant Arguments/Remarks Made in an Amendment | 13 | 15 |
| | Miscellaneous Incoming Letter | 16 | 16 |

| | | | | | |
|---|---|---|---|---|---|
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 2 | Fee Worksheet (SB06) | fee-info.pdf | 30751<br>2f13b74c18ca0be5223de2b8e7cbc042377538a6 | no | 2 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| | | **Total Files Size (in bytes):** | 179076 | | |

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**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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| PATENT APPLICATION FEE DETERMINATION RECORD<br>Substitute for Form PTO-875 | Application or Docket Number<br>14/167,405 | Filing Date<br>01/29/2014 | ☐ To be Mailed |
|---|---|---|---|

**ENTITY**: ☒ LARGE ☐ SMALL ☐ MICRO

## APPLICATION AS FILED – PART I

| FOR | (Column 1) NUMBER FILED | (Column 2) NUMBER EXTRA | RATE ($) | FEE ($) |
|---|---|---|---|---|
| ☐ BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | |
| ☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | N/A | |
| ☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | minus 20 = | * | X $ = | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | minus 3 = | * | X $ = | |
| ☐ APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | |
| ☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | |

## APPLICATION AS AMENDED – PART II

AMENDMENT 07/05/2016

| | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|
| Total (37 CFR 1.16(i)) | * 33 | Minus | ** 33 | = 0 | X $80 = | 0 |
| Independent (37 CFR 1.16(h)) | * 5 | Minus | ***5 | = 0 | X $420 = | 0 |
| ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | TOTAL ADD'L FEE | 0 |

AMENDMENT

| | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|
| Total (37 CFR 1.16(i)) | * | Minus | ** | = | X $ = | |
| Independent (37 CFR 1.16(h)) | * | Minus | *** | = | X $ = | |
| ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | TOTAL ADD'L FEE | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/EVELYN NIMMONS/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

PTO/SB/08a (03-15)
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# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

**( Not for submission under 37 CFR 1.99)**

| | |
|---|---|
| Application Number | 14167405 |
| Filing Date | 2014-01-29 |
| First Named Inventor | Yu-Hsuan Guo |
| Art Unit | 2472 |
| Examiner Name | REYES ORTIZ, HECTOR E |
| Attorney Docket Number | 1291-235.101 |

**U.S.PATENTS**

| Examiner Initial* | Cite No | Patent Number | Kind Code[1] | Issue Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|---|
| | 1 | | | | | |

If you wish to add additional U.S. Patent citation information please click the Add button.

**U.S.PATENT APPLICATION PUBLICATIONS**

| Examiner Initial* | Cite No | Publication Number | Kind Code[1] | Publication Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|---|
| | 1 | 20120140743 | A1 | 2012-06-07 | InterDigital Patent Holdings, Inc. | |

If you wish to add additional U.S. Published Application citation information please click the Add button.

**FOREIGN PATENT DOCUMENTS**

| Examiner Initial* | Cite No | Foreign Document Number[3] | Country Code[2] i | Kind Code[4] | Publication Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear | T[5] |
|---|---|---|---|---|---|---|---|---|
| | 1 | 11234719 | JP | A | 1999-08-27 | Alcatel CIT | | ☐ |
| | 2 | 2011176722 | JP | A | 2011-09-08 | SONY CORP | | ☐ |
| | 3 | 2012019313 | JP | A | 2012-01-26 | NTT DOCOMO INC | | ☐ |

| INFORMATION DISCLOSURE STATEMENT BY APPLICANT ( Not for submission under 37 CFR 1.99) | | |
|---|---|---|
| | Application Number | 14167405 |
| | Filing Date | 2014-01-29 |
| | First Named Inventor | Yu-Hsuan Guo |
| | Art Unit | 2472 |
| | Examiner Name | REYES ORTIZ, HECTOR E |
| | Attorney Docket Number | 1291-235.101 |

If you wish to add additional Foreign Patent Document citation information please click the Add button

**NON-PATENT LITERATURE DOCUMENTS**

| Examiner Initials* | Cite No | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published. | T[5] |
|---|---|---|---|
| | 1 | Office Action on corresponding JP Patent Application No. 2015-107120 dated April 5, 2016 | ☐ |

If you wish to add additional non-patent literature document citation information please click the Add button

**EXAMINER SIGNATURE**

| Examiner Signature | | Date Considered | |
|---|---|---|---|

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.



**Petitioners' Exhibit 1002, p. 283**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

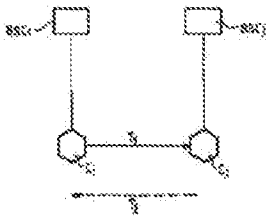
Legal Status

(11)Publication number 11-234719
(43)Date of publication of application 27.08.1999
(51)Int.Cl. H04Q 7/22
H04Q 7/28

(21)Application number 10-335461
(22)Date of filing 26.11.1998
(71)Applicant ALCATEL CIT
(72)Inventor ROBERTS MICHAEL

(30)Priority
Priority number : 97 9714911 Priority date : 27.11.1997 Priority country : FR

# (54)METHOD FOR ENHANCING COOPERATION BETWEEN ENTITIES OF CELLULAR MOBILE RADIO COMMUNICATION NETWORK DURING CALL HAND-OVER BETWEEN CELLS



(57)Abstract
PROBLEM TO BE SOLVED: To provide a method for enhancing cooperation between entities of a cellular mobile radio communication network during hand-over of a call between cells.
SOLUTION: In this method, a new server entity (BSCj) is informed of the reason of a hand-over in the case of hand-over of a call from a 'current server cell' (Ci) controlled by a 'current server entity' (BSCi) of a system to a 'new server cell' (Cj) controlled by the new server entity (BSCj) other than the 'current server entity' of the system.

Petitioners' Exhibit 1002, p. 284
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

(19)日本国特許庁（ＪＰ）　(12)公開特許公報（Ａ）　(11)特許出願公開番号

特開平11－234719

(43)公開日　平成11年(1999)８月27日

| (51)Int.Cl.[6] | 識別記号 | ＦＩ | |
|---|---|---|---|
| Ｈ０４Ｑ　7/22 | | Ｈ０４Ｑ　7/04 | Ｋ |
| 7/28 | | | |

審査請求　未請求　請求項の数１　ＯＬ　外国語出願　（全 25 頁）

(21)出願番号　特願平10－335461

(22)出願日　平成10年(1998)11月26日

(31)優先権主張番号　９７１４９１１

(32)優先日　1997年11月27日

(33)優先権主張国　フランス（ＦＲ）

(71)出願人　598119762
アルカテル
フランス国、75008　パリ、リユ・ラ・ボエテイ　54

(72)発明者　ミシエル・ロベール
フランス国、92200・ヌイイーーシユールーセーヌ、アブニユ・ドユ・ルール、95

(74)代理人　弁理士　川口　義雄　（外２名）

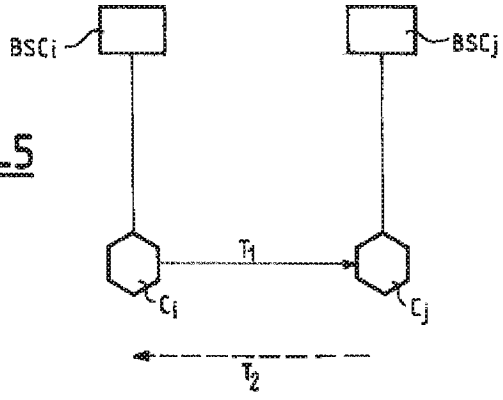
(54)【発明の名称】　セル間の呼のハンドオーバ中にセルラ移動無線通信ネットワークのエンティティ間の協働を改善する方法。

(57)【要約】

【課題】　セル間の呼のハンドオーバ中にセルラ移動無線通信ネットワークのエンティティ間の協働を改善する方法を提供すること。

【解決手段】　前記方法は、システムの「現在のサーバエンティティ」（ＢＳＣｉ）によって制御される「現在のサーバセル」（Ｃｉ）から、システムの前記現在のサーバエンティティとは別個の「新しいサーバエンティティ」（ＢＳＣｊ）によって制御される「新しいサーバセル」（Ｃｊ）へ呼をハンドオーバする際に、前記新しいサーバエンティティ（ＢＳＣｊ）が前記ハンドオーバの理由を通知されることを特徴とする。

FIG_5




Petitioners' Exhibit 1002, p. 285
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

1

【特許請求の範囲】

【請求項１】　セル間の呼のハンドオーバ中にセルラ移動無線通信ネットワークのエンティティ間の協働を改善する方法であって、

システムの「現在のサーバエンティティ」（ＢＳＣｉ）によって制御される「現在のサーバセル」（Ｃｉ）から、システムの前記現在のサーバエンティティとは別個の「新しいサーバエンティティ」（ＢＳＣｊ）によって制御される「新しいサーバセル」（Ｃｊ）へ呼をハンドオーバする際に、前記新しいサーバエンティティ（ＢＳＣｊ）が前記ハンドオーバの理由を通知されることを特徴とする方法。

【請求項２】　前記ハンドオーバの理由に関する情報自体が、逆方向のハンドオーバを必要な場合に再び要求できるようになるまでの時間経過に関する表示を含むことを特徴とする請求項１に記載の方法。

【請求項３】　ハンドオーバが要求される候補セルが「ターゲットセル」と呼ばれ、ターゲットセルを制御するエンティティが「ターゲットエンティティ」（ＢＳＣｃ）と呼ばれ、前記ターゲットセルに要求されたハンドオーバが可能な場合に各ターゲットエンティティが前記新しいサーバエンティティになる可能性があり、各ターゲットエンティティが、前記ターゲットセルへのハンドオーバ要求中にハンドオーバ要求の理由を通知されることを特徴とする請求項１または２に記載の方法。

【請求項４】　ハンドオーバ要求の理由に関する情報が、サーバエンティティとターゲットエンティティの間のリンクを形成するネットワークの「高レベルエンティティ」（ＭＳＣ）を介して現在サーバエンティティ（ＢＳＣｓ）からターゲットエンティティ（ＢＳＣｃ）へ送信されることを特徴とする請求項３に記載の方法。

【請求項５】　制御されるセルが新しいサーバセルによって構成される場合に、前記ハンドオーバの理由に関する情報を受信するための手段を含むことを特徴とする請求項１から４のいずれか一項に記載の方法を実施するセルラ移動無線通信ネットワークのためのセル制御エンティティ（ＢＳＣ）。

【請求項６】　制御されるセルがサーバセルによって構成される場合に、ハンドオーバ要求の理由に関する情報（ＩＮＦ）を送信するための手段（４）を含み、

制御されるセルがターゲットセルによって構成される場合に、ハンドオーバ要求の理由に関する情報（ＩＮＦ'）を受信するための手段（７）を含み、

制御されるセルが連続してターゲットセル、次にサーバセルになるセルによって構成される場合に、前記理由に応じてハンドオーバ要求の送信を阻止または許可するための手段（３）を含むことを特徴とする請求項３または４に記載の方法を実施する請求項５に記載のエンティティ。

【請求項７】　制御されるセルが連続してターゲットセル、次にサーバセルになるセルによって構成される場合に、前記時間経過の後で、または前記ハンドオーバ理由によって決まる時間経過の後でハンドオーバ要求の送信を許可するための手段（３）をさらに含むことを特徴とする請求項２に記載の方法を実施する請求項６に記載のエンティティ。

2

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、一般にセルラ移動無線通信システム、より詳細にはそのようなシステムで無線リソースを管理する方法、さらに詳細には、セル間で呼をハンドオーバする間（「セル間の呼のハンドオーバ」と呼ぶ）にそのようなシステムで無線リソースを管理する方法に関する。

【０００２】

【従来の技術】図１を参照すると、特にＧｌｏｂａｌ　Ｓｙｓｔｅｍ　ｆｏｒ　Ｍｏｂｉｌｅｃｏｍｍｕｎｉｃａｔｉｏｎｓ（ＧＳＭ）などのセルラ移動無線通信システムの一般的なアーキテクチャが想起される。このようなシステムは基本的に以下を含む。

【０００３】ＢＴＳ１、ＢＴＳ２、ＢＴＳ３、およびＢＴＳ４で示されるものなど基地局または「基地送受信局」（「ＢＴＳ」）のセット。図示の例では、各基地局はＣ１、Ｃ２、Ｃ３、およびＣ４で示されるそれぞれのセルに割り当てられる（同じＢＴＳが複数のセルに割り当てられる別の例も当然可能である）。基地局はセル内に位置するＭＳ１、ＭＳ２，ＭＳ３、ＭＳ４など移動局と協働する。

【０００４】それぞれが無線リソース管理の観点からセルのそれぞれのサブセットを制御するＢＳＣ１およびＢＳＣ２で示されるものなど「基地局制御装置」（「ＢＳＣ」）のセット。図示の例では、基地局制御装置ＢＳＣ１はセルＣ１およびＣ２を制御し、基地局制御装置ＢＳＣ２はセルＣ３およびＣ４を制御する。

【０００５】それぞれが特に公衆交換電話網（ＰＳＴＮ）や統合サービスディジタル網（ＩＳＤＮ）など外部ネットワークと協働し、セル管理の観点から基地局制御装置のサブセットを制御するＭＳＣ１で示されるものなど「移動交換局」（「ＭＳＣ」）のセット。図示の例では、移動交換局ＭＳＣ１は基地局制御装置ＢＳＣ１およびＢＳＣ２を制御する。

【０００６】このようなシステムでは一般に、（特に呼が遮断されるのを防止するために）特に進行中の呼の品質を改善するために、またはネットワーク内の全体的な干渉レベルを改善するために、ネットワーク内の無線信号の伝送品質を改善する理由で呼をハンドオーバする決定がなされる。

【０００７】このようなシステムではまた、特にセル内の過大なトラフィックの問題を克服するために、またはセル内で試験または保守動作が進行中であるので、呼を

Petitioners' Exhibit 1002, p. 286
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ハンドオーバする決定がなされることもある。このような状況では、ハンドオーバは伝送品質を改善する上記の理由の目的に反するので、ハンドオーバは「強制的」であると言える。

【０００８】このようなシステムでは、特に現在のサーバセルおよび現在のサーバセルに隣接するセルの無線信号に関して行われた測定結果や、セル内のトラフィックレベルおよび／またはオペレータ制御データに関する表示など、いくつかのパラメータに基づいて、呼をハンドオーバする決定がネットワークによってなされる。

【０００９】呼のハンドオーバ先のセルは「新しいサーバセル」と呼ぶことができ、このセルはさらに、（前記測定結果に基づいて決定される）「候補セル」と呼ばれるセルのセットから以下のようにして選択される。

【００１０】まず、呼を候補セルのうちの最良の候補セルへハンドオーバする要求がなされる。このようなハンドオーバが可能な場合、最良の候補セルは新しいサーバセルになる。このようなハンドオーバが不可能な場合、候補セルの優先順位に従って、呼を次の候補セルへハンドオーバする要求がなされる。

【００１１】ハンドオーバの要求先の候補セルは「ターゲットセル」とも呼ばれる。

【００１２】ターゲットセルが現在のサーバセルと同じＢＳＣによって制御される場合（図１ではこの状況は、例えばセルＣ１からセルＣ２へ、またはセルＣ３からＣ４へハンドオーバが要求される場合に対応し、このようなハンドオーバを「内部ハンドオーバ」または「ＢＳＣ内ハンドオーバ」とも呼ぶ）、当該のＢＳＣには、単独でかつ内部で、前記ターゲットセルへのハンドオーバが可能か否かを判定することができる。これは、ＢＳＣがサーバセルとターゲットセルの両方の無線リソースを管理する責任があるネットワークエンティティであるためである。

【００１３】ターゲットセルが現在のサーバセル（以下、単に「サーバセル」とも呼ぶ）を制御するＢＳＣ（「現在のサーバＢＳＣ」または以下、単に「サーバＢＳＣ」とも呼ぶ）以外のＢＳＣ（「ターゲットＢＳＣ」と呼ぶ）によって制御される場合、この状況は、例えば図１で呼をセルＣ１およびＣ２のいずれか一方からセルＣ３およびＣ４のいずれか一方へハンドオーバする要求に対応し（このようなハンドオーバは「外部ハンドオーバ」または「ＢＳＣ間ハンドオーバ」とも呼ばれる）、手順は図２および図３のいずれか一方に示すようなものになる。すなわち、$BSC_s$で示されるサーバＢＳＣは、まずハンドオーバ要求メッセージ（この例では「ハンドオーバ必要」をＨＯ　ＲＥＱで示す）をＭＳＣへ送信する。

【００１４】次にＭＳＣは、同じタイプのメッセージ（この例では「ハンドオーバ要求」を表すＨＯ　ＲＥＱ’で示される）を$BSC_g$で示されるターゲットＢＳＣへ送信する。

【００１５】ターゲットセル内でリソースが使用可能か否かによって、ターゲットＢＳＣは、図２に示すようにそれ自体ハンドオーバコマンドメッセージを含むハンドオーバ要求確認メッセージ（この例ではＨＯ　ＲＥＱ　ＡＣＫで示される）か、あるいは図３に示すように前記ターゲットセルへのハンドオーバの実行が不可能であることを示すメッセージ（このメッセージはこの例では「ハンドオーバ失敗」を表すＨＯ　ＦＡＩＬで示される）をＭＳＣへ送信する。

【００１６】次にＭＳＣは、同じタイプのメッセージ、すなわち、ハンドオーバコマンドメッセージ（この例ではＨＯ　ＣＯＭＭで示される）か、あるいは前記ターゲットセルへのハンドオーバの実行が不可能であることを示すメッセージ（このメッセージはこの例では「ハンドオーバ要求拒否」を表すＨＯ　ＲＥＪで示される）をサーバＢＳＣへ送信する。

【００１７】図４および図５に示すように、あるセル$C_i$から別のセル$C_j$へのハンドオーバ（または「転送」）$T_1$が実際に実行された後、特に新しいサーバセルおよび最初のサーバセルに関連する無線信号の測定結果が再び最初のサーバセルにとってより有利になるので、例えば移動局が二つのセル間の有効範囲に位置するので、最初のサーバセルへの逆方向のハンドオーバ$T_2$が要求されることがある。この現象は「ピンポン」現象とも呼ばれる。

【００１８】第一のハンドオーバが「強制的」である場合、すなわちこのようなハンドオーバを実行する決定がネットワーク内の無線信号の伝送品質を改善する理由以外の理由でなされる場合には問題が発生する。

【００１９】逆方向のハンドオーバが要求された時にこのような他の理由が存続する場合、これらの理由は、前記逆方向のハンドオーバの根底にあるネットワーク内の無線信号の伝送品質を改善する理由に優先すると考えられ、このような状況では、このような逆方向のハンドオーバを許可してはならない。

【００２０】図４に示すように、問題の二つのセルの両方が$BSC_i$」で示される同じＢＳＣによって制御される場合、このＢＳＣは、第一のハンドオーバの「強制的」性質を認識しており、このような逆方向のハンドオーバを実行してはならないと決定することができる。

【００２１】図５に示すように、当該の二つのセルが同じＢＳＣによって制御されていない場合、ＢＳＣ」で示される現在のサーバＢＳＣ（または「最初のターゲットＢＳＣ」）は、図２および図３に関して上記に想起される手順を用いて$BSC_i$で示されるターゲットＢＳＣ（または「最初のサーバＢＳＣ」）へハンドオーバ要求を送信し、次にターゲットセル（または「最初のサーバセル」）へのハンドオーバを実行できないことを示すメッセージをターゲットＢＳＣから受信する。

【００２２】いずれの場合も、不必要なハンドオーバ要求がなされ、そのためハンドオーバ時間が不必要に長くなり、対応する信号メッセージを交換するために伝送リソースが無駄に消費され、サービス品質が低下する。

【００２３】

【発明が解決しようとする課題】本発明の目的はとりわけ、上記の欠点を回避すること、すなわち、このような場合のネットワーク動作を最適化すること、より一般的には「外部」ハンドオーバ中にネットワークのエンティティ間の協働を改善することである。

【００２４】

【課題を解決するための手段】本発明は、システムの「現在のサーバエンティティ」によって制御される「現在のサーバセル」から、システムの前記現在のサーバエンティティとは別個の「新しいサーバエンティティ」によって制御される「新しいサーバセル」へ呼をハンドオーバする際に、前記新しいサーバエンティティが前記ハンドオーバの理由を通知されることを特徴とする、セル間の呼のハンドオーバ中にセルラ移動無線通信ネットワークのエンティティ間の協働を改善する方法を提供する。

【００２５】したがって、特にハンドオーバが「強制的」である場合、すなわち、呼をハンドオーバする決定が伝送品質を改善する理由以外の理由でなされる場合、前記新しいサーバエンティティはハンドオーバの「強制的」性質を通知されるので、不必要に逆方向のハンドオーバ要求をなさず、したがって上記の欠点が回避される。

【００２６】別の特徴によれば、前記ハンドオーバの理由に関する前記情報自体は、呼が前記現在のサーバセルから前記新しいサーバセルへハンドオーバされた後で逆方向のハンドオーバを必要な場合に再び要求できるようになるまでの時間経過に関する表示を含む。

【００２７】したがって、新しいサーバセルは、逆方向ハンドオーバを必要な場合に再び要求できる時間を決定することができ、それによってネットワーク動作をさらに最適化することができる。

【００２８】本発明はまた、セルラ移動無線通信ネットワークのためのセル制御エンティティ、特にそのような方法を実施するＧＳＭタイプのネットワークなどのネットワークのためのＢＳＣを提供する。

【００２９】本発明の他の目的および特徴は、添付の図面に関して与えられる以下の実施形態の説明を読めば明らかになろう。

【００３０】

【発明の実施の形態】本発明によれば、呼の「外部」ハンドオーバ中、すなわちシステムの「現在のサーバエンティティ」（図５のエンティティＢＳＣ$_i$など）によって制御される「現在のサーバセル」（図５のセルＣ$_i$など）から、システムの前記現在のサーバエンティティとは別個でありかつ「新しいサーバエンティティ」と呼ばれるシステムのエンティティ（図５のエンティティＢＳＣ」など）によって制御される「新しいサーバセル」（図５のセルＣ」など）へのハンドオーバ中に、ネットワークのエンティティ間の協働を改善するために、前記新しいサーバエンティティは前記ハンドオーバの理由を通知される。

【００３１】このために、図６および図７に関して説明する実施態様では、ハンドオーバが要求される候補セルが「ターゲットセル」と呼ばれ、ターゲットセルを制御する制御エンティティＢＳＣ$_c$が「ターゲットエンティティ」と呼ばれ、前記ターゲットセルに要求されたハンドオーバが可能な場合に各ターゲットエンティティが新しいサーバエンティティになる可能性があり、各ターゲットエンティティは、前記ターゲットセルへのハンドオーバ要求中にハンドオーバ要求の理由を通知される。

【００３２】さらに、図６および図７に関して説明される実施態様において、ハンドオーバ要求の理由に関する前記情報は、サーバエンティティとターゲットエンティティの間にリンクを形成する、エンティティＭＳＣ（または「高レベルエンティティ」）を介してサーバエンティティＢＳＣ$_s$からターゲットエンティティＢＳＣ$_c$へ送信される。

【００３３】したがって、図６で、ハンドオーバ要求の理由に関するこのような情報（ＩＮＦ）は、図２および図３に関して上記に想起される手順を用いてサーバＢＳＣ（ＢＳＣ$_s$）からＭＳＣへ送信されたメッセージ（ＨＯ　ＲＥＱ）に関連付けられる。

【００３４】同様に、この実施形態では、ＩＮＦ’で示され、また図示の例ではＭＳＣからターゲットＢＳＣ（ＢＳＣ$_s$）へ再送される対応するメッセージ（ＨＯ　ＲＥＱ’）に関連付けられた情報がＭＳＣからターゲットＢＳＣ（ＢＳＣ$_c$）へ再送される。

【００３５】別の実施態様（特に図示せず）では、現在のサーバエンティティではなくエンティティＭＳＣによってハンドオーバ要求の理由を各ターゲットエンティティに通知することができる。このような実施態様は、特に、現在のサーバエンティティが候補セルのリストをＭＳＣへ送信する場合、およびＭＳＣ自体が対応するハンドオーバ要求を連続して行う場合に対応する。

【００３６】特に、前記情報は、前記ハンドオーバが「強制的」ハンドオーバであること、すなわちハンドオーバを実行する決定がネットワーク内の無線信号の伝送品質を改善する理由以外の理由でなされるという趣旨の情報であり、したがってこの情報によれば上記の欠点を回避することができる。

【００３７】前記情報自体は、ハンドオーバが実行された後、逆方向のハンドオーバを必要な場合に再び要求できるようになるまでの時間経過に関する表示を含み、これによってネットワーク動作をさらに最適化することが

できることが有利である。

【００３８】図７に、本発明の実施の際に、セルラ移動無線通信システムのためのセル制御エンティティ、特にＧＳＭタイプのネットワークのためのＢＳＣ内で用いるタイプの手段を概略的に示す。

【００３９】知られており、したがって本明細書では詳細に説明しない形で、制御されるセルがサーバセルによって構成される場合、このようなエンティティＢＳＣは、ターゲットセルへのハンドオーバを要求するハンドオーバ要求メッセージ（ＨＯＲＥＱメッセージ）を送信するための手段１と、このような要求への応答として得られたメッセージ（ＨＯ　ＣＯＭＭおよびＨＯ　ＲＥＪメッセージ）を受信するための手段２とを含む。これらの手段１および２は、無線リソースを管理するための手段３と関連して知られている形で動作する。

【００４０】図示の例では、制御されるセルがサーバセルによって構成される場合、エンティティＢＳＣは、ハンドオーバ要求の理由に関する情報ＩＮＦを送信するための手段４をさらに含む。図示の例では、この情報ＩＮＦはハンドオーバ要求メッセージＨＯ　ＲＥＱに関連して送信される。

【００４１】このために、手段４は、無線リソースを管理するための手段３が発した、ハンドオーバ要求の理由に関する情報を受信し、手段４は、受信した情報を情報ＩＮＦを構成するためにエンティティＭＳＣへ送信のに適した形に変換する。

【００４２】さらに、情報ＩＮＦ自体が逆方向のハンドオーバを必要な場合に再び要求できるようになるまでの時間経過に関する表示を含み、かつサーバセル内のトラフィック過負荷に対処するため、または前記サーバセル内の試験あるいは保守の要求を満足するためにハンドオーバが要求される場合、前記表示は、例えばトラフィック過負荷を引き起こした事象が消滅していると仮定されるようになるまでの時間経過、または前記サーバセル内の試験または保守動作が終了していると仮定されるようになるまでの時間経過などのデータで構成される。

【００４３】同じく知られており、したがって本明細書では再び詳細に説明しない形で、制御されるセルがターゲットセルによって構成される場合、このようなエンティティＢＳＣは、ハンドオーバ要求メッセージ（ＨＯ　ＲＥＱ’メッセージ）を受信するための手段５と、ハンドオーバ要求確認メッセージ（ＨＯ　ＲＥＱ　ＡＣＫメッセージ）または前記ターゲットセルへのハンドオーバを実行できないことを示すメッセージ（ＨＯ　ＦＡＩＬメッセージ）のいずれかを送信するための手段６とを含む。これらの手段５および６は、無線リソースを管理するための手段３と関連して同じく知られている形で動作する。

【００４４】図示の例では、制御されるセルがターゲットセルによって構成される場合に、エンティティＢＳＣは、ハンドオーバ要求の理由に関するＩＮＦ’などの情報を受信するための手段７をさらに含む。図示の例では、この情報ＩＮＦ’はハンドオーバ要求メッセージＨＯ　ＲＥＱ’と関連して受信される。

【００４５】特に、無線リソースを管理するための手段３は、制御されるセルが連続してターゲットセル、次にサーバセルになるセルによって構成される場合に、最初のハンドオーバが「強制的」であるならば手段１が逆方向のハンドオーバ要求を送信できないような形で手段７によって制御される。

【００４６】さらに、前記情報ＩＮＦ’が、逆方向のハンドオーバを必要な場合に再び要求できるようになるまでの時間経過に関する表示を含む場合、このような時間経過の後、または前記理由によって決まる時間経過（例えば所定の時間経過）の後でこのような逆方向のハンドオーバ要求の送信を許可するために、無線リソースを管理するための手段３はさらに手段７によって制御される。

【００４７】ハンドオーバ要求メッセージ（ＲＥＱメッセージ）を送信するための手段１、このような要求への応答として得られたメッセージ（ＨＯ　ＲＥＪおよびＨＯＣＯＭＭメッセージ）を受信するための手段２、ハンドオーバ要求メッセージ（ＨＯ　ＲＥＱ’メッセージ）を受信するための手段５、ハンドオーバ要求確認メッセージ（ＨＯ　ＲＥＱ　ＡＣＫメッセージ）またはターゲットセルへのハンドオーバを実行できないことを示すメッセージ（ＨＯ　ＦＡＩＬメッセージ）のいずれかを送信するための手段６、および、本発明に関する機能以外の機能に関して、無線リソースを管理するための手段３は、従来の手段であり、したがって本明細書で説明する必要はない。

【００４８】前に拒否されたセルに関する情報ＩＮＦを送信するための手段４、対応する情報ＩＮＦ’を受信するための手段７、および本発明に関連する無線リソースを管理するための手段３の特定の機能が上記の方法を用いて動作できるように実施される特定の形は、当業者には特に困難なものではなく、したがって特に説明する必要はない。

【００４９】本発明は、上記の例に限定されないこと、またより一般的には、呼のセル間の「外部」ハンドオーバ中にセルラ移動無線通信ネットワークのエンティティ間の協働を改善することができることを理解されたい。

【図面の簡単な説明】

【図１】特にＧＳＭネットワークなどの移動無線通信ネットワークの編成を示す概略図である。

【図２】外部ハンドオーバ要求中およびこのようなハンドオーバが可能な場合にこのようなネットワークの様々なエンティティ間で交換される様々なメッセージを示す概略図である。

【図３】外部ハンドオーバ要求中およびこのようなハン

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ドオーバが不可能な場合にこのようなネットワークの様々なエンティティ間で交換される様々なメッセージを示す概略図である。

【図４】問題が本発明によってどのように解決されるかを示す図である。

【図５】問題が本発明によってどのように解決されるかを示す図である。

【図６】協働を改善するための本発明の方法の一例を示す図である。

【図７】セルラ移動無線通信ネットワークのためのセル制御エンティティ（特にＧＳＭタイプのネットワークのためのＢＳＣ）において本発明に従って実施される手段の一例を示す図である。

【符号の説明】

１　ハンドオーバ要求メッセージ（ＨＯ　ＲＥＱメッセージ）を送信するための手段

２　要求への応答として得られたメッセージ（ＨＯ　ＣＯＭＭおよびＨＯ　ＲＥＪメッセージ）を受信するための手段

３　無線リソースを管理するための手段

４　ハンドオーバ要求の理由に関する情報ＩＮＦを送信するための手段

５　ハンドオーバ要求メッセージ（ＨＯ　ＲＥＱ’メッセージ）を受信するための手段

６　ハンドオーバ要求確認メッセージ（ＨＯ　ＲＥＱ　ＡＣＫメッセージ）またはターゲットセルへのハンドオーバを実行できないことを示すメッセージ（ＨＯ　ＦＡＩＬメッセージ）のいずれかを送信するための手段

７　ハンドオーバ要求の理由に関するＩＮＦ’などの情報を受信するための手段

【図１】

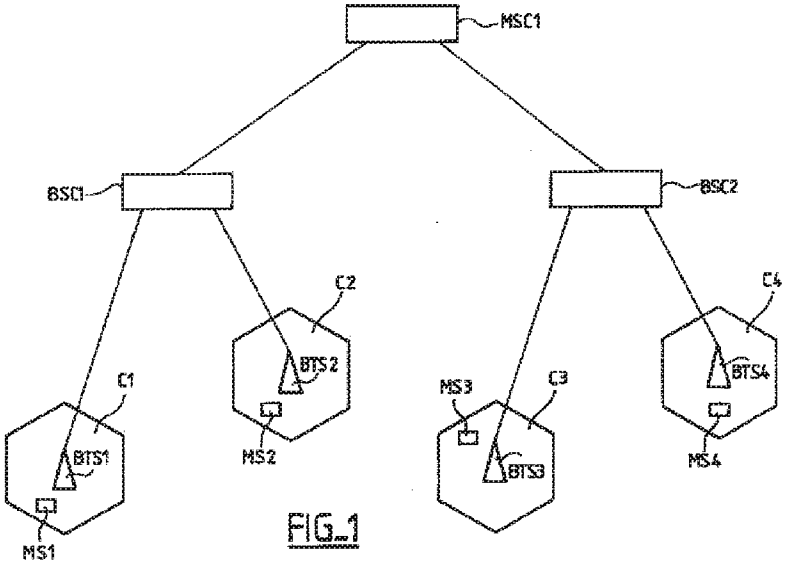



FIG_1

【図４】

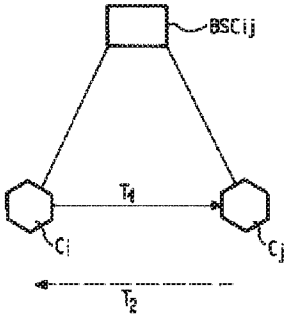



FIG_4

【図２】

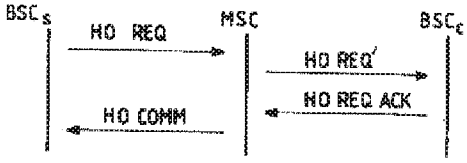



FIG_2

【図３】

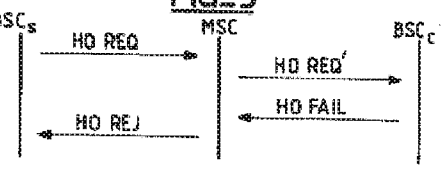



FIG_3

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【図５】

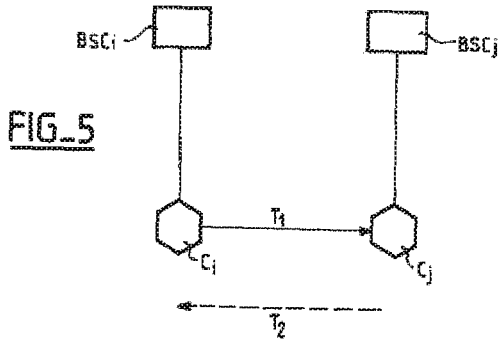
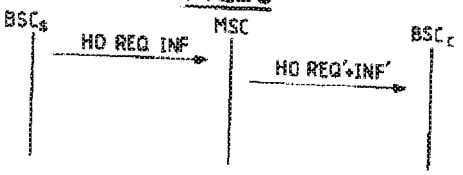



FIG_5

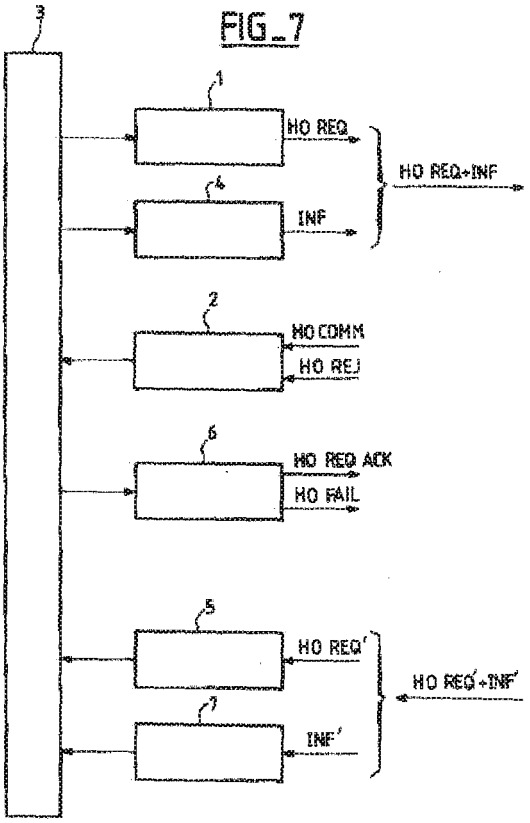
【図６】

FIG_6




【図７】

FIG_7




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【外国語明細書】

## 1. Title of Invention

A METHOD OF IMPROVING CO-OPERATION BETWEEN ENTITIES OF A CELLULAR MOBILE RADIOCOMMUNICATIONS NETWORK DURING CALL HANDOVER BETWEEN CELLS

## 2. Claims

1/ A method of improving co-operation between entities in a cellular mobile radiocommunications network, during inter-cell call handover, said method being characterized in that, when handing over a call from a "current server cell" ($C_i$) controlled by a "current server entity" ($BSC_i$) of the system to a "new server cell" ($C_j$) controlled by a "new server entity" ($BSC_j$) of the system, which new server entity is distinct from said current server entity, said new server entity ($BSC_j$) is informed of the reason for said handover.

2/ A method according to claim 1, characterized in that said information as to the reason for said handover itself includes an indication as to the lapse of time after which an opposite handover can, if necessary, be requested again.

3/ A method according to claim 1 or 2, characterized in that, with a candidate cell to which handover is requested being referred to as the "target cell", with the entity for controlling a target cell being referred to as the "target entity" ($BSC_c$), and with each target entity potentially becoming said new server entity if the requested handover to said target cell is possible, each target entity is informed, during a request for handover to said target cell, of the reason for the handover request.

4/ A method according to claim 3, characterized in that said information as to the reason for the handover request is transmitted by the current server entity ($BSC_s$) to the target entity ($BSC_c$) via a "higher-level entity" (MSC) of the network, which entity provides the link between the server entity and the target entity.

5/ A cell control entity (BSC) for a cellular mobile radiocommunications network, for implementing the method according to any one of claims 1 to 4, said cell control entity being characterized in that, for the case when the controlled cell is constituted by a new server cell, said entity includes means for receiving information as to the reason for said handover.

6/ An entity according to claim 5, for implementing the method according to claim 3 or 4, said entity being characterized in that:

for the case when the controlled cell is constituted by a server cell, said entity includes means (4) for transmitting information (INF) as to the reason for a handover request;

for the case when the controlled cell is constituted by a target cell, said entity includes means (7) for receiving information (INF') as to the reason for a handover request; and

for the case when the controlled cell is constituted by a cell that is successively a target cell and a server cell, said entity includes means (3) for either preventing or allowing transmission of a handover request, depending on said reason.

7/ An entity according to claim 6, for implementing the method according to claim 2, said entity being characterized in that, for the case when the controlled cell is constituted by a cell that is successively a target cell and a server cell, said entity further includes means (3) for authorizing transmission of a handover request after said lapse of time, or after a lapse of time that is a function of the reason for said handover.

## 3. Detailed Description of Invention

The present invention relates generally to cellular mobile radiocommunications systems, more particularly to managing radio resources in such systems, and even more particularly to managing radio resources in such systems while handing over a call between cells (referred to as "inter-cell call handover").

With reference to Figure 1, the general architecture is recalled of a cellular mobile radiocommunications system such as, in particular, the Global System for Mobile communications (GSM). Such a system essentially comprises:

a set of base stations or "Base Transceiver Stations" ("BTSs"), such as those referenced BTS1, BTS2, BTS3, and BTS4; in the example shown, each of the base stations is assigned to a respective cell, the cells being referenced C1, C2, C3, and C4 (other examples naturally being possible in which the same BTS is assigned to a plurality of cells), and the base stations co-operate with mobile stations, such as MS1, MS2, MS3, MS4, situated in the cells;

a set of "Base Station Controllers" ("BSCs"), such as those referenced BSC1 and BSC2, each of the BSCs controlling a respective subset of cells from the point of view of managing the radio resources; in the example shown, the Base Station Controller BSC1 controls the cells C1 and C2, and the Base Station Controller BSC2 controls the cells C3 and C4; and

a set of "Mobile Switching Centers" ("MSCs"), such as that referenced MSC1, each of the MSCs co-operating with external networks, such as, in particular, Public Switched Telephone Networks (PSTNs) or Integrated Services Digital Networks (ISDNs), and controlling a subset of Base Station Controllers from the point of view of managing calls; in the example shown, the Mobile

Switching Center MSC1 controls the Base Station Controllers BSC1 and BSC2.

In such a system, a decision to hand over a call is generally taken for reasons of improving the transmission quality of the radio signals in the network, in particular so as to improve the quality of a call in progress (in particular to prevent the call from being cut off), or so as to improve the overall level of interference in the network.

In such a system, a decision to a hand over a call can also be taken for other reasons, in particular so as to overcome the problem of too much traffic in a cell, or because testing or maintenance operations are in progress in a cell. Under such conditions, handover may be said to be "forced" because it can go against the objects of the above-mentioned reasons of improving transmission quality.

In such a system, a decision to hand over a call is taken by the network on the basis of a certain number of parameters, such as, in particular, the results of measurements taken on radio signals for the current server cell and for cells neighboring the current server cell, and indications about the level of traffic in the cells and/or operator control data.

The cell to which the call is to be handed over may be referred to as the "new server cell", and it is further chosen from a set of cells referred to as "candidate cells" (determined on the basis of said measurement results) in the following manner.

Firstly a request is made to hand over the call to the best of the candidate cells. When such handover is possible, the best candidate cell constitutes the new server cell. When such handover is not possible, a request is made to hand over the call to the following candidate cell, in the order of preference of candidate cells, and so on.

A candidate cell to which handover is requested may also be referred to as the "target cell".

When the target cell is controlled by the same BSC as the current server cell (in Figure 1, this situation corresponds, for example, to handover being requested from cell C1 to cell C2, or from cell C3 to cell C4, such handover also being referred to as "internal handover" or "intra-BSC handover"), the BSC in question is capable, by itself and internally, of determining whether or not handover to said target cell is possible, since the BSC is the network entity that is in charge of managing the radio resources both for the server cell and for the target cell.

When the target cell is controlled by a BSC (referred to as the "target BSC") other than the BSC (referred to as the "current server BSC" or more simply below as the "server BSC") that controls the current server cell (also referred to more simply below as the "server cell"), this situation corresponding for example, in Figure 1, to a request to hand over a call from one or other of the cells C1 and C2 to one or other of the cells C3 and C4 (such handover also being referred to as "external handover", or "inter-BSC handover"), the procedure is as shown in one or other of Figures 2 and 3, namely:

the server BSC, referenced $BSC_s$, firstly sends a handover request message (referenced HO REQ in this example for "handover required") to the MSC;

the MSC in turn sends a message of the same type (referenced HO REQ' in this example for "handover request") to the target BSC, referenced $BSC_c$;

depending on whether or not a resource is available in the target cell, the target BSC sends to the MSC either, as shown in Figure 2, a handover request acknowledgement message (referenced HO REQ ACK in this example) itself containing a handover command message, or else, as shown in Figure 3, a message indicating that it

is impossible to perform handover to said target cell (this message being referenced HO FAIL in this example for "handover failure"); and

the MSC in turn sends a message of the same type to the server BSC, namely either a handover command message (referenced HO COMM in this example), or else a message indicating that it is impossible to perform handover to said target cell (this message being referenced HO REJ for "handover request rejected").

As shown in Figures 4 and 5, once a handover (or "transfer") $T_1$ from one cell $C_i$ to another cell $C_j$ has actually been performed, it is possible that the opposite handover $T_2$ back to the initial server cell might be requested, in particular because the results of measurements of radio signals relating to the new server cell and to the initial server cell become more favorable to the initial server cell again, e.g. because the mobile station is situated at the limit of coverage between the two cells. That phenomenon is also known as the "ping-pong" phenomenon.

A problem then arises when the first handover is "forced", i.e. when the decision to perform such handover is taken for reasons other than those of improving the transmission quality of the radio signals in the network.

If such other reasons continue to exist at the time at which the opposite handover is requested, they are considered as taking priority over the reasons of improving the transmission quality of the radio signals in the network, which reasons lie behind said opposite handover, and, under such conditions, such an opposite handover must not be authorized.

As shown in Figure 4, when both of the two cells in question are controlled by the same BSC, referenced $BSC_{ij}$, the BSC is aware of the "forced" nature of the first handover, and is thus capable of deciding that such an opposite handover must not be performed.

As shown in Figure 5, when the two cells in question are not controlled by the same BSC, the current server BSC (or "initial target BSC"), referenced $BSC_j$, uses the procedure recalled above with reference to Figures 2 and 3 to send a handover request to the target BSC (or "initial server BSC"), referenced $BSC_i$, and it then receives from the target BSC a message indicating that it is impossible to perform handover to the target cell (or "initial server cell").

In which case, an unnecessary handover request is made, thereby lengthening handover time unnecessarily, and giving rise to unnecessary consumption of transmission resources for the purpose of interchanging the corresponding signalling messages, and thus degrading the quality of service.

A particular object of the present invention is to avoid those drawbacks, i.e. to optimize operation of the network in such cases, and more generally to improve co-operation between entities of the network during "external" handover.

The present invention provides a method of improving co-operation between entities in a cellular mobile radio-communications network, during inter-cell call handover, said method being characterized in that, when handing over a call from a "current server cell" controlled by a "current server entity" of the system to a "new server cell" controlled by a "new server entity" of the system, which new server entity is distinct from said current server entity, said new server entity is informed of the reason for said handover.

Thus, in particular when handover is "forced", i.e. when the decision to hand over a call is taken for reasons other than those of improving the transmission quality, said new server entity is informed of the "forced" nature of the handover, and so it does not make an opposite handover request unnecessarily, thereby avoiding the above-mentioned drawbacks.

According to another characteristic, said information as to the reason for said handover itself includes an indication as to the lapse of time after which, once the call has been handed over from said current server cell to said new server cell, an opposite handover can, if necessary, be requested again.

Thus, the new server cell is then able to determine the time at which an opposite handover can, if necessary, be requested again, thereby making it possible to optimize network operation further.

The present invention also provides a cell control entity for a cellular mobile radiocommunications network, in particular a BSC for a network such as a network of the GSM type, for implementing such a method.

Other objects and characteristics of the present invention will appear on reading the following description of an embodiment given with reference to the accompanying drawings.

In accordance with the invention, to improve co-operation between entities of the network during "external" call handover, namely handover from a "current server cell" (such as cell $C_i$ shown in Figure 5) controlled by a "current server entity" of the system (such as entity $BSC_i$ shown in Figure 5) to a "new server cell" (such as cell $C_j$ shown in Figure 5) controlled by an entity of the system that is distinct from said current server entity and that is referred to as the "new server entity" (such as entity $BSC_j$ shown in Figure 5), said new server entity is informed of the reason for said handover.

For this purpose, in the implementation described with reference to Figures 6 and 7, with a candidate cell to which handover is requested being referred to as the "target cell", with the control entity $BSC_c$ for controlling a target cell being referred to as the "target entity", and with each target entity potentially becoming the new server entity if the requested handover to said target cell is possible, each target entity is informed, during a request for handover to said target cell, of the reason for the handover request.

In addition, in the implementation described with reference to Figures 6 and 7, said information as to the reason for the handover request is transmitted from the server entity $BSC_s$ to the target entity $BSC_c$ via the entity MSC (or "higher-level entity") providing the link between said server entity and said target entity.

Thus, in the diagram shown in Figure 6, such information as to the reason for the handover request (referenced INF) is associated with the message (HO REQ) transmitted to the MSC by the server BSC ($BSC_s$) by using the procedure recalled above with reference to Figures 2 and 3.

Similarly, in this implementation, the information is re-transmitted by the MSC to the target BSC ($BSC_c$), the information then being referenced INF' and also being associated, in the example shown, with the corresponding message (HO REQ') re-transmitted by the MSC to the target BSC ($BSC_c$).

In another implementation (not shown specifically), it is also possible for each target entity to be informed of the reason for the handover request by the entity MSC rather than by the current server entity. Such an implementation corresponds, in particular, to the case when the current server entity transmits the list of candidate cells to the MSC, and when the MSC itself successively makes the corresponding handover requests.

In particular, said information is information to the effect that said handover is a "forced" handover, i.e. the decision to perform the handover is taken for reasons other than those of improving the transmission quality of the radio signals in the network, this information thus making it possible to avoid the above-mentioned drawbacks.

Advantageously, said information itself then contains an indication as to the lapse of time after which, once the handover has been performed, opposite handover can, if necessary, be requested again, thereby making it possible to optimize network operation further.

Figure 7 diagrammatically shows the type of means to be used, in an implementation of the invention, in a cell control entity for a cellular mobile radiocommunications network, in particular a BSC for a GSM-type network.

In a manner that is known and therefore not re-described in detail herein, for the case when the controlled cell is constituted by a server cell, such an entity BSC includes means 1 for transmitting a handover request message (HO REQ message) requesting handover to a target cell, and means 2 for receiving messages obtained in reply to such a request (HO COMM and HO REJ messages),

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these means 1 and 2 operating in known manner in association with means 3 for managing radio resources.

In the example shown, for the case when the controlled cell is constituted by a server cell, the entity BSC further includes means 4 for transmitting information INF as to the reason for a handover request. In the example shown, this information INF is transmitted in association with the handover request message HO REQ.

For this purpose, the means 4 receive information issued by the means 3 for managing radio resources and as to the reason for a handover request, and they put the information they receive in a form suitable for it to be transmitted to the entity MSC, so as to constitute the information INF.

Furthermore, when the information INF itself includes an indication as to the lapse of time after which opposite handover can, if necessary, be requested again, and when handover is requested to cope with a traffic overload in the server cell, or to satisfy a request for testing or maintenance in said server cell, said indication is, for example, constituted by data such as, for example, a lapse of time after which it is assumed that an event which has caused a traffic overload in the server cell will have disappeared, or after which a testing or maintenance operation in said server cell will have finished.

Also in a manner that is known and therefore not described again in detail herein, and for the case when the controlled cell is constituted by a target cell, such an entity BSC includes means 5 for receiving handover request messages (HO REQ' messages) and means 6 for transmitting either a handover request acknowledgement message (HO REQ ACK message), or a message indicating that it is impossible to perform handover to said target cell (HO FAIL message), these means 5 and 6 operating, also in known manner, in association with the means 3 for managing radio resources.

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In the example shown, and for the case when the controlled cell is constituted by a target cell, the entity BSC further includes means 7 for receiving information such as INF' as to the reason for a handover request. In the example shown, this information INF' is received in association with the handover request message HO REQ'.

In particular, the means 3 for managing radio resources are controlled by the means 7 in a manner such that, when the controlled cell is constituted by a cell that is successively a target cell and then a server cell, the means 1 are prevented from transmitting an opposite handover request when the initial handover is "forced".

Furthermore, when said information INF' includes an indication relating to the lapse of time after which an opposite handover can, if necessary, be requested again, the means 3 for managing radio resources are further controlled by the means 7 so as to authorize transmission of such an opposite handover request after such a lapse of time or after a lapse of time (e.g. a predetermined lapse of time) which is a function of said reason.

The means 1 for transmitting handover request messages (REQ messages), the means 2 for receiving messages obtained in reply to such a request (HO REJ and HO COMM messages), the means 5 for receiving handover request messages (HO REQ' messages), the means 6 for transmitting either a handover request acknowledgement message (HO REQ ACK message) or a message indicating that it is impossible to perform handover to a target cell (HO FAIL message), and, as regards their functions other than those relating to the present invention, the means 3 for managing radio resources may be means that are conventional and that therefore do not need to be re-described herein.

The particular manner in which the means 4 for transmitting information INF as to cells previously

rejected, in which the means 7 for receiving corresponding information INF', and in which those particular functions of the means 3 for managing radio resources which relate to the present invention are implemented for the purpose of enabling them to operate using the above-described method poses no particular difficulty for the person skilled in the art, and does not therefore need to be specially described either.

It can be understood that the invention is not limited to the above-described examples, and that, more generally, it makes it possible to improve co-operation between entities in a cellular mobile radiocommunications network, during "external" inter-cell call handover.

## 4. Brief Description of Drawings

Figure 1 is a reminder diagram showing the organization of a mobile radiocommunications network such as, in particular, the GSM network;

Figure 2 is a reminder diagram showing the various messages interchanged between various entities of such a network during an external handover request, and when such handover is possible;

Figure 3 is a reminder diagram showing the various messages interchanged between various entities of such a network during an external handover request, and when such handover is not possible;

Figures 4 and 5 are diagrams showing how the problem is solved by the present invention;

Figure 6 is a diagram showing an example of a method of the invention for improving co-operation; and

Figure 7 diagrammatically shows an example of means to be implemented in accordance with the invention in a cell control entity for a cellular mobile radio-communications network (in particular a BSC for a GSM-type network).

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Fig. 1

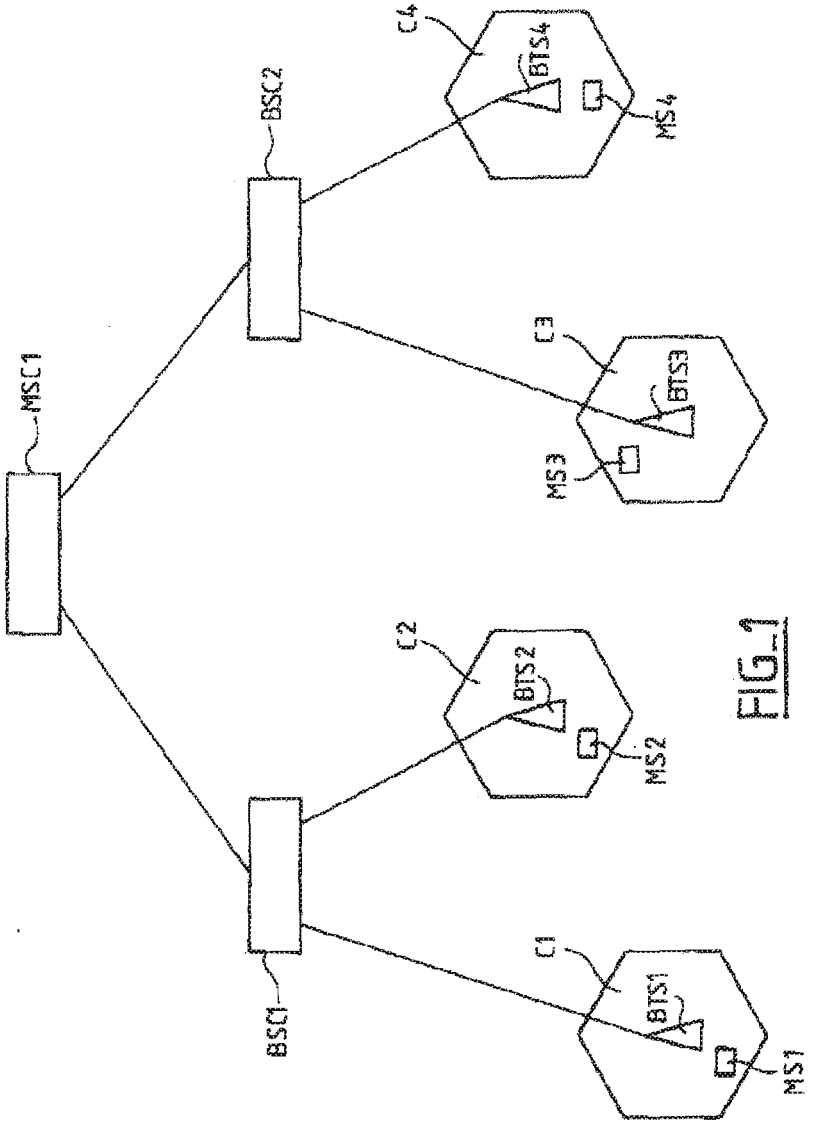



FIG_1

Fig. 2

FIG_2

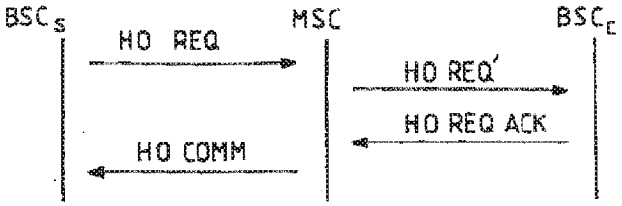



Fig. 3

FIG_3

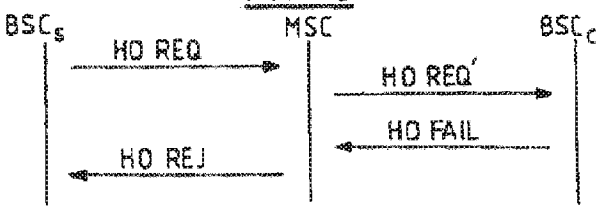



Fig. 4

FIG_4

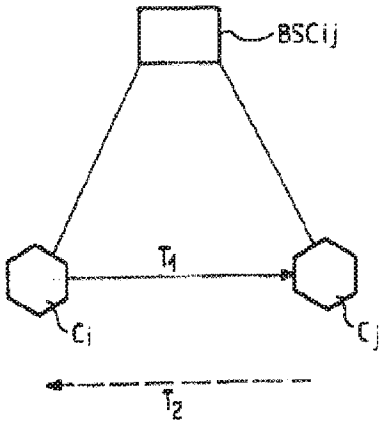


Fig. 5

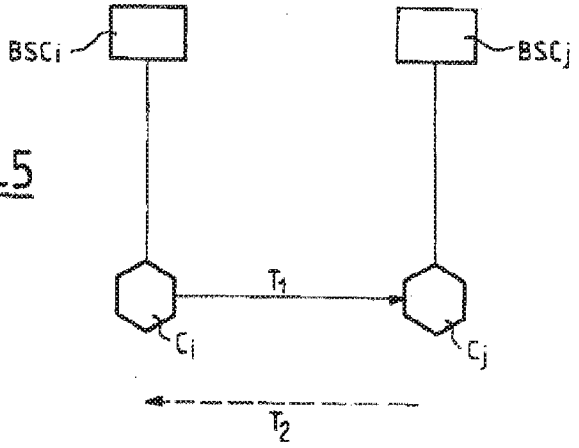



FIG_5

Fig. 6

FIG_6

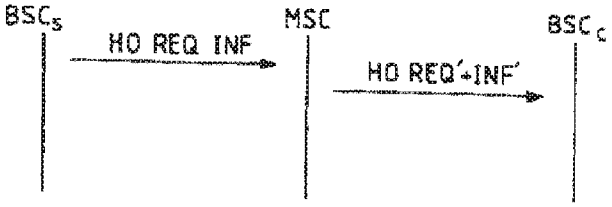
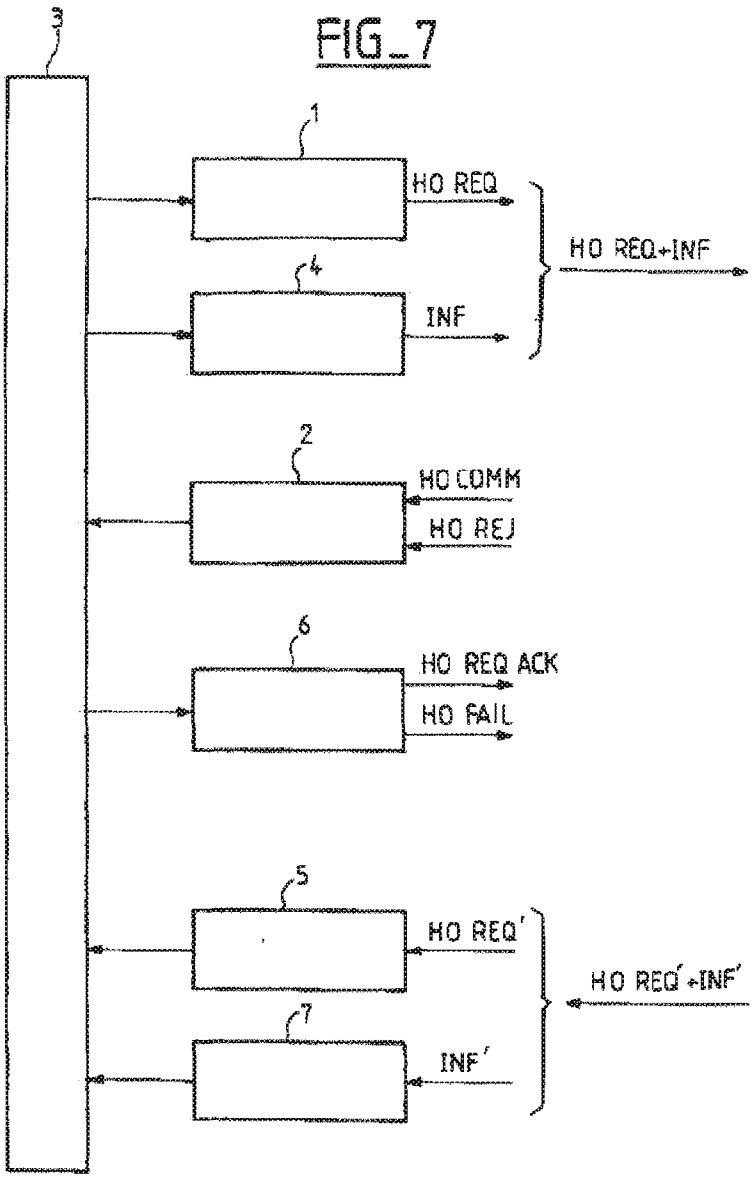


Fig. 7


FIG_7
3
1
HO REQ
HO REQ+INF
4
INF
2
HO COMM
HO REJ
6
HO REQ ACK
HO FAIL
5
HO REQ'
HO REQ'+INF'
7
INF'

## 1. Abstract

A method of improving co-operation between entities in a cellular mobile radiocommunications network, during inter-cell call handover, said method being characterized in that, when handing over a call from a "current server cell" ($C_i$) controlled by a "current server entity" ($BSC_i$) of the system to a "new server cell" ($C_j$) controlled by a "new server entity" ($BSC_j$) of the system, which new server entity is distinct from said current server entity, said new server entity ($BSC_j$) is informed of the reason for said handover.

## 2. Representative Drawing

Fig. 5

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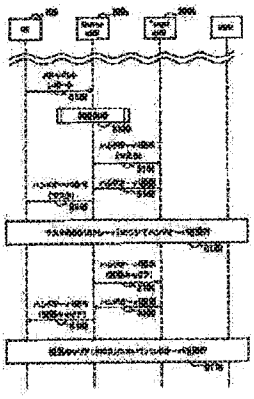
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**JP,2011-176722,A**

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| **(11)Publication number** | 2011-176722 |
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| **(22)Date of filing** | 25.02.2010 |
| **(71)Applicant** | SONY CORP |
| **(72)Inventor** | TAKANO HIROAKI |



**(54)METHOD FOR CONTROLLING HANDOVER, TERMINAL DEVICE, BASE STATION, AND WIRELESS COMMUNICATION SYSTEM**

**(57)Abstract**

PROBLEM TO BE SOLVED: To perform handover without causing data loss, even under a situation where cross scheduling is available.

SOLUTION: A method is provided for controlling handover from a first base station to a second base station by a terminal device which performs wireless communication on a communication channel formed by combining a plurality of component carriers. In the method, scheduling information for each component carrier is supplied according to a straight scheduling system or a cross scheduling system. The method includes a step of giving a handover instructing at first to the terminal device from the first base station with respect to handover for the second component carrier according to the straight scheduling system in the second base station, when it is determined that handover is to be performed for the first component carrier according to the cross scheduling system.

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特開2011-176722
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(43)公開日　平成23年9月8日(2011.9.8)

| (51)Int.Cl. | | F I | | | テーマコード（参考） |
|---|---|---|---|---|---|
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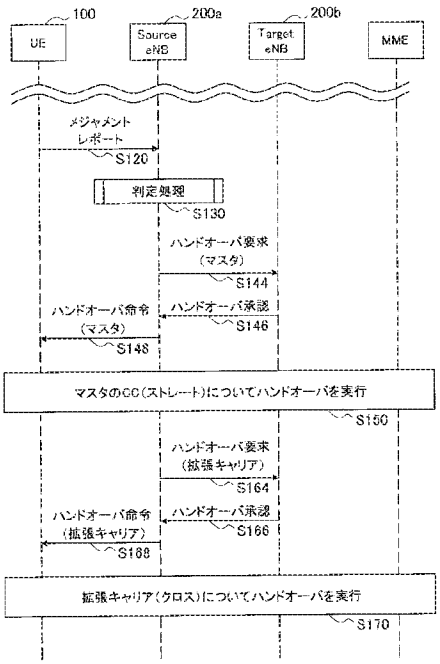
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Ｆターム(参考)　5K067 AA13　BB36　EE02　EE10　JJ39

(54)【発明の名称】ハンドオーバを制御するための方法、端末装置、基地局及び無線通信システム

(57)【要約】
【課題】クロススケジューリングが行われ得る状況下においてもデータをロスすることなくハンドオーバを遂行すること。
【解決手段】複数のコンポーネントキャリアを統合することにより形成される通信チャネル上で無線通信している端末装置による第１の基地局から第２の基地局へのハンドオーバを制御するための方法であって、各コンポーネントキャリアについてのスケジューリング情報は、ストレートスケジューリング方式又はクロススケジューリング方式に従って配信され、前記方法は、前記クロススケジューリング方式に従う第１のコンポーネントキャリアについてハンドオーバを実行すべきであると判定された場合に、前記第２の基地局において前記ストレートスケジューリング方式に従って運用されるべき第２のコンポーネントキャリアについてのハンドオーバを前記第１の基地局から最初に前記端末装置に命令するステップ、を含む方法を提供する。
【選択図】図１０




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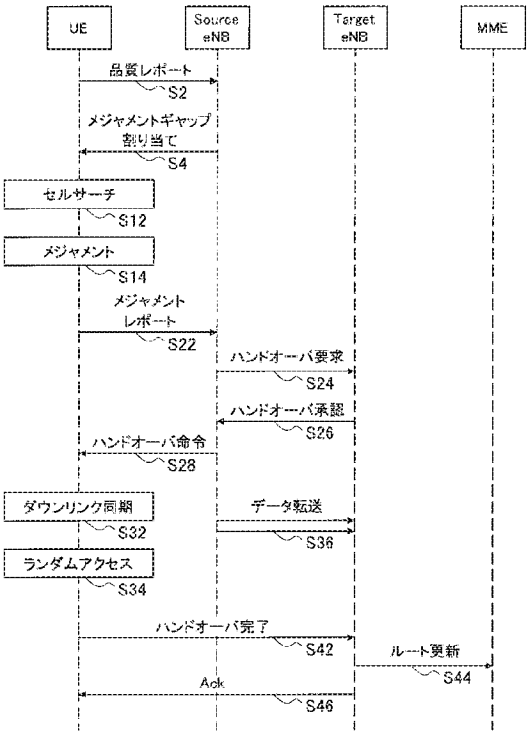
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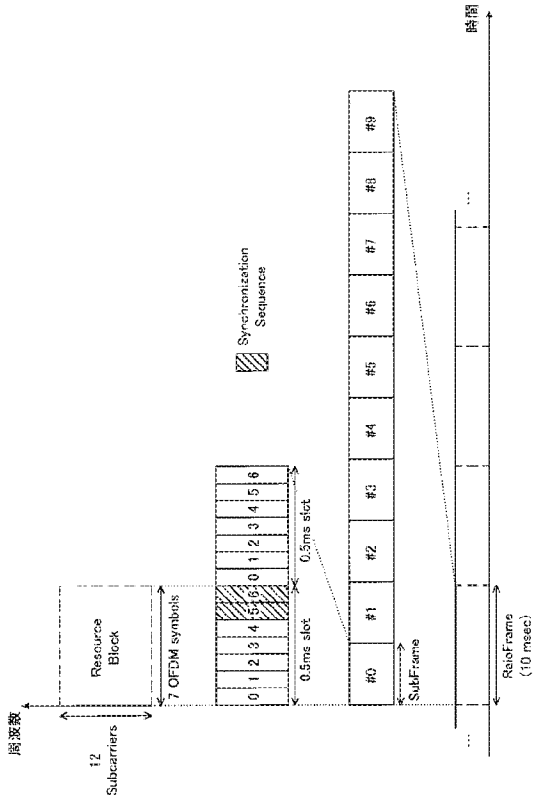
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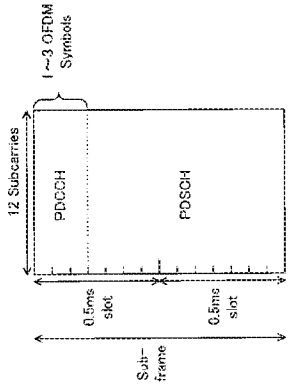
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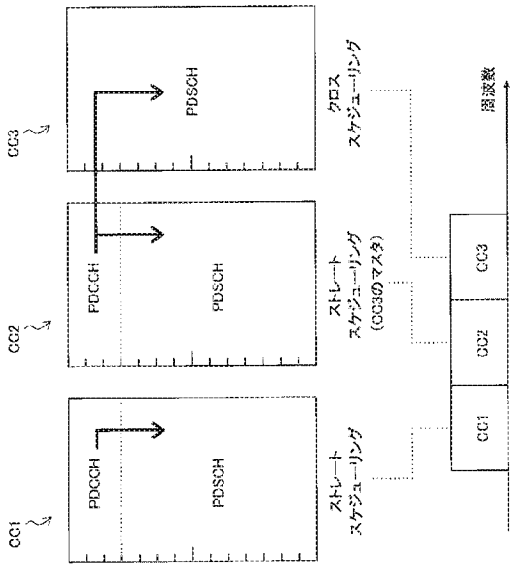
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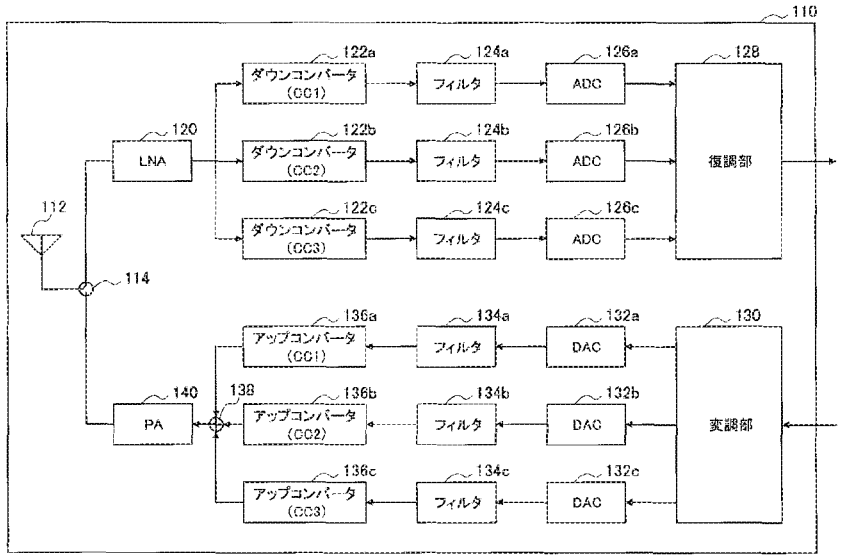
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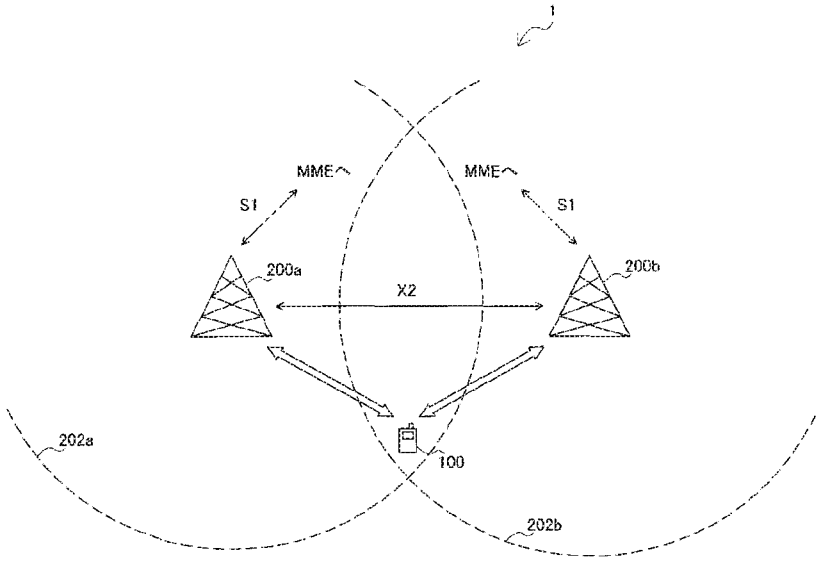


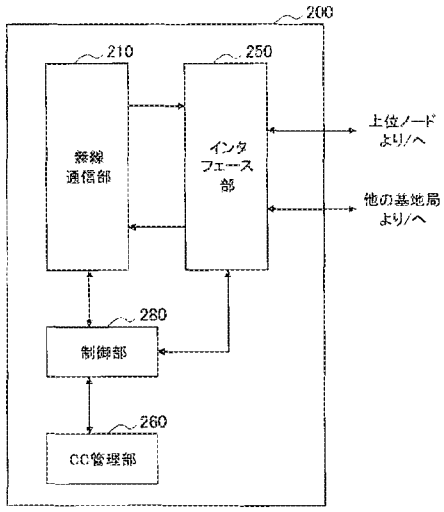



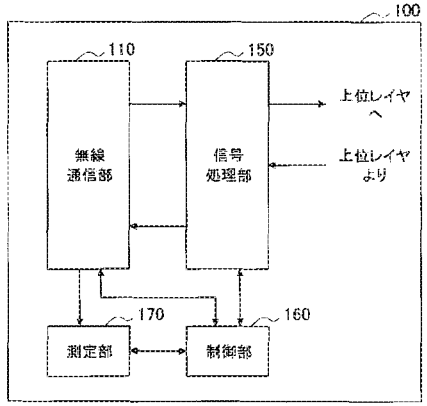





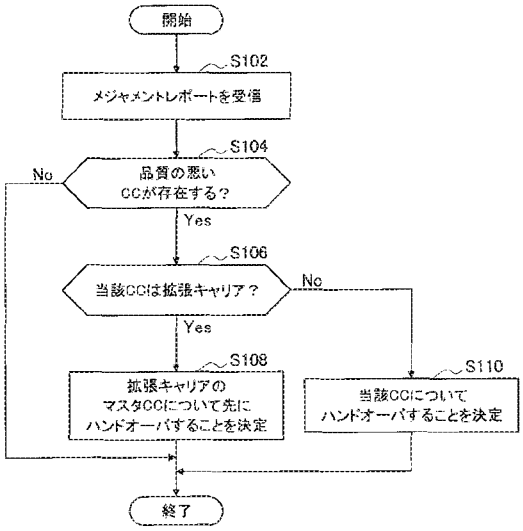



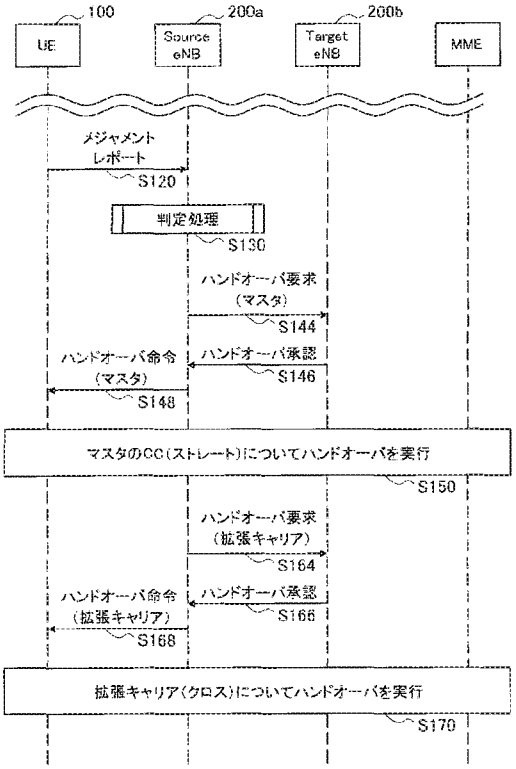



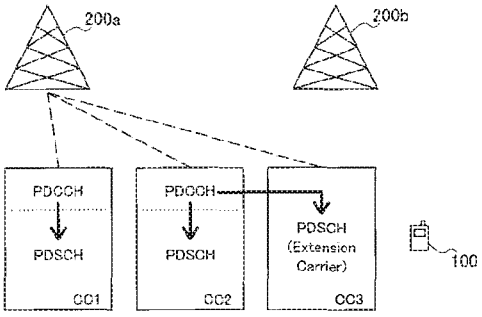



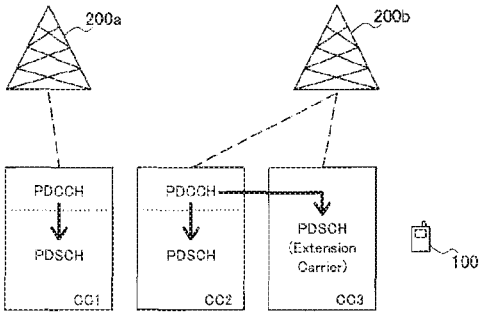


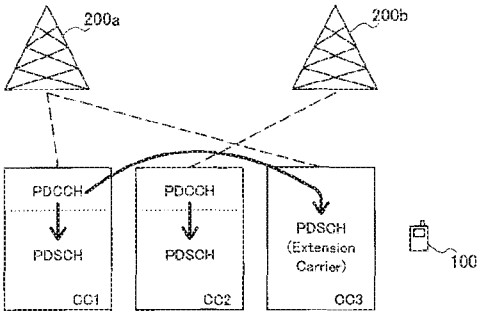

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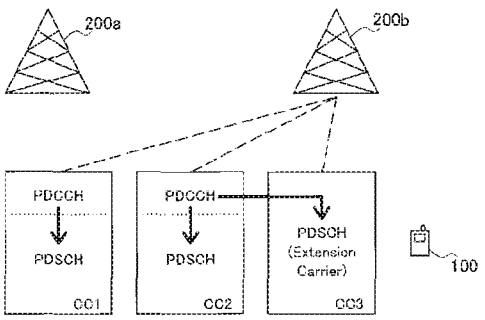

開始
S102
メジャメントレポートを受信
S104
No
品質の悪い
CCが存在する？
Yes
S106
当該CCは拡張キャリア？
No
Yes
S108
拡張キャリアの
マスタCCについて先に
ハンドオーバすることを決定
S110
当該CCについて
ハンドオーバすることを決定
終了

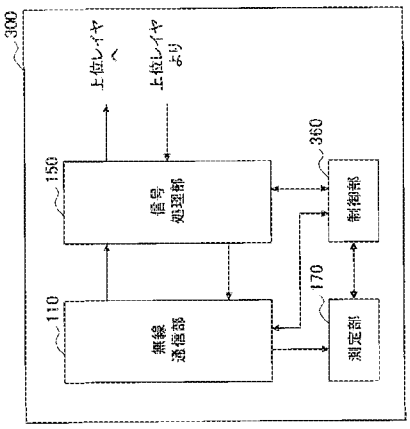

100
UE
200a
Source
eNB
200b
Target
eNB
MME
メジャメント
レポート
S120
判定処理
S130
ハンドオーバ要求
(マスタ)
S144
ハンドオーバ承認
S146
ハンドオーバ命令
(マスタ)
S148
マスタのCC(ストレート)についてハンドオーバを実行
S150
ハンドオーバ要求
(拡張キャリア)
S164
ハンドオーバ承認
S166
ハンドオーバ命令
(拡張キャリア)
S168
拡張キャリア(クロス)についてハンドオーバを実行
S170

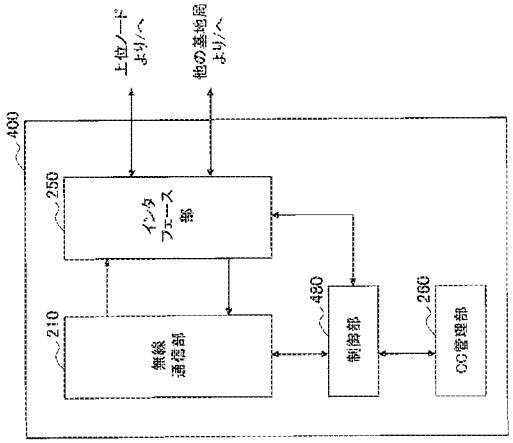

200a
200b
PDCCH
PDSCH
PDCCH
PDSCH
PDSCH
(Extension
Carrier)
CC1
CC2
CC3
100

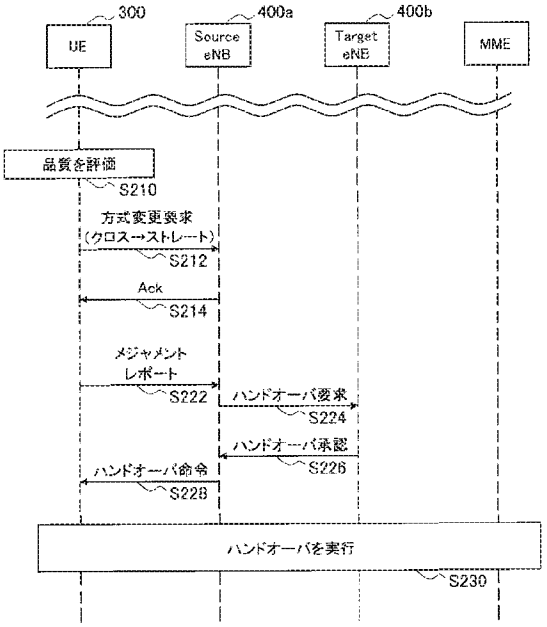

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200b
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PDSCH
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CC2
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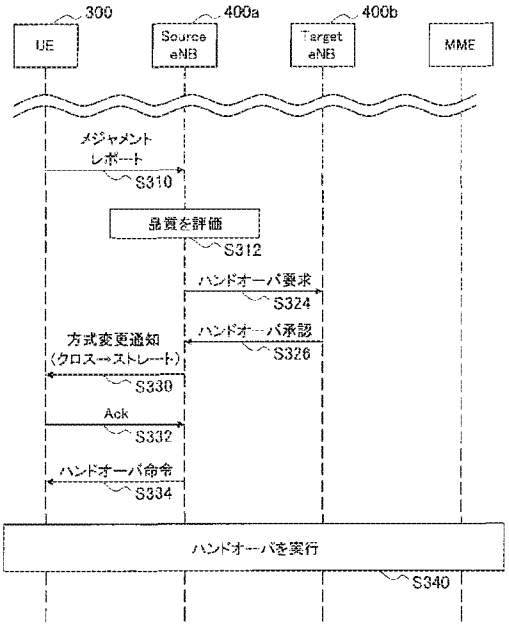

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200b
PDCCH
PDSCH
PDCCH
PDSCH
PDSCH
(Extension
Carrier)
CC1
CC2
CC3
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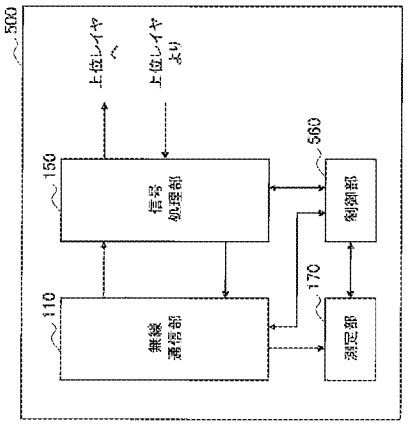

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200b
PDCCH
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PDSCH
(Extension
Carrier)
CC1
CC2
CC3
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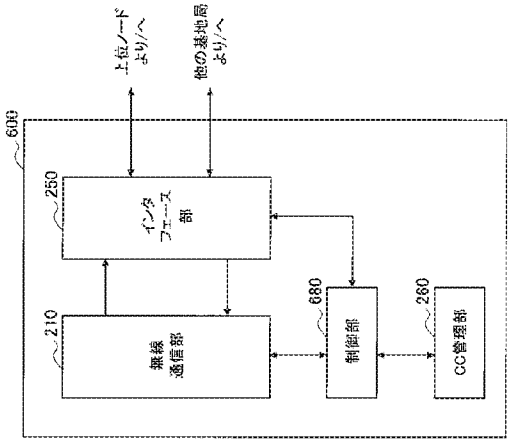

300
上位レイヤへ
上位レイヤより
150
信号処理部
360
制御部
110
無線通信部
170
測定部

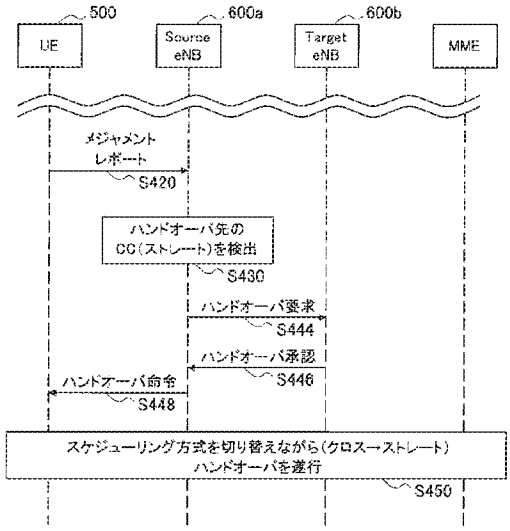

400
上位ノードより/へ
他の基地局より/へ
250
インタフェース部
210
無線通信部
460
制御部
260
CC管理部


300
400a
400b
UE
Source eNB
Target eNB
MME
品質を評価
S210
方式変更要求 (クロス→ストレート)
S212
Ack
S214
メジャメントレポート
S222
ハンドオーバ要求
S224
ハンドオーバ承認
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ハンドオーバを実行
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300
400a
400b
UE
Source eNB
Target eNB
MME
メジャメントレポート
S310
品質を評価
S312
ハンドオーバ要求
S324
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S326
方式変更通知 (クロス→ストレート)
S330
Ack
S332
ハンドオーバ命令
S334
ハンドオーバを実行
S340


500
上位レイヤへ
上位レイヤより
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信号処理部
560
制御部
110
無線通信部
170
測定部

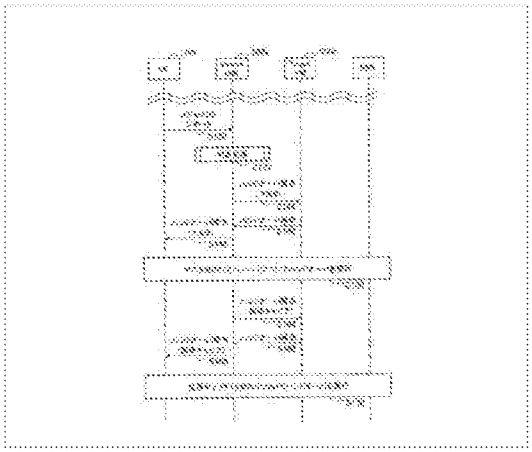

600
上位ノードより/へ
他の基地局より/へ
250
インタフェース部
210
無線通信部
680
制御部
260
CC管理部


500
UE
600a
Source eNB
600b
Target eNB
MME
メジャメントレポート
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ハンドオーバ先のCC(ストレート)を検出
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スケジューリング方式を切り替えながら(クロス→ストレート)ハンドオーバを遂行
S450

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(71)Applicant SONY CORP
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**(54)METHOD FOR CONTROLLING HANDOVER, TERMINAL DEVICE, BASE STATION, AND WIRELESS COMMUNICATION SYSTEM**

**(57)Abstract**
PROBLEM TO BE SOLVED: To perform handover without causing data loss, even under a situation where cross scheduling is available.
SOLUTION: A method is provided for controlling handover from a first base station to a second base station by a terminal device which performs wireless communication on a communication channel formed by combining a plurality of component carriers. In the method, scheduling information for each component carrier is supplied according to a straight scheduling system or a cross scheduling system. The method includes a step of giving a handover instructing at first to the terminal device from the first base station with respect to handover for the second component carrier according to the straight scheduling system in the second base station, when it is determined that handover is to be performed for the first component carrier according to the cross scheduling system.

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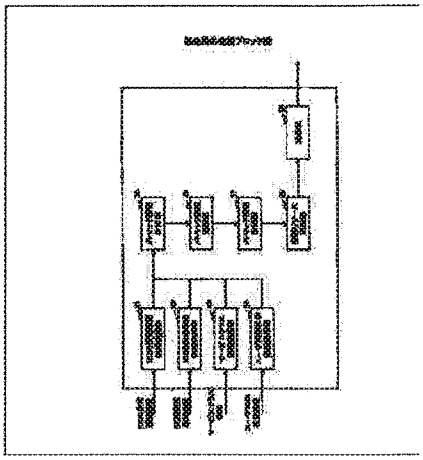
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| **(71)Applicant** | NTT DOCOMO INC | |
| **(72)Inventor** | SAKAE YUTA | |



**(54)BASE STATION AND METHOD IN MOBILE COMMUNICATION SYSTEM**

**(57)Abstract**

PROBLEM TO BE SOLVED: To enhance efficiency of scheduling processing which allocates a wireless resource to a user device in a mobile communication system including the user device that communicates by using a plurality of component carriers (CC) by means of carrier aggregation (CA).

SOLUTION: A base station can utilize wireless quality information by a frequency block unit in each component carrier which is fed back from the user device, and the wireless quality information of the entire component carrier which is allocated to the user device, by separating those pieces of information. The base station comprises means for calculating each scheduling metric based on those pieces of wireless quality information, and an allocation unit for allocating the wireless resource to the user device according to the scheduling metric for each component carrier by using two or more of those scheduling metrics.

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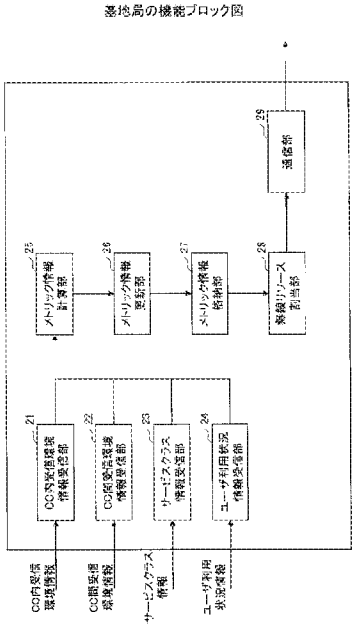
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Ｆターム(参考)　5K067 AA13　DD45　EE02　EE10　EE63

(54)【発明の名称】移動通信システムにおける基地局及び方法

(57)【要約】
【課題】キャリアアグリゲーション（ＣＡ）により複数のコンポーネントキャリア（ＣＣ）を用いて通信するユーザ装置を含む移動通信システムにおいて、ユーザ装置に無線リソースを割り当てるスケジューリング処理の効率化を図ること。
【解決手段】基地局は、ユーザ装置からフィードバックされた各コンポーネントキャリア内の周波数ブロック単位の無線品質情報と、ユーザ装置に割り当てているコンポーネントキャリア全体の無線品質情報とを分離して利用することが可能である。基地局は、それらの無線品質情報を元にして、それぞれのスケジューリングメトリックを計算する手段を有し、２つ以上のこれらのスケジューリングメトリックを利用して、コンポーネントキャリア毎に、前記スケジューリングメトリックに応じてユーザ装置に無線リソースを割り当てる割当部とを有する。
【選択図】図２



【特許請求の範囲】
【請求項１】
キャリアアグリゲーションにより複数のコンポーネントキャリアを用いて通信するユーザ装置に無線リソースを割り当てる基地局であって、
ユーザ装置からフィードバックされた各コンポーネントキャリア内の周波数ブロック単位の無線品質情報と、
ユーザ装置に割り当てているコンポーネントキャリア全体の無線品質情報とを
分離して利用することが可能である基地局であって、
それらの無線品質情報を元にして、それぞれのスケジューリングメトリックを計算する手段を有し、
２つ以上のこれらのスケジューリングメトリックを利用して、コンポーネントキャリア毎に、前記スケジューリングメトリックに応じてユーザ装置に無線リソースを割り当てる割当部と、
を有する基地局。
【請求項２】
前記スケジューリングメトリックを計算する手段が、
ユーザ装置からフィードバックされた各コンポーネントキャリア内の周波数ブロック単位の無線品質情報またはその無線品質情報から算出されるスループット情報から第１のメトリックを算出する第１算出部と、
前記ユーザ装置に割り当てられているコンポーネントキャリア数及び／又は各コンポーネントキャリア全体の無線品質情報または該当するコンポーネントキャリア全体の無線品質情報から推測されるスループット情報から第２のメトリックを算出する第２算出部と、
前記ユーザ装置が利用するサービスクラスに応じて決定される第３のメトリックを求める第３算出部と、
前記ユーザ装置による通信サービスの利用状況に応じて決定される第４のメトリックを求める第４算出部と、
前記第１のメトリックと、前記第２ないし第４のメトリックの内の１つ以上とを合成することで、前記ユーザ装置のスケジューリングメトリックを算出するメトリック算出部と
を有する請求項１の基地局。
【請求項３】
前記メトリック算出部は、前記第１のメトリックと、前記第２ないし第４のメトリックの内の１つ以上とを加算することで、前記ユーザ装置のスケジューリングメトリックを算出する、請求項１または２記載の基地局。
【請求項４】
前記メトリック算出部は、前記第１のメトリックと、前記第２ないし第４のメトリックの内の１つ以上とを乗算することで、前記ユーザ装置のスケジューリングメトリックを算出する、請求項1または2記載の基地局。
【請求項５】
前記第１算出部が算出する第１のメトリックは、プロポーショナルフェアネス法、ＭＡＸ／ＣＩ法又はラウンドロビン法によるスケジューリングにおいて使用されるメトリックである、請求項１ないし３の何れか請求項１または２に記載の基地局。
【請求項６】
前記第２算出部が算出する第２のメトリックは、コンポーネントキャリア数分の１である第１の値、又はコンポーネントキャリア毎の無線品質の総和に対する個々のコンポーネントキャリアの無線品質である第２の値により表現される、請求項１ないし５の何れか１項に記載の基地局。
【請求項７】
前記第３算出部が算出する或るコンポーネントキャリアについての第３のメトリックは、リアルタイム型のサービスクラスの場合は大きな値をとり、ベストエフォート型のサービスクラスの場合は小さな値をとる、請求項１ないし６の何れか１項に記載の基地局。

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【請求項８】
前記第４算出部が算出する第４のメトリックは、過去に多くの通信を行ったユーザほど小さな値をとる、請求項１ないし７の何れか１項に記載の基地局。
【請求項９】
前記第１算出部は、サブフレーム毎に前記第１のメトリックを更新する請求項１ないし８の何れか１項に記載の基地局。
【請求項１０】
前記第２算出部は、ユーザ装置に対するコンポーネントキャリアの割り当て状況が変わった場合に、第２のメトリックを更新する、請求項１ないし９の何れか１項に記載の基地局。
【請求項１１】
前記第３算出部は、ユーザに提供するサービスクラスが決まった場合に、第３のメトリックを更新する、請求項１ないし１０の何れか１項に記載の基地局。
【請求項１２】
前記第４算出部は、一定期間毎に及び／又はユーザの契約更新時に第４のメトリックを更新する、請求項１ないし１１の何れか１項に記載の基地局。
【請求項１３】
キャリアアグリゲーションにより複数のコンポーネントキャリアを用いて通信するユーザ装置に無線リソースを割り当てる基地局における方法であって、
ユーザ装置について第１ないし第４のメトリックを算出し、
前記第１のメトリックと、前記第２ないし第４のメトリックの内の１つ以上とを合成することで、前記ユーザ装置のスケジューリングメトリックを算出し、
コンポーネントキャリア毎に、前記スケジューリングメトリックに応じてユーザ装置に無線リソースを割り当て、
無線リソースの割当情報をユーザ装置に通知するステップ
を有し、前記第１のメトリックは、前記ユーザ装置からフィードバックされた各コンポーネントキャリア内の周波数ブロック単位の無線品質情報、またはその無線品質情報から推測されるスループット情報から算出され、
前記第２のメトリックは、前記ユーザ装置に割り当てられているコンポーネントキャリア数及び／又は各コンポーネントキャリア全体の無線品質またはそのコンポーネントキャリアに対する無線品質から推測されるスループット情報から算出され、
前記第３のメトリックは、前記ユーザ装置が利用するサービスクラスに応じて決定され、
前記第４のメトリックは、前記ユーザ装置による通信サービスの利用状況に応じて決定される、基地局における方法。
【発明の詳細な説明】
【技術分野】
【０００１】
本発明は移動通信システムにおける基地局及び方法に関する。
【背景技術】
【０００２】
この種の技術分野では、いわゆる第３世代の後継となる移動通信方式が、ワイドバンド符号分割多重接続（Ｗ－ＣＤＭＡ）方式の標準化団体3GPPにより検討されている。特に、W-CDMA方式、高速ダウンリンクパケットアクセス（HSDPA）方式及び高速アップリンクパケットアクセス（HSUPA）方式等の後継として、ロングタームエボリューション（LTE: Long Term Evolution）方式や、さらに後継のLTEアドバンスト（LTE－Advanced）方式等が挙げられる。LTEアドバンスト方式については、非特許文献１に記載されている。
【０００３】
LTEアドバンスト方式では、「キャリアアグリゲーション（Carrier aggregation）」の検討が行われている。キャリアアグリゲーション技術では、同時に複数のキャリアを用

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いて下りリンクの信号を受信できる一方、同時に複数のキャリアを用いて上りリンクの信号を送信できる。キャリアアグリゲーションが行われる場合の各キャリアは、コンポーネントキャリア（CC：Component Carrier）と呼ばれる。「コンポーネントキャリア」は、LTE方式等のこれまでの無線通信システムにおける１つのシステムキャリアに相当する。例えば、１つのシステムキャリアは、5MHz、10MHz又は20MHz等のようなシステム帯域幅のシステムにより、通信サービスを提供する。LTEアドバンスト方式では、２つ以上の「コンポーネントキャリア」を同時に使用して通信を行うことが許容される。複数のコンポーネントキャリアの内の１つは、メインのキャリアであり、プライマリコンポーネントキャリア（PCC：Primary Component Carrier）と呼ばれる。それ以外のキャリアは、セカンダリコンポーネントキャリア（SCC：Secondary Component Carrier）と呼ばれる。これらのプライマリコンポーネントキャリアまたはセカンダリコンポーネントキャリアは、移動局の受信環境に応じて適切に選択される。そして、その選択に基づき、基地局では複数の移動局に対して、スケジューリング処理を行い周波数資源の割り当てを行う。

【先行技術文献】

【非特許文献】

【０００４】

【非特許文献１】３ＧＰＰ　ＴＳ３６.９１３（Ｖ８.０.１）

【非特許文献２】３ＧＰＰ　ＴＳＧ－ＲＡＮ　ＷＧ２＃７０　Ｔｄｏｃ－Ｒ２－１０３０６３　Ｍｏｎｔｒｅａｌ，Ｃａｎａｄａ，１０ｔｈ－１４ｔｈ　Ｍａｙ２０１０

【発明の概要】

【発明が解決しようとする課題】

【０００５】

一般に、移動局が通信に使用する無線リソースは、基地局がスケジューリングを行うことで適宜割り当てられる。したがって、移動局が、同時に複数のコンポーネントキャリアを用いて信号を送受信できるようにするには、基地局は、複数のコンポーネントキャリアにわたって、無線リソースの割当を計画する必要がある（スケジューリング処理を行う必要がある。）。この点については、例えば非特許文献２に記載されている。この場合において、まず移動局が複数のコンポーネントキャリアを利用可能であるということは、１つのコンポーネントキャリアに接続するＵＥ数が増加するということになる。なぜなら、ＬＴＥシステムにおいて、２つのキャリアを利用して運用していた場合に各キャリアに１０台ずつの移動局が接続していた地域で考えると、ＬＴＥアドバンストシステムにおいては、１つのコンポーネントキャリアに２０台の移動局が接続し通信できることになる。加えて、移動局が複数のコンポーネントキャリアを利用可能であるが、効率的にリソース割当制御を行うためには、全てのコンポーネントキャリアの割当状況を監視し、スケジューリング処理を行うことが必要となる。この場合において、スケジューリング処理に使用する制御情報をコンポーネントキャリア間で通知し必要がある。例えば、コンポーネントキャリアのWider－band CQI情報や平均伝送速度などの情報をコンポーネントキャリア間で共有化し平均化等の処理を行ったうえで、各コンポーネントキャリア内での周波数資源の割り当て処理を行うことにより、効率性の高いスケジューリング処理ができることが、非特許文献２に示されている。

【０００６】

しかしながら、上記のような場合、スケジューラが処理する移動局数の増加に加え、コンポーネントキャリア間での情報交換量の増加してしまうため、コンポーネントキャリア毎のスケジューリング処理をする装置間での情報交換量が非常に多くなってしまう。また交換した情報を元にスケジューリング処理を行うため、その多い情報交換量の影響によりスケジューラにかかる負担も大きくなる傾向がある。つまり、制御量の多さに伴い、そのスケジューリング処理に制約が発生してしまい、本来の効率性を発揮することが困難となる。

【０００７】

本発明の課題は、キャリアアグリゲーションにより複数のコンポーネントキャリアを用

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いて通信する移動局を含む移動通信システムにおいて、コンポーネントキャリア間で交換が必要となる情報を削減しながらも、移動局に無線リソースを割り当てるスケジューリング処理の効率化を図ることである。

【課題を解決するための手段】

【０００８】

本発明の一形態による基地局は、

キャリアアグリゲーションにより複数のコンポーネントキャリアを用いて通信するユーザ装置に無線リソースを割り当てる基地局であって、

ユーザ装置からフィードバックされた各コンポーネントキャリア内の周波数ブロック単位の無線品質情報と、

ユーザ装置に割り当てているコンポーネントキャリア全体の無線品質情報とを

分離して利用することが可能である基地局であって、

それらの無線品質情報を元にして、それぞれのスケジューリングメトリックを計算する手段を有し、

２つ以上のこれらのスケジューリングメトリックを利用して、コンポーネントキャリア毎に、前記スケジューリングメトリックに応じてユーザ装置に無線リソースを割り当てる割当部と、

を有する基地局である。

【発明の効果】

【０００９】

本発明の一形態によれば、キャリアアグリゲーションにより複数のコンポーネントキャリアを用いて通信するユーザ装置を含む移動通信システムにおいて、コンポーネントキャリア間で交換する情報量を最小限にしながら、ユーザ装置に無線リソースを割り当てるスケジューリング処理の効率化を図ることができる。

【図面の簡単な説明】

【００１０】

【図１】実施例を説明するために想定している環境を示す図。

【図２】基地局の機能ブロック図。

【図３】第１－第４のメトリック相互の関係を示す図。

【図４】第１のメトリックを使用して無線リソースを割り当てる様子を示す図

【図５】第２のメトリックを使用して無線リソースを割り当てる様子を示す図。

【図６】第３、第４のメトリックを使用して無線リソースを割り当てる様子を示す図。

【図７】基地局がスケジューリングを行うためのフローチャート。

【発明を実施するための形態】

【００１１】

以下の観点から実施例を説明する。

【００１２】

１．想定環境

２．基地局

３．スケジューリングメトリック

３．１　第１のメトリック

３．２　第２のメトリック

３．３　第３のメトリック

３．４　第４のメトリック

４．動作例

【実施例１】

【００１３】

＜１．想定環境＞

図１は実施例を説明するために想定している移動通信システムにおける通信環境を示す。図示の例では、３つの基地局（ＢＳ）と、基地局各々がカバーしているエリアを示す。

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説明の便宜上、１つの基地局（ＢＳ）が３つのエリアを２つのキャリアを利用してカバーしている。しかしながら、基地局は、適切な如何なる数のエリアをカバーしてもよい。図示の例の基地局（ＢＳ）では、第１のコンポーネントキャリア（ＣＣ１）および第２のコンポーネントキャリア（ＣＣ２）の２つのキャリアを利用して通信もサポートしている。図示の簡明化のため、２つのコンポーネントキャリアしか示されていないが、コンポーネントキャリアの数はいくつでもよい。コンポーネントキャリアは、例えばLTE方式における１つのシステムキャリアに対応する。ユーザ装置は、１つ以上のコンポーネントキャリアを用いて通信を行う。キャリアアグリゲーションが行われる場合、何れか１つのコンポーネントキャリアがプライマリコンポーネントキャリア（ＰＣＣ）として指定される。他のキャリアが使用される場合、それら１つ以上のコンポーネントキャリアがセカンダリコンポーネントキャリア（ＳＣＣ）として指定される。一般的には、プライマリコンポーネントキャリア（ＰＣＣ）は、ユーザ装置が使用可能なコンポーネントキャリアの内、最良の受信レベルをもたらすコンポーネントキャリアである。しかしながら、負荷の状況（ロードバランス）等に起因して、例えば次善の受信レベルのコンポーネントキャリアがプライマリコンポーネントキャリア（ＰＣＣ）として指定されてもよい。

【００１４】

なお、ユーザ装置は、一般的には携帯電話のような移動局であるが、固定端末でもよい。具体的には、ユーザ装置は、情報端末、スマートフォン、パーソナルディジタルアシスタント、携帯用パーソナルコンピュータ等でもよい。

【００１５】

図示の例において、第１のユーザ（ＵＥ：Ａ）は、第１及び第２のコンポーネントキャリアの地域の境界付近に位置している。このユーザ（ＵＥ：Ａ）にとって、第１のコンポーネントキャリア（ＣＣ１）に対する受信レベルは大きいので、これはプライマリコンポーネントキャリア（ＰＣＣ）として指定されている。また、このユーザ（ＵＥ：Ａ）にとって、第２のコンポーネントキャリア（ＣＣ２）に対する受信レベルも比較的大きいので、これはセカンダリコンポーネントキャリア（ＳＣＣ）として指定されている。一方、ユーザ（ＵＥ：Ｂ）は、第２のコンポーネントキャリアの地域に在圏している。このユーザ（ＵＥ：Ｂ）にとって、第２のコンポーネントキャリア（ＣＣ２）に対する受信レベルは大きいので、これはプライマリコンポーネントキャリア（ＰＣＣ）として指定されている。ユーザ（ＵＥ：Ｂ）に対してセカンダリコンポーネントキャリア（ＳＣＣ）は指定されていない。

【００１６】

本実施例として、このような通信環境において、ユーザ装置は、プライマリコンポーネントキャリア（ＰＣＣ）に加えて、必要に応じてセカンダリコンポーネントキャリア（ＳＣＣ）を使用することで、無線通信を行う。ユーザ装置による通信を可能にするため、基地局は、無線リソースの割当を計画する必要がある（スケジューリング処理を行う必要がある。）。

【００１７】

＜２．基地局＞

図２は、基地局の機能ブロック図を示す。図２には、基地局に備わる様々な機能要素の内、本実施例に特に関連するものが示されている。基地局は、ＣＣ内受信環境情報受信部２１、ＣＣ間受信環境情報受信部２２、サービスクラス情報受信部２３、ユーザ利用状況情報受信部２４、メトリック情報計算部２５、メトリック情報更新部２６、メトリック情報格納部２７、無線リソース割当部２８及び通信部２９を少なくとも有する。

【００１８】

ＣＣ内受信環境情報受信部２１は、ＣＣ内受信環境情報をユーザ装置から受信する。ＣＣ内受信環境情報は、ユーザ装置に割り当てられているコンポーネントキャリア（ＣＣ）各々における周波数ブロック毎の無線品質を示す情報である。周波数ブロックはリソースブロックとも呼ばれ、ユーザは、スケジューリングにより割り当てられた１つ以上のリソースブロックを利用して無線通信を行うことができる。無線品質又は受信レベルは、無線

チャネルの状態の良否を示す適切な如何なる量で表現されてもよい。例えば、受信電力ＲＳＲＰ、ＲＳＲＱ、ＲＳＳＩ、ＲＳＣＰ、ＳＩＲ、ＣＩＮＲ、Ｓ／Ｎ、Ｅｃ／$Ｎ_0$、ＣＱＩ、パスロス、等で表現されてもよい。ＣＣ内受信環境情報は、後述の第１のメトリックの計算の基礎になる。

【００１９】

ＣＣ間受信環境情報受信部２２は、ＣＣ間受信環境情報を、ユーザ装置又は交換機等の上位装置から受信する。ＣＣ間受信環境情報は、コンポーネントキャリアがユーザ装置にどのように割り当てられているかを示す情報である。一例として、ユーザ装置に割り当てられているコンポーネントキャリア数や、コンポーネントキャリア毎の受信レベル等により表現されてもよい。ＣＣ間受信環境情報は、後述の第２のメトリックの計算の基礎になる。

【００２０】

サービスクラス情報受信部２３は、サービスクラス情報を、ユーザ装置又は交換機等の上位装置から受信する。サービスクラス情報は、例えば、音声パケット（ＶｏＩＰ）や、ファイル転送によるデータ通信等の通信種別を示す情報である。あるいは、サービスクラス情報は、通信するベアラの品質（ＱｏＳ）に応じて決定されてもよい。サービスクラス情報は、後述の第３のメトリックの計算の基礎になる。

【００２１】

ユーザ利用状況情報受信部２４は、ユーザ利用状況情報を、交換機等の上位装置から受信する。ユーザ利用状況情報は、例えば、１日、１週間、１ヶ月、１年間等の一定期間の間に、どの程度多くの通信を行ったか等により表現される。ユーザ利用状況情報は、このような利用状況を示す情報に加えて、ユーザの契約情報を含んでもよい。ユーザ利用状況情報は、後述の第４のメトリックの計算の基礎になる。

【００２２】

メトリック情報計算部２５は、各種の情報受信部２１－２４から取得した情報に基づいて、各ユーザ装置のスケジューリングメトリックを計算する。ｋ番目のユーザ装置（ＵＥ：ｋ）のスケジューリングメトリックｐ（ｋ，ｃ，ｓｂ）は、第１、第２、第３及び第４のメトリック$ｐ_1$（ｋ，ｃ，ｓｂ）、$ｐ_2$（ｋ，ｃ，ｓｂ）、$ｐ_3$（ｋ，ｃ，ｓｂ）及び$ｐ_4$（ｋ，ｃ，ｓｂ）を合成することで算出される。合成は、例えば、加算又は乗算により行われてもよい。ここで、ｃはコンポーネントキャリアの番号を示す。ｓｂは各コンポーネントキャリアのサブバンドを示しており、サブバンドとは、スケジューラがＵＥに割り当てる最小の周波数資源単位である。

【００２３】

【数１】

$$p(k,c,sb)=\left(\prod_{j\in J}p_j(k,c,sb)\right)$$
$$=p_1(k,c,sb)p_2(k,c,sb)p_3(k,c,sb)\cdots$$

第１－第４のメトリック$ｐ_j$（ｋ，ｃ，ｓｂ）（ｊ∈Ｊ）については、後述する。Ｊはメトリックとして考慮することが可能な要素の集合を表し、本実施例ではｊ＝１、２、３又は４であるが、それより多い数の観点からメトリックが計算されてもよい。上記の数式では第１－第４のメトリックの全てを使用してスケジューリングメトリックを導出しているが、このことは本発明に必須ではない。第１－第４のメトリックの１つ以上を用いてスケジューリングメトリックを導出することができる。ただし、後述の様々な状況を全て考慮してスケジューリングする観点からは、第１－第４のメトリック全てを使用することが好ましい。さらに、ユーザ毎のスケジューリングメトリックｐ（ｋ，ｃ，ｓｂ）は、上記

以外の関数により表現されてもよい。何らかの形で第１－第４のメトリックが含まれていればよいからである。

【００２４】

メトリック情報更新部２６は、第１－第４のメトリックを各メトリックに相応しい頻度で更新する。第１のメトリックは、無線リソースの割り当て間隔毎に（サブフレーム毎に）更新されることが好ましい。一例として、第１のメトリックは、１ミリ秒毎に更新されてもよい。第２のメトリックは、ユーザに割り当てられるコンポーネントキャリアの割り当て状況が変わった場合に少なくとも更新されることが好ましい。具体的には、ユーザが移動して受信環境が変わった際など、ユーザ装置に対して何らかのコンポーネントキャリアが、セカンダリコンポーネントキャリアとして追加された場合、又はセカンダリコンポーネントキャリアが削除された場合に、第２のメトリックを更新することが好ましい。一例として、第２のメトリックは、数百ミリ秒毎に更新されてもよい。第３のメトリックは、ユーザに提供するサービスクラスが決定した際に更新されてもよい。第４のメトリックは、一定期間毎に（１日、１週間、１ヶ月、１年間等の一定期間毎に）又はユーザの契約更新時に更新されてもよい。

【００２５】

メトリック情報格納部２７は、各ユーザ装置のスケジューリングメトリックを保存し、必要に応じて無線リソース割当部２８に提供する。

【００２６】

無線リソース割当部２８は、各ユーザ装置のスケジューリングメトリックを用いて、無線リソースを割り当てる。概して、上記で算出されるスケジューリングメトリックｐ（ｋ，ｃ，ｓｂ）の大きいユーザに対して、そのＣ番目のコンポーネントキャリアのｓｂ番目のサブバンドの周波数資源を優先的に割り当てを受けることができる。この場合において、無線リソース割当部２８は、１つのコンポーネントキャリア（ＣＣ）毎にスケジューリングを行う。すなわち、ある１つのコンポーネントキャリアについて無線リソースのスケジューリングを行った後に、次の（別の）コンポーネントキャリアについて無線リソースのスケジューリングを行い、最後のコンポーネントキャリアに至るまでスケジューリングを行う。あるいは、無線リソース割当部２８は、複数のコンポーネントキャリアに対するスケジューリングを同時に行ってもよいが、その場合でも、あるコンポーネントキャリアに対するスケジューリングと、別のコンポーネントキャリアに対するスケジューリングとは独立である。このため、従来懸念されていたような、膨大な量の情報交換は不要になる。

【００２７】

通信部２９は、無線リソース割当部２８が決定した無線リソースの割当情報をユーザ装置に通知する。

【００２８】

なお、各ＣＣにおいて、スケジューリングを行う際には、スケジューリングメトリックの大きい順に並び替えを行い、その順に資源を割り当ててもよい。つまり、ｓｂ番号順に周波数資源の割り当てを行わずに、メトリックの大きい順にサブバンドに割り当てていき、既に割り当てられているサブバンドには割り当てないように制御を行ってもよい。また、逆にｓｂ番号順に割り当てを行って言ってもよい。

【００２９】

このようにスケジューリング処理を行うことにより、非特許文献４に記載されるような複数のコンポーネントキャリア内のサブバンドの無線品質情報や全コンポーネントキャリアを利用して通信を行った際のスループット情報を利用してスケジューリング処理を行わずに処理を行うことができる。つまり、複数のコンポーネントキャリア内のサブバンドの無線品質情報や全コンポーネントキャリアのスループット情報は、各コンポーネントキャリア間でそれらの情報をやり取りし共有化が必要となってしまうが、本実施例のような方法では、各コンポーネントキャリアの情報さえあれば効率的にスケジューリング処理を行うことができる。

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【００３０】
＜３．スケジューリングメトリック＞
以下、第１－第４のメトリック$p_1$（ｋ，ｃ，ｓｂ）－$p_4$（ｋ，ｃ，ｓｂ）をさらに説明する。上述したように、ｋはユーザ番号を示し、ｃはコンポーネントキャリア番号を示し、ｓｂはサブバンド番号を示す。
【００３１】
図３は、第１－第４のメトリック$p_1$（ｋ，ｃ，ｓｂ）－$p_4$（ｋ，ｃ，ｓｂ）相互の関係を模式的に示している。第１のメトリックは、コンポーネントキャリア内の無線品質のような物理レイヤの状況に関連するメトリックである。第２のメトリックはコンポーネントキャリアの割り当て状況のような、より上位レイヤの状況に関連するメトリックである。第３及び第４のメトリックは、サービスクラスや利用状況のような、さらに上位のレイヤに関するメトリックである。図２のメトリック情報更新部２６における更新頻度は、このようなレイヤの上下関係に基づいて、決定されている。下位レイヤほど頻繁に更新され、上位レイヤほど更新周期は長くなる。
【００３２】
＜３．１　第１のメトリック＞
図４の破線枠は、第１のメトリックを使用して無線リソースを割り当てる様子を模式的に示す。第１のメトリック$p_1$（ｋ，ｃ，ｓｂ）は、ＣＣ内受信環境情報受信部２１から取得したＣＣ内受信環境情報から算出される。上述したように、ＣＣ内受信環境情報は、ユーザ装置に割り当てられているコンポーネントキャリア（ＣＣ）各々における無線品質又は受信レベルを示す情報である。したがって、この情報は、１つのコンポーネントキャリアにおける無線チャネルの状態又はフェージングの状況等を示す。この情報に基づいて、何らかの従来のスケジューリングアルゴリズム（ＭＡＸ／ＣＩ法、プロポーショナルフェアネス法、ラウンドロビン法等）で使用されるメトリックが計算され、そのメトリックが第１のメトリック$p_1$（ｋ，ｃ，ｓｂ）となる。
【００３３】
例えば、スケジューリングアルゴリズムとしてＭＡＸ／ＣＩ法が使用される場合、ｋ番目のユーザ装置（ＵＥ：ｋ）の無線品質の瞬時値が、そのままメトリックとして使用されてもよい。スケジューリングアルゴリズムとしてプロポーショナルフェアネス法が使用される場合、ｋ番目のユーザ装置（ＵＥ：ｋ）の無線品質の瞬時値と平均値との比率が、メトリックとして使用されてもよい。この場合、該当するサブバンドの無線品質の瞬時値から得られる瞬時スループットとそれまでに該当ＵＥが得られている平均的なスループットの比率としてもよい。スケジューリングアルゴリズムとしてプロポーショナルフェアネス法が使用される場合、無線品質によらず、順番にユーザ装置（ＵＥ：ｋ）にリソースが割り当てられる（順番に大きなメトリックが設定される。）。いずれにせよ、何らかの従来のスケジューリングアルゴリズムにしたがって計算されたメトリックが、第１のメトリック$p_1$（ｋ，ｃ，ｓｂ）として決定される。
【００３４】
第１のメトリックは、無線品質に基づいて計算されるので、基地局は、第１のメトリックの計算に必要な情報をユーザ装置から取得できる。したがって、他の基地局や交換機等から情報を収集する必要はない。
【００３５】
＜３．２　第２のメトリック＞
図５の破線枠は、第２のメトリックを使用して無線リソースを割り当てる様子を模式的に示す。第２のメトリック$p_2$（ｋ，ｃ，ｓｂ）は、ＣＣ間受信環境情報受信部２２から取得したＣＣ間受信環境情報から算出される。上述したように、ＣＣ間受信環境情報は、ユーザ装置に割り当てられているコンポーネントキャリア数により表現されてもよい。一例として、第１のユーザ（ＵＥ：Ａ）に２つのコンポーネントキャリア（ＣＣ１、ＣＣ２）が割り当てられ、第２のユーザ（ＵＥ：Ｂ）に１つのコンポーネントキャリア（ＣＣ２）しか割り当てられていなかったとする。この場合、第１のユーザ（ＵＥ：Ａ）の第２の

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メトリック$p_2$（１，ＣＣ１，ｓｂ）及び$p_2$（１，ＣＣ２，ｓｂ）は、それぞれ１／２のように表現される。第２のユーザ（ＵＥ：Ｂ）の第２のメトリック$p_2$（２，ＣＣ２，ｓｂ）は、１のように表現される。一般的には、

$p_2$（ｋ，ｃ，ｓｂ）＝１／（割り当てられているコンポーネントキャリア数）

のように表現されてもよい。この例の場合、第１のユーザ（ＵＥ：Ａ）のメトリックは、ＣＣ１及びＣＣ２各々について、

$p_2$（１，ＣＣ１，ｓｂ）＝$p_2$（１，ＣＣ２，ｓｂ）＝１／２　であり、

第２のユーザ（ＵＥ：Ｂ）のＣＣ１のメトリックは、

$p_2$（２，ＣＣ１，ｓｂ）＝０　であり、

第２のユーザ（ＵＥ：Ｂ）のＣＣ２のメトリックは、

$p_2$（２，ＣＣ２，ｓｂ）＝１

である。なお、上記の計算例では、サブバンド番号ｓｂが全て共通していることを想定しているが、このことは本発明に必須ではない。サブバンド番号が異なるコンポーネントキャリアを使用することもできる。その場合、メトリックはサブバンド毎に算出される。

【００３６】

第１のユーザは、２つのコンポーネントキャリア（ＣＣ１、ＣＣ２）の双方において無線リソースの割り当てを受ける機会がある。これに対して、第２のユーザは、一方のコンポーネントキャリア（ＣＣ２）でしか割り当てを受けることができない。コンポーネントキャリア毎の第１のユーザのメトリックを１／２とすることで、ユーザ間の公平性を図ることができる。

【００３７】

上記の例では、第２のメトリックは、割り当てられているコンポーネントキャリア数分の１に設定されていたが、別の方法で設定することも可能である。例えば、コンポーネントキャリア毎の無線品質の総和に対する個々のコンポーネントキャリアの無線品質として定義されてもよい。該当のコンポーネントキャリアに対するメトリックは

$p_2$（ｋ，ｃ，ｓｂ）＝（１つのコンポーネントキャリアの無線品質）／（コンポーネントキャリア毎の無線品質の総和）

のように定義されてもよい。この定義によると、第１のユーザ（ＵＥ：Ａ）のメトリックは、ＣＣ１に対して、

$p_2$（１,ＣＣ１，ｓｂ）＝（ＣＣ１の無線品質）／（ＣＣ１の無線品質＋ＣＣ２の無線品質）となり、ＣＣ２に対して、

$p_2$（１,ＣＣ２，ｓｂ)＝（ＣＣ２の無線品質）／（ＣＣ１の無線品質＋ＣＣ２の無線品質）となる。

第２のユーザ（ＵＥ：Ｂ）のメトリックは、

$p_2$（２，ＣＣ２，ｓｂ）＝（ＣＣ２の無線品質）／（ＣＣ２の無線品質）＝１となる。

この場合、第２のユーザ（ＵＥ：Ｂ）については上記の例と同じであるが、第１のユーザ（ＵＥ：Ａ）に対するメトリックが異なる。この例の場合、ＣＣ１とＣＣ２の内、品質が良い方のメトリックが大きくなる。したがって、この定義によると、ユーザ間の公平性を図りつつ、より良いコンポーネントキャリアで通信できるようになる。

【００３８】

なお、上記の２つの定義$p_2$（ｋ，ｃ，ｓｂ）＝１／（割り当てられているコンポーネントキャリア数）、及び$p_2$（ｋ，ｃ，ｓｂ）＝（１つのコンポーネントキャリアの無線品質）／（コンポーネントキャリア毎の無線品質の総和）は、単独に使用されてもよいし、組み合わせて使用されてもよい。

【００３９】

第２のメトリックは、コンポーネントキャリアの利用状況に基づいて計算され、この情報は、ユーザ装置から取得できるし、基地局が記憶しておくことも可能である。したがって、このメトリックについても他の基地局や交換機等から情報を収集する必要はない。

【００４０】

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＜３．３　第３のメトリック＞

図６の破線枠は、第３のメトリックを使用して無線リソースを割り当てる様子を示す。第３のメトリック$p_3$（ｋ，ｃ，ｓｂ）は、サービスクラス情報受信部２３から取得したサービスクラス情報から算出される。サービスクラス情報は、例えば、音声パケット（ＶｏＩＰ）等の音声サービスや、ファイル転送によるデータ通信等の通信種別により決定される。あるいは、サービスクラス情報は、通信するベアラの品質（ＱｏＳ）に応じて決定されてもよい。例えば、リアルタイム型の通信や、ＱｏＳが高い通信の場合には、大きな値が第３のメトリックに対応付けられてもよい。逆に、ベストエフォート型の通信や、ＱｏＳが低い通信の場合には、小さな値が第３のメトリックに対応付けられてもよい。

【００４１】

このような対応づけをコンポーネントキャリア毎に予め設定しておくことで、特定のサービスクラスの通信を特定のコンポーネントキャリアに集中させる又は偏らせることができる。例えば、第１のコンポーネントキャリア（ＣＣ１）が、８００ＭＨｚの帯域を使用し、地域的に広範囲をカバーしていた場合に、ＣＣ１において、音声サービスの通信がなるべく行われるようにすることが考えられる。また、第２のコンポーネントキャリア（ＣＣ２）が、２ＧＨｚの帯域を使用し、地域的には狭い範囲をカバーする場合に、ＣＣ２において、データ通信がなるべく行われるようにすることが考えられる。この場合、ＣＣ１に対する第３のメトリックは、音声サービスについては大きな値に設定され、データ通信については小さな値が設定される。ＣＣ２に対する第３のメトリックは、逆に、音声サービスについては小さな値に設定され、データ通信については大きな値が設定される。また、帯域幅の差に応じて割り当てられていてもよい。つまり、ＶｏＩＰのようなショートパケットに対しては小さい帯域幅のコンポーネントキャリアを割り当て、ＦＴＰのようなデータ通信に対しては大きい帯域幅のコンポーネントキャリアを割り当ててもよい。このような場合に、

第３のメトリックは、サービスクラスに基づいて計算されるので、基地局は予め記憶しておくことが可能である。サービスクラス毎にどのような値が第３のメトリックとして設定されるかは、基地局が決定してもよいし、基地局よりも上位の装置（例えば、交換機）が決定して基地局に通知してもよい。

【００４２】

＜３．４　第４のメトリック＞

第４のメトリック$p_4$（ｋ，ｃ，ｓｂ）は、サービスクラス情報受信部２３から取得したサービスクラス情報から算出される。ユーザ利用状況情報は、例えば、１日、１週間、１ヶ月、１年間等の一定期間の間に、どの程度多くの通信を行ったか等により表現される。ユーザ利用状況情報は、このような利用状況を示す情報に加えて、ユーザの契約情報を含んでもよい。例えば、過去に多くの通信を行ったユーザほど小さな値をとるように、第４のメトリックが定義されてもよい。これは、ユーザ間の公平性を図る観点から好ましい。あるいは、より多くの通信を行ったユーザほど大きな値をとるように、第４のメトリックが定義されてもよい。これは、通信サービスの利用を促す観点から好ましい。このように、ユーザに対する割当頻度を示すものであり、本実施例で示す第４のメトリックは、コンポーネントキャリアには依存しない数値となる。

【００４３】

第４のメトリックは、サービスの利用状況に基づいて計算されるので、基地局は利用状況の情報を、呼制御等を行っている上位の装置（例えば、交換機）から取得する必要がある。ただし、第４のメトリックを計算するのに必要な利用状況の情報は、物理レイヤの割り当て状況ほど頻繁には変わらない。したがって、基地局が、交換機等からこの情報を取得する頻度は比較的少なくて済む。

【００４４】

第１－第４のメトリックの１つ以上を用いて、図２の無線リソース割当部２８は、無線リソースの割り当てを計画することが可能である。好ましくは、第１のメトリックと、第２－第４のメトリックの内の１つ以上とを合成（加算又は乗算）することで、ユーザ装置

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のスケジューリングメトリックが算出される。さらに好ましくは、第１ないし第４のメトリック全てを合成（加算又は乗算）することで、ユーザ装置のスケジューリングメトリックが算出される。この場合、図３に示すような上位ないし下位レイヤの全ての状況をスケジューリングメトリックに反映させることができる。

【００４５】

＜４．動作例＞

図７は、基地局がスケジューリングを行う場合の動作例を示す。ステップＳ７１において、基地局は、ユーザ装置又は上位装置（交換機等）から各種の情報を受信する。各種の情報は、ＣＣ内受信環境情報、ＣＣ間受信環境情報、サービスクラス情報、ユーザ利用状況情報等を含む。これらの情報を取得する頻度は、各情報に対応する第１－第４のメトリックの更新頻度に応じて決定されている。

【００４６】

ステップＳ７２において、ある１つのコンポーネントキャリアに対するスケジューリングが始まる。ステップＳ７２において、ユーザ装置各々のメトリック情報（スケジューリングメトリック）が計算される。上述したように、ｋ番目のユーザ装置（ＵＥ：ｋ）のスケジューリングメトリックｐ（ｋ，ｃ，ｓｂ）は、例えば、

$$p(k, c, sb) = \Pi p_i (k, c, sb)$$

により表現される。$p_i$（ｋ，ｃ，ｓｂ）は、上記の第１－第４のメトリックである（ｉ＝１、２，３、４）。スケジューリングは、少なくとも第１のメトリック$p_1$（ｋ，ｃ，ｓｂ）に基づいて実行可能であるが、スケジューリング対象のコンポーネントキャリア以外のコンポーネントキャリアの状況をも加味する観点からは、第２、第３及び第４のメトリックの内の１つ以上を考慮することが好ましい。

【００４７】

ステップＳ７３において、メトリック情報（スケジューリングメトリック）が最大のユーザに無線リソースが割り当てられる。

【００４８】

ステップＳ７４において、対象のコンポーネントキャリアにおいて、未割当の無線リソースの有無が確認される。未割当の無線リソースが残っていた場合、フローはステップＳ７５に進む。

【００４９】

ステップＳ７５において、対象のコンポーネントキャリアにおける通信を希望しているが、無線リソースの割り当てを未だ受けていないユーザの有無を確認する。そのようなユーザが存在した場合、フローはステップＳ７２に戻り、割当済みのユーザを除くユーザについて、説明済みの手順が実行され、各ユーザに無線リソースが割り当てられる。

【００５０】

ステップＳ７４において、対象のコンポーネントキャリアにおいて、未割当の無線リソースが残っていなかった場合、対象のコンポーネントキャリアに対するスケジューリングは終了する。また、ステップＳ７５において、未割当のユーザが残っていなかった場合も、対象のコンポーネントキャリアに対するスケジューリングは終了する。フローチャート上では明示されていないが、対象のコンポーネントキャリアに対するスケジューリングが終了した後、別のコンポーネントキャリアに対するスケジューリングを行うため、再びステップＳ７２－Ｓ７５が行われる。すなわち、スケジューリングは、コンポーネントキャリア毎に行われる。

【００５１】

本実施例によれば、各コンポーネントキャリアの現状は、上記の第１－第４のメトリックに反映されているので、これらを合成したスケジューリングメトリックｐ（ｋ，ｃ，ｓｂ）は、各コンポーネントキャリアの状況を反映している。したがって、このスケジューリングメトリックを使用すれば、各コンポーネントキャリアの現状を考慮したスケジューリングを、１つのコンポーネントキャリアに閉じた形で行うことができる。

【００５２】

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以上本発明は特定の実施例を参照しながら説明されてきたが、それらは単なる例示に過ぎず、当業者は様々な変形例、修正例、代替例、置換例等を理解するであろう。例えば、本発明は、キャリアアグリゲーションが行われる適切な如何なる移動通信システムに適用されてもよい。例えば本発明は、HSDPA／HSUPA方式を拡張したDB-DC HSPAや4C-HSPAのシステム、LTE方式のシステム、LTE－Advanced方式のシステム、IMT－Advanced方式のシステム、WiMAX、Wi－Fi方式のシステム等に適用されてもよい。発明の理解を促すため具体的な数値例を用いて説明がなされたが、特に断りのない限り、それらの数値は単なる一例に過ぎず適切な如何なる値が使用されてもよい。発明の理解を促すため具体的な数式を用いて説明がなされたが、特に断りのない限り、それらの数式は単なる一例に過ぎず適切な如何なる数式が使用されてもよい。実施例又は項目の区分けは本発明に本質的ではなく、２以上の項目に記載された事項が必要に応じて組み合わせて使用されてよいし、ある項目に記載された事項が、別の項目に記載された事項に（矛盾しない限り）適用されてよい。説明の便宜上、本発明の実施例に係る装置は機能的なブロック図を用いて説明されたが、そのような装置はハードウェアで、ソフトウェアで又はそれらの組み合わせで実現されてもよい。ソフトウェアは、ランダムアクセスメモリ（ＲＡＭ）、フラッシュメモリ、読み取り専用メモリ（ＲＯＭ）、ＥＰＲＯＭ、ＥＥＰＲＯＭ、レジスタ、ハードディスク（ＨＤＤ）、リムーバブルディスク、ＣＤ－ＲＯＭ、データベース、サーバその他の適切な如何なる記憶媒体に用意されてもよい。本発明は上記実施例に限定されず、本発明の精神から逸脱することなく、様々な変形例、修正例、代替例、置換例等が本発明に包含される。

【符号の説明】

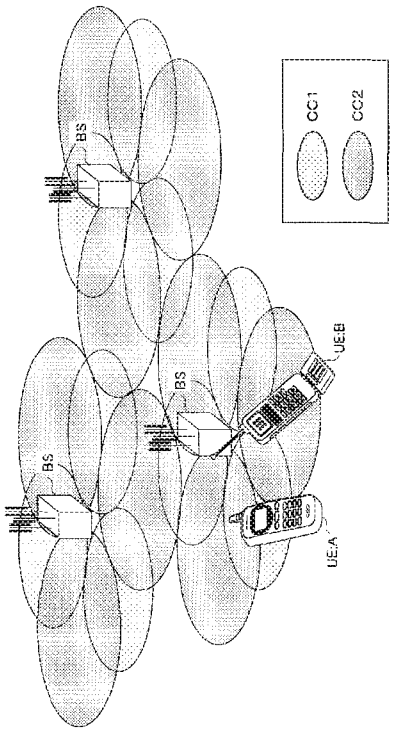
【００５３】

２１　ＣＣ内受信環境情報受信部
２２　ＣＣ間受信環境情報受信部
２３　サービスクラス情報受信部
２４　ユーザ利用状況情報受信部
２５　メトリック情報計算部
２６　メトリック情報更新部
２７　メトリック情報格納部
２８　無線リソース割当部
２９　通信部

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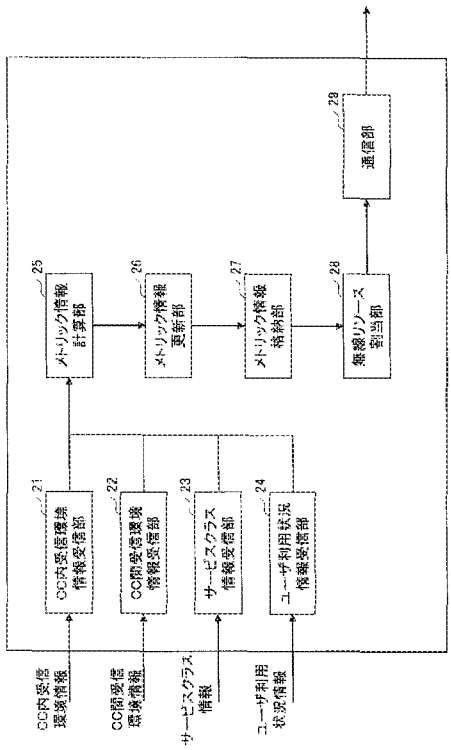
【図１】

実施例を説明するために想定している環境を示す図



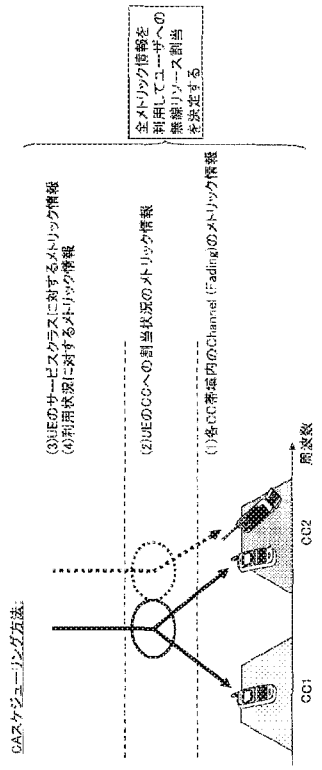

【図２】

基地局の機能ブロック図



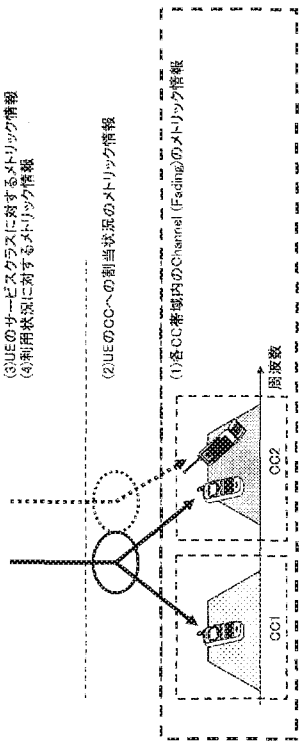

【図３】

第1－第4のメトリック相互の関係を示す図




【図４】

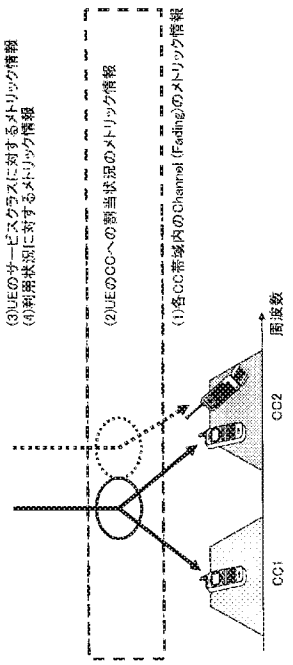
第1のメトリックを使用して無線リソースを割り当てる様子を示す図




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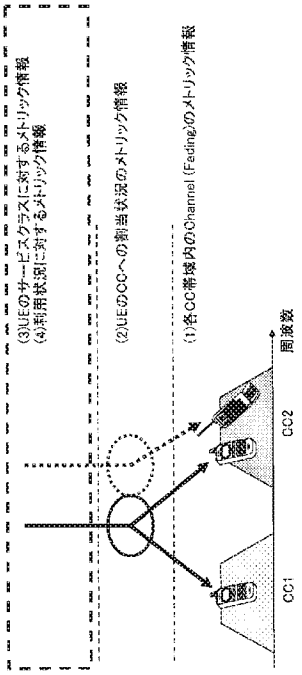
【図５】

第2のメトリックを使用して無線リソースを割り当てる様子を示す図



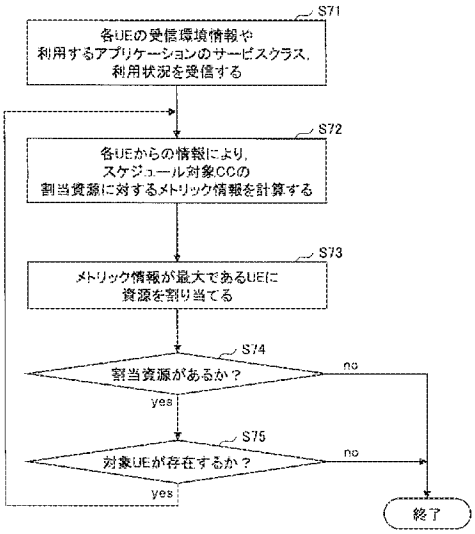

【図６】

第3、第4のメトリックを使用して無線リソースを割り当てる様子を示す図



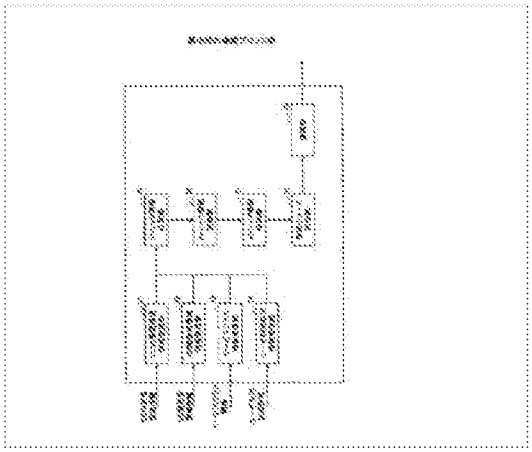

【図７】

基地局がスケジューリングを行うためのフローチャート



Legal Status


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| (21)Application number | 2010-154555 |
| (22)Date of filing | 07.07.2010 |
| (71)Applicant | NTT DOCOMO INC |
| (72)Inventor | SAKAE YUTA |

**(54)BASE STATION AND METHOD IN MOBILE COMMUNICATION SYSTEM**


**(57)Abstract**

PROBLEM TO BE SOLVED: To enhance efficiency of scheduling processing which allocates a wireless resource to a user device in a mobile communication system including the user device that communicates by using a plurality of component carriers (CC) by means of carrier aggregation (CA).

SOLUTION: A base station can utilize wireless quality information by a frequency block unit in each component carrier which is fed back from the user device, and the wireless quality information of the entire component carrier which is allocated to the user device, by separating those pieces of information. The base station comprises means for calculating each scheduling metric based on those pieces of wireless quality information, and an allocation unit for allocating the wireless resource to the user device according to the scheduling metric for each component carrier by using two or more of those scheduling metrics.



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# Electronic Acknowledgement Receipt

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| **EFS ID:** | 26348886 |
| **Application Number:** | 14167405 |
| **International Application Number:** | |
| **Confirmation Number:** | 6471 |
| **Title of Invention:** | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| **First Named Inventor/Applicant Name:** | Yu-Hsuan Guo |
| **Customer Number:** | 106622 |
| **Filer:** | Sang N. Dang/Sandy Kim |
| **Filer Authorized By:** | Sang N. Dang |
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| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
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| 2 | Foreign Reference | JP11-234719v2.pdf | 698222<br>3529cd8154c003a9c2fc2f0775b98ccf9fa47491 | no | 26 |
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| 4 | Foreign Reference | JP2012-019313v2.pdf | 831796<br>09f7f99aed8c5d6fde4bcab107c8945d9d5ff913 | no | 17 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| 5 | Non Patent Literature | JPOfficeActionv2.pdf | 862400<br>aaac03e5b8c0f064270121d57ebd9e97c301230a | no | 18 |
| **Warnings:** | | | | | |
| **Information:** | | | | | |
| | | | **Total Files Size (in bytes):** | 3395244 | |

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

UNITED STATES PATENT AND TRADEMARK OFFICE

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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 14/167,405 | 01/29/2014 | Yu-Hsuan Guo | 1291-235.101 | 6471 |

106622 7590 07/27/2016

Blue Capital Law Firm, P.C.
650 Town Center Drive, Suite 1530
Costa Mesa, CA 92626

| EXAMINER |
|---|
| REYES ORTIZ, HECTOR E |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2472 | |

| NOTIFICATION DATE | DELIVERY MODE |
|---|---|
| 07/27/2016 | ELECTRONIC |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@bluecapitallaw.com



**Petitioners' Exhibit 1002, p. 358**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

| Office Action Summary | Application No. 14/167,405 | Applicant(s) GUO ET AL. | |
|---|---|---|---|
| | Examiner HECTOR REYES | Art Unit 2472 | AIA (First Inventor to File) Status No |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *07/05/2016*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims***

5)☒ Claim(s) *6-7, 9-14, 16-17, 19, 21-23, 25-31, and 33-35* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *6,7,9-14,16,17,19,21-23,25-31 and 33-35* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

**Application Papers**

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.



**Petitioners' Exhibit 1002, p. 359**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

## DETAILED ACTION

## ELECTION/RESTRICTIONS

Applicant's election without traverse of Group II, claims 6-20, in the reply filed on 08/31/2015 is acknowledged.

## RESPONSE

This Office action is in response to claims and remarks filed on 07/05/2016.

## STATUS OF CLAIMS

Claims 1-5 have been withdrawn.

Claims 6, 15, 18 and 20, 24, 32 have been canceled.

Claims 6, 13, 22, 23, 27, 30 and 33 have been amended.

Claims 6-7, 9-14, 16-17, 19, and 21-23, 25-31, 33-35 are pending.

## NOTICE OF PRE-AIA OR AIA STATUS

The present application is being examined under the pre-AIA first to invent provisions.

## INFORMATION DISCLOSURE STATEMENT

The Information Disclosure Statement (IDS) communication(s) submitted on 06/05/2015 and 10/17/2014 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the IDS communication(s) cited references have been considered in the examination of the claims now pending.

## REJECTION

Claims 6-7, 9-14, 16-17, 19, 21-23, 25-31, and 33-35 are rejected as follows.

### *Claim Rejections - 35 USC § 103*

**The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:**

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

**Claims 6-7, 11-12, 21-23, and 27-29** are rejected under pre-AIA 35 U.S.C. 103) as being unpatentable over Sambhwani et al. (US Publication No. 2013/0303224; based on provisional application No. 61/646,233 the effective filing date is May 2012; hereinafter referred to as Sambhwani) in view of Chen et al. (US Publication No. 2013/0183970, hereinafter referred to as Chen) further in view of Horn et al. (US Publication No. 2014/0010207, hereinafter referred to as Horn).

**Regarding Claims 6 and 22,** Sambhwani discloses

*a control circuit* (A controller; see ¶ 0066)*;*

*a processor installed in the control circuit* (A processor; see ¶ 0066)*;*

*a memory installed in the control circuit and operatively coupled to the processor* (A memory; see ¶ 0066)*;*

*wherein the processor is configured to execute a program code stored in the memory to handle inter-node connectivity by* (The memory store data and software; see ¶ 0066)*:*

*transmitting a second request from the first network node, which controls a first serving cell of the UE, to the second network node, which controls a second serving cell of the UE, to change a data path for a first radio bearer of the UE* (A UE establish a first/second flow with a first/second network entity; see Figure 2, ¶ 0031-0032. Furthermore, the first entity RNC transmit a request to the second entity RNC to setup a multiflow leg; see ¶ 0033),

*wherein a first path is via the first network node and used as the data path for the first radio bearer* ***and the third radio bearer*** *before changing the data path for the first radio bearer* (A user equipment establish a first flow with a first network entity; see Figure 2, ¶ 0031. Furthermore, one or more flows can be configured such as not to be limited to a first flow and second flow; see ¶ 0027.).

Sambhwani fails to disclose *receiving, by a first network node, a first request from a second network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment); transmitting an accept message from the first network node to the second network node in response to the first request.* However, in analogous art, Chen discloses that the source base station (BS) send a switching request to the target BS; see Figure 1. Furthermore, the target BS sends a switching request response; see

Figure 1. In addition, the exchange is in order to cooperate with the target base station to configure one or a plurality of Scells; see ¶ 0017. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to in order to efficiently select secondary service cells according to the transmitted information, and reduces time delay.

Sambhwani fails to disclose that ***the second request does not indicate to change the data path for a third radio bearer of the UE.*** However, in analogous art, Horn discloses that the first base station communicates with the second base station to offload at least one data bearer; see ¶ 0009. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to in order to split multiple data bearers between eNB to guaranteed a bit rate for the bearer.

**Regarding Claims 7 and 23,** Sambhwani discloses that *the data path for the first radio bearer is changed to a second path, wherein the second path is via the second network node and used as a data path for a second radio bearer of the UE. (*A user equipment establish a second flow with a second network entity; see Figure 2, ¶ 0032.).

**Regarding Claims 11 and 27,** Sambhwani fails to disclose *receiving, by the first network node, a confirmation message from the second network node for changing the*

*data path for the first radio bearer.* However, in analogous art, Chen discloses that the source base station (BS) send a switching request to the target BS; see Figure 1. Furthermore, the target BS sends a switching request response; see Figure 1. In addition, the response carries the switching command information to the UE; see ¶ 0008. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to in order to efficiently select secondary service cells according to the transmitted information, and reduces time delay.

**Regarding Claims 12 and 28,** Sambhwani discloses that *the first network node is an eNB (evolved Node B) controlling the first serving cell or the SCell of the UE, and the second network node is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE* (A UE establish a first/second flow with a first/second network entity; see Figure 2, ¶ 0031-0032. Furthermore, the network entity is a base station or nodeB; see ¶ 0031).

**Regarding Claims 21 and 29,** Sambhwani discloses that *the communication device terminates transmission and/or reception of the first radio bearer when receiving a confirmation message for the second request* (The respond with a tunnel pointer which is used to direct the communication data flow to the second network entity; see ¶ 0033-34).

**Claims 9 and 25** are rejected under pre-AIA 35 U.S.C. 103 as being unpatentable over Sambhwani, Chen, Horn, and further in view of Sun et al. (US Publication No. 2014/0334427; hereinafter referred to as Sun-II).

**Regarding Claims 9 and 25,** Sambhwani fails to disclose that *the second request includes a cause for data path changing.* However, in analogous art, Sun discloses that the message may include a cause value (e.g. insufficient resources); see ¶ 0013. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to reduce mobility signaling and improve battery life.

**Claims 10 and 26** are rejected under pre-AIA 35 U.S.C. 103 as being unpatentable over Sambhwani, Chen, Horn, and further view of Sun et al. (US Publication No. 2014/0177446; based on provisional application No. 61/515,763 the effective filing date is August 2011; hereinafter referred to as Sun).

**Regarding Claims 10 and 26,** Sambhwani fails to disclose *that the UE has multiple paths via different network nodes after the data path for the first bearer change*. However, in analogous art, Sun discloses the distribution of flow between to different networks; see Figure 1. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to lower the cost of transmission by allowing dual radio terminal to offload traffic.

**Claims 13-14, 16, 19, 29-31, 33, and 35** are rejected under pre-AIA 35 U.S.C. 103 as being unpatentable over Sambhwani et al. (US Publication No. 2013/0303224; based on provisional application No. 61/646,233 the effective filing date is May 2012; hereinafter referred to as Sambhwani) in view of Chen et al. (US Publication No. 2013/0183970, hereinafter referred to as Chen) further in view of Horn et al. (US Publication No. 2014/0010207, hereinafter referred to as Horn).

**Regarding Claims 13 and 30,** Sambhwani discloses

*a control circuit* (A controller; see ¶ 0066)*;*

*a processor installed in the control circuit* (A processor; see ¶ 0066)*;*

*a memory installed in the control circuit and operatively coupled to the processor* (A memory; see ¶ 0066)*;*

*wherein the processor is configured to execute a program code stored in the memory to handle inter-node connectivity by* (The memory store data and software; see ¶ 0066)*:*

*receiving, by the second network node which controls a second serving cell of the UE, a second request from the first network node which controls a first serving cell of the UE; and*

*wherein a first path is via the first network node and used as the data path for the first radio bearer* ***and before third radio bearer*** *before changing the data path for the first radio bearer* (A user equipment establish a first flow with a first network entity; see Figure 2, ¶ 0031. Furthermore, one or more flows can be configured such as not to be limited to a first flow and second flow; see ¶ 0027.).

Sambhwani fails to disclose *transmitting a first request from the communication device to a network node for aggregating a SCell (Secondary Cell) for a UE (User Equipment); receiving, by the communication device, an accept message from the network node in response to the first request.* However, in analogous art, Chen discloses that the source base station (BS) send a switching request to the target BS; see Figure 1. Furthermore, the target BS sends a switching request response; see Figure 1. In addition the exchange is in order to cooperate with the target base station to configure one or a plurality of Scells; see ¶ 0017. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to in order to efficiently select secondary service cells according to the transmitted information, and reduces time delay.

Sambhwani fails to disclose *changing a data path for a first radio bearer of the UE* ***and not changing a data path for a third radio bearer of the UE*** *based on the second request.*However, in analogous art, Horn discloses that the first base station communicates with the second base station to offload at least one data bearer; see ¶ 0009. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to in order to split multiple data bearers between eNB to guaranteed a bit rate for the bearer.

**Regarding Claims 14 and 31,** Sambhwani discloses that *the data path for the first radio bearer is changed to a second path, wherein the second path is via the second network node and used as a data path for a second radio bearer of the UE (*A

user equipment establish a second flow with a second network entity; see Figure 2, ¶ 0032.).

**Regarding Claims 16 and 33,** Sambhwani fails to disclose *transmitting a confirmation message from the second network node to the first network node for changing the data path for the first radio bearer.* However, in analogous art, Chen discloses that the source base station (BS) send a switching request to the target BS; see Figure 1. Furthermore, the target BS sends a switching request response; see Figure 1. In addition, the response carries the switching command information to the UE; see ¶ 0008. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to in order to efficiently select secondary service cells according to the transmitted information, and reduces time delay.

**Regarding Claims 19 and 35,** Sambhwani discloses that *the first network node is an eNB (evolved Node B) controlling a serving cell or SCell (Secondary Cell) of the UE, and the second network node is an eNB controlling a serving cell or PCell (Primary Cell) of the UE* (A UE establish a first/second flow with a first/second network entity; see Figure 2, ¶ 0031-0032. Furthermore, the network entity is a base station or nodeB; see ¶ 0031).

**Claims 17 and 34** are rejected under pre-AIA 35 U.S.C. 103 as being unpatentable over Sambhwani, Chen, Horn, and further in view of Sun et al. (US Publication No. 2014/0177446; based on provisional application No. 61/515,763 the effective filing date is August 2011; hereinafter referred to as Sun).

**Regarding Claims 17 and 34,** Sambhwani fails to disclose that *the UE has multiple paths via different network nodes after the data path change.* However, in analogous art, Sun discloses the distribution of flow between to different networks; see Figure 1. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sambhwani with the above teaching in order to lower the cost of transmission by allowing dual radio terminal to offload traffic.

## RESPONSE TO ARGUMENTS

**Regarding Claims 6, 13, 20, and 22,** Applicant's arguments with respect to claims have been considered but are moot in view of the new grounds of rejection necessitated by the amended claims.

## CONCLUSION

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Please see PTO-892 form for considered prior art for record.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Héctor Reyes whose telephone number is (571) 270-

0239 and the fax number is (571) 483-7161. The examiner can normally be reached on (Mon-Fri) 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on (571) 272-3088. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at (866) 217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call (800) 786-9199 (IN USA OR CANADA) or (571) 272-1000.

/H. R./

Examiner, Art Unit 2472

/ANH-VU LY/
Primary Examiner, Art Unit 2472

| Notice of References Cited | Application/Control No. 14/167,405 | Applicant(s)/Patent Under Reexamination GUO ET AL. | |
|---|---|---|---|
| | Examiner HECTOR REYES | Art Unit 2472 | Page 1 of 1 |

**U.S. PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Name | CPC Classification | US Classification |
|---|---|---|---|---|---|---|
| * | A | US-2014/0010207 A1 | 01-2014 | Horn; Gavin Bernard | H04W36/165 | 370/332 |
| | B | US- | | | | |
| | C | US- | | | | |
| | D | US- | | | | |
| | E | US- | | | | |
| | F | US- | | | | |
| | G | US- | | | | |
| | H | US- | | | | |
| | I | US- | | | | |
| | J | US- | | | | |
| | K | US- | | | | |
| | L | US- | | | | |
| | M | US- | | | | |

**FOREIGN PATENT DOCUMENTS**

| * | | Document Number Country Code-Number-Kind Code | Date MM-YYYY | Country | Name | CPC Classification |
|---|---|---|---|---|---|---|
| | N | | | | | |
| | O | | | | | |
| | P | | | | | |
| | Q | | | | | |
| | R | | | | | |
| | S | | | | | |
| | T | | | | | |

**NON-PATENT DOCUMENTS**

| * | | Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) |
|---|---|---|
| | U | |
| | V | |
| | W | |
| | X | |

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.



**Petitioners' Exhibit 1002, p. 371**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

**( Not for submission under 37 CFR 1.99)**

| | |
|---|---|
| Application Number | 14167405 |
| Filing Date | 2014-01-29 |
| First Named Inventor | Yu-Hsuan Guo |
| Art Unit | 2472 |
| Examiner Name | REYES ORTIZ, HECTOR E |
| Attorney Docket Number | 1291-235.101 |

**U.S.PATENTS**

| Examiner Initial* | Cite No | Patent Number | Kind Code[1] | Issue Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|---|
| | 1 | | | | | |

If you wish to add additional U.S. Patent citation information please click the Add button.

**U.S.PATENT APPLICATION PUBLICATIONS**

| Examiner Initial* | Cite No | Publication Number | Kind Code[1] | Publication Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|---|
| | 1 | 20120140743 | A1 | 2012-06-07 | InterDigital Patent Holdings, Inc. | |

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**FOREIGN PATENT DOCUMENTS**

| Examiner Initial* | Cite No | Foreign Document Number[3] | Country Code[2] | Kind Code[4] | Publication Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear | T[5] |
|---|---|---|---|---|---|---|---|---|
| | 1 | 11234719 | JP | A | 1999-08-27 | Alcatel CIT | | ☐ |
| | 2 | 2011176722 | JP | A | 2011-09-08 | SONY CORP | | ☐ |
| | 3 | 2012019313 | JP | A | 2012-01-26 | NTT DOCOMO INC | | ☐ |



ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.E.R/

# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

**( Not for submission under 37 CFR 1.99)**

| | |
|---|---|
| Application Number | 14167405 |
| Filing Date | 2014-01-29 |
| First Named Inventor | Yu-Hsuan Guo |
| Art Unit | 2472 |
| Examiner Name | REYES ORTIZ, HECTOR E |
| Attorney Docket Number | 1291-235.101 |

If you wish to add additional Foreign Patent Document citation information please click the Add button

**NON-PATENT LITERATURE DOCUMENTS**

| Examiner Initials* | Cite No | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published. | T[5] |
|---|---|---|---|
| | 1 | Office Action on corresponding JP Patent Application No. 2015-107120 dated April 5, 2016 | ☐ |

If you wish to add additional non-patent literature document citation information please click the Add button

**EXAMINER SIGNATURE**

| Examiner Signature | /HECTOR E REYES ORTIZ/ | Date Considered | 07/22/2016 |
|---|---|---|---|

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.E.R/



Petitioners' Exhibit 1002, p. 373
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

| Index of Claims | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 14167405 | GUO ET AL. |
| | Examiner | Art Unit |
| | HECTOR REYES ORTIZ | 2472 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ✓ | Rejected | - | Cancelled | N | Non-Elected | A | Appeal |
| = | Allowed | ÷ | Restricted | I | Interference | O | Objected |

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

| CLAIM | | DATE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Final | Original | 09/29/2015 | 04/01/2016 | 07/22/2016 | | | | | | |
| | 1 | N | N | N | | | | | | |
| | 2 | N | N | N | | | | | | |
| | 3 | N | N | N | | | | | | |
| | 4 | N | N | N | | | | | | |
| | 5 | N | N | N | | | | | | |
| | 6 | ✓ | ✓ | ✓ | | | | | | |
| | 7 | ✓ | ✓ | ✓ | | | | | | |
| | 8 | ✓ | ✓ | - | | | | | | |
| | 9 | ✓ | ✓ | ✓ | | | | | | |
| | 10 | ✓ | ✓ | ✓ | | | | | | |
| | 11 | ✓ | ✓ | ✓ | | | | | | |
| | 12 | ✓ | ✓ | ✓ | | | | | | |
| | 13 | ✓ | ✓ | ✓ | | | | | | |
| | 14 | ✓ | ✓ | ✓ | | | | | | |
| | 15 | ✓ | ✓ | - | | | | | | |
| | 16 | ✓ | ✓ | ✓ | | | | | | |
| | 17 | ✓ | ✓ | ✓ | | | | | | |
| | 18 | ✓ | - | - | | | | | | |
| | 19 | ✓ | ✓ | ✓ | | | | | | |
| | 20 | ✓ | - | - | | | | | | |
| | 21 | | ✓ | ✓ | | | | | | |
| | 22 | | ✓ | ✓ | | | | | | |
| | 23 | | ✓ | ✓ | | | | | | |
| | 24 | | ✓ | - | | | | | | |
| | 25 | | ✓ | ✓ | | | | | | |
| | 26 | | ✓ | ✓ | | | | | | |
| | 27 | | ✓ | ✓ | | | | | | |
| | 28 | | ✓ | ✓ | | | | | | |
| | 29 | | ✓ | ✓ | | | | | | |
| | 30 | | ✓ | ✓ | | | | | | |
| | 31 | | ✓ | ✓ | | | | | | |
| | 32 | | ✓ | - | | | | | | |
| | 33 | | ✓ | ✓ | | | | | | |
| | 34 | | ✓ | ✓ | | | | | | |
| | 35 | | ✓ | ✓ | | | | | | |



Petitioners' Exhibit 1002, p. 374
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IPR2024-00991

**EAST Search History**

**EAST Search History (Prior Art)**

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|---|---|---|---|---|---|---|
| S3 | 1 | (APP-000) \| 14/167405.APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:22 |
| S4 | 4 | (FMID-000) \| ("50002584".FMID.) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:22 |
| S5 | 99 | (INV-000) \| ( ((Yu \| Hsuan) near2 (Guo)).INV. & (( Meng \| Hui) near2 (Ou)).INV. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:24 |
| S6 | 23 | (INV-000) \| ( ((Yu \| Hsuan) near2 (Guo)).INV. & (( Meng \| Hui) near2 (Ou)).INV. ) & ( (cell).CLM. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:25 |
| S7 | 1 | (INV-000) \| ( ((Yu \| Hsuan) near2 (Guo)).INV. & (( Meng \| Hui) near2 (Ou)).INV. ) & ( (path).CLM. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:27 |
| S8 | 798 | (AS-000) \| ( (INNOVATIVE NEAR2 SONIC).AS. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:28 |
| S9 | 26 | (AS-000) \| ( (INNOVATIVE NEAR2 SONIC).AS. ) & ( path ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:28 |
| S10 | 256 | (CLM-000) \| ( (path).CLM. NEAR5 | US-PGPUB; | ADJ | ON | 2015/09/10 |

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|---|---|---|---|---|---|---|
| | | (different \| ((first \| primary) & second$3) \| multi$3).CLM. ) SAME ( (differentiated \| service type \| QoS \| quality of service).CLM. ) | USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | | | 17:15 |
| S11 | 27 | (CLM-000) \| ( (path).CLM. NEAR5 (different \| ((first \| primary) & second$3) \| multi$3).CLM. ) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!).CLM. ) & ( (differentiated \| service type \| QoS \| quality of service).CLM. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 17:54 |
| S15 | 15 | (IDS-000) \| ( (US "20120106511") \| (EP "2448325" \| US "20120106510") \| (JP "2014022895" \| US "20150195837") \| ("1020120046692" \| KR "20120046692" \| US "20120106510") ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 18:57 |
| S18 | 176 | (CPC-Classification) \| ( (path).CLM. NEAR5 (different \| ((first \| primary) & second$3) \| multi$3) ) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) & ( (differentiated \| service type \| QoS \| quality of service) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 20:08 |
| S19 | 2058 | (CPC-Classification) \| ( (path) NEAR5 (different \| ((first \| primary) & second$3) \| multi$3) ) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) & ( (differentiated \| service type \| QoS \| quality of service) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 20:08 |
| S20 | 4 | (CPC-000-CAT) \| ( (H04W76/064 & H04L5/0096 & H04W92/20 & H04W36/28).cpc. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 20:24 |
| S21 | 4 | (CPC-000-CAT) \| ( (H04W76/064 & H04L5/0096 & H04W92/20 ).cpc. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 20:24 |
| S22 | 22 | (CPC-000-CAT) \| ( (H04W76/064 & H04L5/0096).cpc. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 20:25 |
| S23 | 3208 | (CPC-000-CarrierAggregation-Schedulling-ConnectionManagement) \| ( (H04L5/$ \| H04L5/009$ \| H04L5/0096).CPC. & (H04W72/$ \| H04W72/12$ \| H04W72/0406 \| H04W72/042).CPC. & (H04W76/$ \| H04W76/06$ \| | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; | ADJ | ON | 2015/09/17 10:10 |

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|---|---|---|---|---|---|---|
| | | H04E76/064).CPC. ) | IBM_TDB | | | |
| S24 | 56 | (CPC-000-CarrierAggregation-Schedulling-ConnectionManagement) \| ( (H04L5/009$ \| H04L5/0096).CPC. & (H04W72/12$ \| H04W72/0406 \| H04W72/042).CPC. & (H04W76/06$ \| H04E76/064).CPC. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 10:10 |
| S25 | 217 | (CPC-000-CarrierAggregation-ConnectionManagement) \| ( (H04L5/009$ \| H04L5/0096).CPC. & (H04W76/06$ \| H04E76/064).CPC. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 10:25 |
| S27 | 133 | (CPC-000-CarrierAggregation) \| ( (H04L5/$).CPC. & (rerout$3 \| re rout$3) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 10:41 |
| S32 | 2458 | H04W$/$.CPC. & ( (path \| carrier \| CC \| componet ) NEAR5 (different \| ((first \| primary) & second$3) \| multi$3) ) NEAR10 ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) SAME10 ( (differentiated \| service type \| QoS \| quality of service \| quality) ) & (carrier aggregation \| CA! \| component carrier \| CC! \| multicomponent \| multicarrier) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 14:03 |
| S33 | 1732 | H04W$/$.CPC. & ( (path \| carrier \| CC \| componet ) NEAR5 (different \| ((first \| primary) & second$3) \| multi$3) ) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) SAME (carrier aggregation \| CA! \| component carrier \| CC! \| multicomponent \| multicarrier) ) SAME10 ( (differentiated \| service type \| QoS \| quality of service \| quality) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 14:13 |
| S34 | 195 | H04W76/$.CPC. & ( (path \| carrier \| CC \| componet ) NEAR5 (different \| ((first \| primary) & second$3) \| multi$3) ) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) SAME (carrier aggregation \| CA! \| component carrier \| CC! \| multicomponent \| multicarrier) ) SAME10 ( (differentiated \| service type \| QoS \| quality of service \| quality) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 14:14 |
| S35 | 1469 | H04W$/$.CPC. & ( ( (first \| primary \| serving \| PCC \| PCell) & (second$3 \| SCC \| SCell) ) NEAR5 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) SAME10 ( (differentiated \| service type \| QoS \| quality of service \| quality) & (carrier aggregation \| CA! \| component carrier \| CC! \| multicomponent \| multicarrier) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/18 10:19 |

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|---|---|---|---|---|---|---|
| S36 | 1 | ("2009/0191881").URPN. | USPAT | ADJ | ON | 2015/09/18 11:34 |
| S37 | 29 | ("20010016493" \| "20010030953" \| "20020091326" \| "20040043767" \| "20040053614" \| "20040203784" \| "20050153743" \| "20070129075" \| "20070293226" \| "20090052330" \| "20090061878" \| "20090117900" \| "20090191881" \| "20100167744" \| "20100173626" \| "20100178920" \| "20100190451" \| "20100267378" \| "20100291931" \| "20110064016" \| "20110256871" \| "20120094706" \| "4045794" \| "5095500" \| "5805666" \| "6611688" \| "8457638" \| "8472359" \| "8515415").PN. OR ("8971871").URPN. | US-PGPUB; USPAT; USOCR | ADJ | ON | 2015/09/18 11:35 |
| S38 | 4312 | H04W$/$.CPC. & ( (carrier \| CC!) NEAR5 (quality) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/18 11:41 |
| S39 | 90 | H04W$/$.CPC. & ( (carrier \| CC!) NEAR5 (quality) SAME degradat$3 ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/18 11:42 |
| S40 | 11 | (NPL-000) \|( ("8706124".pn.) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/18 13:19 |
| S41 | 27 | ("20020055343" \| "20040171384" \| "20050021885" \| "20050117601" \| "20050163093" \| "20050243849" \| "20060114813" \| "20070060082" \| "20070153729" \| "20070214490" \| "20070262913" \| "20080076353" \| "20090137206" \| "20090175374" \| "20090318075" \| "20100122284" \| "20100142416" \| "20100208633" \| "20100259682" \| "20100332822" \| "20110053521" \| "6760772" \| "7590426" \| "7639706" \| "8045922" \| "8102853" \| "8218654").PN. OR ("8706124").URPN. | US-PGPUB; USPAT; USOCR | ADJ | ON | 2015/09/18 13:20 |
| S44 | 396 | H04W76/$.CPC. & ( (path \| carrier \| CC \| componet) SAME ((first \| primary) & second$3)) SAME10 (carrier aggregation \| CA! \| component carrier \| CC! \| multicomponent \| multicarrier \| multiband \| multichannel) SAME10 ( (differentiated \| service type \| QoS \| quality of service \| quality) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/23 11:51 |
| S45 | 5 | (EDAN-14433541) \| ( ("20120094608" \| "20120236801").PN. ) | US-PGPUB; USPAT; USOCR; FPRS; | ADJ | ON | 2015/09/23 13:21 |

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|---|---|---|---|---|---|---|
| | | | EPO; JPO; DERWENT; IBM_TDB | | | |
| S46 | 5 | ("2011/0103327").URPN. | USPAT | ADJ | ON | 2015/09/23 14:35 |
| S47 | 46 | H04W76/$.CPC. & ( (datapath \| path \| $3carrier \| CC \| component \| pdn ) NEAR5 (first \| primary \| serving \| second$3) ) SAME (inter (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| node) ) & ( (differentiated \| service type \| QoS \| quality of service \| quality) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 14:43 |
| S48 | 25 | H04W76/$.CPC. & H04W36/$.CPC. & H04W28/$.CPC. & (inter (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| node)) & (differentiated \| service type \| QoS \| quality of service \| quality) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 14:45 |
| S49 | 25 | (H04W76/064.CPC. \| H04W36/385.CPC. \| H04W28/0268.CPC. \| H04W40/12.CPC) & (inter (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| node)) & (differentiated \| service type \| QoS \| quality of service \| quality) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 14:56 |
| S50 | 2265 | (CPC-000-ReleaseConnection-ReselectionCore-TrafficMGMT-PathFinding) \| (H04W76/064.CPC. & (H04W36/385.CPC. \| H04W36/30 \| H04W36/04-08) \| (H04W28/0268.CPC. \| H04W40/12.CPC)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 15:48 |
| S52 | 91 | (CPC-000-ReleaseConnection-ReselectionCore-TrafficMGMT-PathFinding) \| (H04W76/064.CPC. & (H04W36/385.CPC. \| H04W36/30 \| H04W36/04-08) \| (H04W28/0268.CPC. \| H04W40/12.CPC)) & (carrier aggregation \| component carrier \| multicomponent \| multicarrier \| multiband \| multichannel) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 15:52 |
| S54 | 175 | (CPC-000-ReleaseConnection-ReselectionCore-TrafficMGMT-PathFinding) \| ((H04W36/385.CPC. \| H04W36/30 \| H04W36/04-08)) & (carrier aggregation \| component carrier \| multicomponent \| multicarrier \| multiband \| multichannel) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 16:04 |
| S55 | 1219 | (H04W76/$) & (carrier aggregation \| component carrier \| multicomponent \| multicarrier \| multiband \| multichannel) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 16:14 |
| S56 | 178 | (H04W76/$) & (carrier aggregation \| component carrier \| multicomponent \| multicarrier \| multiband \| multichannel) & (differentiated \| service type \| QoS \| | US-PGPUB; USPAT; USOCR; FPRS; | ADJ | ON | 2015/09/24 16:15 |



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|---|---|---|---|---|---|---|
| | | quality of service \| quality) NOT ( (handover \| handoff \| hand (over \|off)) ) | EPO; JPO; DERWENT; IBM_TDB | | | |
| S59 | 308 | H04W$/$.CPC. & (inter (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| node)) SAME request SAME5 ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 16:42 |
| S60 | 3 | ("2013/0176988").URPN. | USPAT | ADJ | ON | 2015/09/24 16:55 |
| S61 | 144 | H04W$/$.CPC. & ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) SAME (reconfigur$5) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) WITH (request$3) WITH (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 19:19 |
| S62 | 520 | H04W76/$.CPC. & ( ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| first \| primary \| serving) NEAR10 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| second$3 \| serving \| other \| neighbor$5) SAME (request$3) ) SAME10 ( (quality \| service type \| differentiated \| QOS \| QOE \| CQI \| CSI \| TOS ) ) ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 20:25 |
| S63 | 8 | (EDAN-000-14224825) \|( ("20090253426" \| "20120005177" \| "20090253426" \| "20120005177" \| "20080167041" \| "20080167041").PN. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 20:57 |
| S64 | 65 | H04W28/10-12.CPC. & ( ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) SAME ( (eNB \| eNode$1 \| $1NodeB \| | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 21:34 |

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|---|---|---|---|---|---|---|
| | | (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| first \| primary \| serving) NEAR10 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| second$3 \| serving \| other \| neighbor$5) SAME (request$3) ) SAME10 ( (quality \| service type \| differentiated \| QOS \| QOE \| CQI \| CSI \| TOS ) ) ) NOT ( (handover \| handoff \| hand (over \|off)) ) | | | | |
| S65 | 207 | (H04W28/$.CPC. & H04W76/$.CPC. & H04W36/$.CPC. & H04W92/20.CPC.) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 21:41 |
| S66 | 5 | (H04W28/10,12.CPC. & H04W76/$.CPC. & H04W36/$.CPC. & H04W92/20.CPC.) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 22:13 |
| S67 | 30 | ( H04W76/$.CPC. & H04W36/16,22,28.CPC. & H04W28/10,12.CPC. ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 22:15 |
| S68 | 356 | ( H04W76/025,064.CPC. &( H04W36/16,22,28.CPC. \| H04W28/10,12.CPC.) ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 22:19 |
| S69 | 293 | ( (H04W76/025,064.CPC. \| H04W36/16,22,28.CPC.) & H04W28/10,12.CPC. ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 22:19 |
| S70 | 413 | ( (H04W76/025,064.CPC. \| H04W28/10,12.CPC.) & H04W36/16,22,28.CPC. ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 22:20 |
| S71 | 724 | H04W76/$.CPC. & ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ADJ5 (request$3) ADJ5 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/28 18:29 |
| S72 | 51 | H04W76/$.CPC. & ( (eNB \| eNode$1 \| | US-PGPUB; | ADJ | ON | 2015/09/28 |

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|---|---|---|---|---|---|---|
| | | $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ADJ5 (reallocat$3 \| reconfigur$5) ADJ5 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | | | 19:00 |
| S73 | 322 | H04W$/$.CPC. & ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ADJ5 (reallocat$3 \| reconfigur$5) ADJ5 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/28 19:20 |
| S75 | 2 | (EAST-000-9084152) \| ( "20130303224".did. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/28 20:02 |
| S78 | 2 | "20140177446".did. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/28 21:21 |
| S79 | 2 | (EAST-000-2013022219) \| ( "20140177446".did. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/28 21:22 |
| S80 | 115 | (US-20140211759-$ or US-20080109695-$ or US-20020069238-$ or US-20020181395-$ or US-20030039246-$ or US-20030103465-$ or US-20030110290-$ or US-20060182119-$ or US-20070101018-$ or US-20070171816-$ or US-20070291648-$ or US-20080165683-$ or US-20080291827-$ or US-20140362829-$ or US-20150020157-$ or US-20120106511-$ or US-20150195837-$ or US-20120039200-$ or US-20070211658-$ or US-20090191881-$ or US-20110034175-$ or US-20110039593-$ or US-20110051685-$ or US-20110103221-$ or US-20110134774-$ or US-20110212693-$).did. or (US-20110317552-$ or US-20120039252-$ or US-20120082082-$ or US-20120099464-$ or US-20120213207-$ or US-20110053521-$ or US-20050163093-$ or US-20150264612-$ or US-20150263846-$ or US-20150172032-$ or US-20150133126-$ or US-20150124743-$ or US-20150110048-$ or US-20150094073-$ or US-20150055621-$ or US-20150016323-$ or US-20100303039-$ or | US-PGPUB; USPAT; FPRS; DERWENT | ADJ | ON | 2015/09/28 21:46 |



**Petitioners' Exhibit 1002, p. 382**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

| | | | | | | |
|---|---|---|---|---|---|---|
| | | US-20150004981-$ or US-20150003402-$ or US-20140092787-$ or US-20140307622-$ or US-20140204777-$ or US-20130301439-$ or US-20130331077-$ or US-20130010716-$ or US-20120163205-$ or US-20110103327-$).did. or (US-20150009826-$ or US-20140050184-$ or US-20140044087-$ or US-20130183970-$ or US-20110269442-$ or US-20150156780-$ or US-20130217382-$ or US-20130176988-$ or US-20120057544-$ or US-20140295856-$ or US-20110105140-$ or US-20150201410-$ or US-20150201418-$ or US-20150117292-$ or US-20140301201-$ or US-20090253426-$ or US-20110111785-$ or US-20130329550-$ or US-20150124735-$ or US-20140321267-$ or US-20140269575-$ or US-20150140999-$ or US-20130303224-$ or US-20140177446-$).did. or (US-8724544-$ or US-8971871-$ or US-8706124-$).did. or (CN-103974459-$ or KR-20140097996-$ or EP-2448325-$ or EP-2770661-$ or WO-2014070347-$ or WO-2014171888-$ or WO-2013022219-$ or WO-2014169117-$ or WO-2014048294-$ or WO-2014003899-$ or WO-2012165893-$ or WO-2015065855-$ or EP-1418782-$).did. or (EP-2448325-$ or WO-2013191084-$ or US-20120106511-$ or EP-2257113-$ or US-20120236801-$ or WO-2014000610-$ or WO-2013022220-$ or WO-2014015734-$ or WO-2013153442-$ or WO-2013022219-$ or WO-2012006744-$ or WO-2011149081-$ or US-20140307622-$ or US-20130303224-$ or US-20110267978-$ or US-20040125748-$ or US-20150133122-$ or WO-2014017872-$ or WO-2014017874-$).did. | | | | |
| S81 | 100 | S80 & ( type \| channel \| carrier \| qos \| quality) | US-PGPUB; USPAT; FPRS; DERWENT | ADJ | ON | 2015/09/28 21:48 |
| S84 | 3 | (EAST-000-8706124) \| ( "20110065440".did. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/29 12:45 |
| S87 | 618 | (H04W76/$) & ( type \| channel \| carrier \| qos \| quality) NEAR5 (stream \| flow) SAME5 ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) | US-PGPUB; USPAT; FPRS; DERWENT | ADJ | ON | 2015/09/29 14:53 |
| S88 | 327 | (H04W76/$) & ( type \| channel \| carrier \| qos \| quality) NEAR5 (stream \| flow) | US-PGPUB; USPAT; | ADJ | ON | 2015/09/29 18:36 |



**Petitioners' Exhibit 1002, p. 383**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

| | | | | | | |
|---|---|---|---|---|---|---|
| | | SAME ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) & (@ad \| @rlad)<= "20130130" | FPRS; DERWENT | | | |
| S92 | 122 | (US-20140211759-$ or US-20080109695-$ or US-20020069238-$ or US-20020181395-$ or US-20030039246-$ or US-20030103465-$ or US-20030110290-$ or US-20060182119-$ or US-20070101018-$ or US-20070171816-$ or US-20070291648-$ or US-20080165683-$ or US-20080291827-$ or US-20140362829-$ or US-20150020157-$ or US-20120106511-$ or US-20150195837-$ or US-20120039200-$ or US-20070211658-$ or US-20090191881-$ or US-20110034175-$ or US-20110039593-$ or US-20110051685-$ or US-20110103221-$ or US-20110134774-$ or US-20110212693-$).did. or (US-20110317552-$ or US-20120039252-$ or US-20120082082-$ or US-20120099464-$ or US-20120213207-$ or US-20110053521-$ or US-20050163093-$ or US-20150264612-$ or US-20150263846-$ or US-20150172032-$ or US-20150133126-$ or US-20150124743-$ or US-20150110048-$ or US-20150094073-$ or US-20150055621-$ or US-20150016323-$ or US-20100303039-$ or US-20150004981-$ or US-20150003402-$ or US-20140092787-$ or US-20140307622-$ or US-20140204777-$ or US-20130301439-$ or US-20130331077-$ or US-20130010716-$ or US-20120163205-$ or US-20110103327-$).did. or (US-20150009826-$ or US-20140050184-$ or US-20140044087-$ or US-20130183970-$ or US-20110269442-$ or US-20150156780-$ or US-20130217382-$ or US-20130176988-$ or US-20120057544-$ or US-20140295856-$ or US-20110105140-$ or US-20150201410-$ or US-20150201418-$ or US-20150117292-$ or US-20140301201-$ or US-20090253426-$ or US-20110111785-$ or US-20130329550-$ or US-20150124735-$ or US-20140321267-$ or US-20140269575-$ or US-20150140999-$ or US-20130303224-$ or US-20140177446-$ or US-20110065440-$ or US-20150264738-$ or US-20150085730-$).did. or (US-20140348081-$ or US-20140334427-$ or US-20140293874-$).did. or (US-8724544-$ or US-8971871-$ or US-8706124-$).did. or (CN-103974459-$ or KR-20140097996-$ or EP-2448325-$ or EP-2770661-$ or WO-2014070347-$ or WO-2014171888-$ or WO-2013022219-$ or WO- | US-PGPUB; USPAT; FPRS; DERWENT | ADJ | OFF | 2016/04/01 08:19 |



**Petitioners' Exhibit 1002, p. 384**
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**IPR2024-00991**

| | | | | | | |
|---|---|---|---|---|---|---|
| | | 2014169117-$ or WO-2014048294-$ or WO-2014003899-$ or WO-2012165893-$ or WO-2015065855-$ or EP-1418782-$).did. or (EP-2448325-$ or WO-2013191084-$ or US-20120106511-$ or EP-2257113-$ or US-20120236801-$ or WO-2014000610-$ or WO-2013022220-$ or WO-2014015734-$ or WO-2013153442-$ or WO-2013022219-$ or WO-2012006744-$ or WO-2011149081-$ or US-20140307622-$ or US-20130303224-$ or US-20110267978-$ or US-20040125748-$ or US-20150133122-$ or WO-2014017872-$ or WO-2014017874-$ or US-20150085730-$).did. | | | | |
| S94 | 19 | S92 & aggregat$3 & Scell | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | OFF | 2016/04/01 08:20 |
| S95 | 35 | S92 & cause | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | OFF | 2016/04/01 09:47 |
| S96 | 16 | S92 & request WITH path | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | OFF | 2016/04/01 09:52 |
| S97 | 1 | (APP-000) \| 14/167405.APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/04/01 09:54 |
| S98 | 1 | S97 & cause | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/04/01 09:54 |
| S99 | 1 | (APP-000) \| 14/167405.APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/07/21 21:27 |
| S100 | 4 | (FMID-000) \| ("50002584".FMID.) | US-PGPUB; USPAT; USOCR; FPRS; | ADJ | ON | 2016/07/21 21:27 |



**Petitioners' Exhibit 1002, p. 385**
**AT&T et al v. Innovative Sonic & Celerity**
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| | | | | | | |
|---|---|---|---|---|---|---|
| | | | EPO; JPO; DERWENT; IBM_TDB | | | |
| S101 | 229 | H04W76/$.CPC. & ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) SAME (bearer) SAME path ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/07/21 22:10 |
| S102 | 270 | H04W76/$.CPC. & ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) WITH(reallocat$3 \| reconfigur$5 \| chang$3) WITH (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) WITH (bearer \| flow \| stream) ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/07/21 22:19 |
| S103 | 32 | H04W76/$.CPC. & ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ADJ5 (reallocat$3 \| reconfigur$5 \| chang$3) ADJ5 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) SAME (bearer \| flow \| stream) ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/07/21 22:20 |
| S104 | 22 | H04W76/$.CPC. & ( (reallocat$3 \| reconfigur$5 \| chang$3) WITH (bearer \| flow \| stream) ) SAME5 ("X2" \| "X-2") NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/07/21 22:54 |
| S105 | 62 | H04W76/$.CPC. & ( (bearer \| flow \| stream) ) SAME ("X2" \| "X-2") NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/07/21 22:59 |
| S106 | 4 | H04W76/$.CPC. & ( (bearer) SAME (RRC) SAME ("X2" \| "X-2") ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/07/21 23:07 |
| S107 | 56 | H04W76/$.CPC. & ( (bearer) SAME (RRC) SAME5 ("X2" \| "X-2") ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/07/21 23:08 |
| S108 | 30 | H04W76/$.CPC. & ( (bearer) WITH (split$3) ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; | ADJ | ON | 2016/07/21 23:32 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | EPO; JPO; DERWENT; IBM_TDB | | | |
| S109 | 1 | (NPL-000) \| "13/934038".app. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | OFF | 2016/07/22 00:15 |

**7/22/2016 12:47:05 AM**
**C:\Users\hreyes\Desktop\Applications\14167405_Carrier Aggregation - Path selection_NF\14167405_EAST.wsp**

| Search Notes | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 14167405 | GUO ET AL. |
| | Examiner | Art Unit |
| | HECTOR REYES ORTIZ | 2472 |

| CPC- SEARCHED | | |
|---|---|---|
| Symbol | Date | Examiner |
| | | |

| CPC COMBINATION SETS - SEARCHED | | |
|---|---|---|
| Symbol | Date | Examiner |
| | | |

| US CLASSIFICATION SEARCHED | | | |
|---|---|---|---|
| Class | Subclass | Date | Examiner |
| | | | |

| SEARCH NOTES | | |
|---|---|---|
| Search Notes | Date | Examiner |
| Consulted Restriction | 9/29/2015 | HR |
| Consulted CPC | 9/29/2015 | HR |
| Consulted Search Strategy | 9/29/2015 | HR |
| Performed Double Patenting search | 9/29/2015 | HR |
| Performed NPL search | 9/29/2015 | HR |
| Performed text search in combination with the following CPC groups: H04W76/025, 064; H04L5/0096; H04W92/20; H04W36/385, 30, 04-08; H04W28/10,12 -- See EAST printout | 9/29/2015 | HR |
| Performed search update | 4/1/2016 | HR |
| Performed search update | 7/22/2016 | HR |

| INTERFERENCE SEARCH | | | |
|---|---|---|---|
| US Class/ CPC Symbol | US Subclass / CPC Group | Date | Examiner |
| | | | |

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|---|---|
| /H.R./<br>Examiner.Art Unit 2472 | |



Petitioners' Exhibit 1002, p. 388
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | | |
|---|---|---|
| Appl. No. | : | 14/167,405 |
| Confirmation No. | : | 6471 |
| Applicant | : | Yu-Hsuan Guo |
| Filed | : | January 29, 2014 |
| Title | : | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| TC/A.U. | : | 2472 |
| Examiner | : | Hector E. Reyes Ortiz |
| Docket No. | : | 1291-235.101 (IS 1020044-US-D1) |
| Customer No. | : | 106622 |

**Amendment to Office Action**

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Office Action mailed on July 27, 2016, having a three-month period for filing a response to **October 27, 2016**, Applicant respectfully submits the following amendments.

**Claims** begin on page 2.

**Remarks** begin on page 8.



**Petitioners' Exhibit 1002, p. 389**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

**IN THE CLAIMS:**

1. (Withdrawn)

2. (Withdrawn)

3. (Withdrawn)

4. (Withdrawn)

5. (Withdrawn)

6. (Currently Amended) A method for handling inter-node connectivity in a wireless communication system, comprising:

receiving, by a first ~~network node~~ evolved node B (eNB), a first request from a second ~~network node~~ eNB for aggregating a ~~SCell (Secondary Cell)~~ Secondary Cell (SCell) for a ~~UE (User Equipment)~~ User Equipment (UE);

transmitting an accept message from the first ~~network node~~ eNB to the second ~~network node~~ eNB in response to the first request; and

transmitting a second request from the first ~~network node~~ eNB, which controls ~~a first serving cell~~ the SCell of the UE, to the second ~~network node~~ eNB, which controls ~~a second serving cell~~ a Primary Cell (PCell) of the UE, to change a data path for a first radio bearer of the UE, wherein the second request does not indicate to change the data path for a third radio bearer of the UE;

wherein a first path is via the first ~~network node~~ eNB and used as the data path for the first radio bearer and the third radio bearer before changing the data path for the first radio bearer.

7. (Currently Amended) The method of claim 6, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the second ~~network node~~ eNB and used as a data path for a second radio bearer of the UE.

8. (Canceled)



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**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

9. (Previously Presented) The method of claim 6, wherein the second request includes a cause for data path changing.

10. (Currently Amended) The method of claim 6, wherein the UE has multiple paths via different ~~network nodes~~ eNBs after the data path for the first radio bearer change.

11. (Currently Amended) The method of claim 6, further comprising:

receiving, by the first ~~network node~~ eNB, a confirmation message from the second ~~network node~~ eNB for changing the data path for the first radio bearer.

12. (Currently Amended) The method of claim 6, wherein ~~the first network node is an eNB (evolved Node B) controlling the first serving cell or the SCell of the UE, and the second network node is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE~~ the second request comprises information about loading status of a cell controlled by the first eNB.

13. (Currently Amended) A method for handling inter-node connectivity in a wireless communication system, comprising:

transmitting a first request from a second ~~network node~~ evolved Node B (eNB) to a first ~~network node~~ evolved Node B (eNB) for aggregating a ~~SCell (Secondary Cell)~~ Secondary Cell (SCell) for a ~~UE (User Equipment)~~ User Equipment (UE);

receiving, by the second ~~network node~~ eNB, an accept message from the first ~~network node~~ eNB in response to the first request;

receiving, by the second ~~network node~~ eNB which controls a ~~second serving cell~~ Primary Cell (PCell) of the UE, a second request from the first ~~network node~~ eNB which controls ~~a first serving cell~~ the SCell of the UE; and

changing a data path for a first radio bearer of the UE and not changing a data path for a third radio bearer of the UE based on the second request;

wherein a first path is via the first ~~network node~~ eNB and used as the data path for the first radio bearer and the third radio bearer before changing the data path for the first radio bearer.



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**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

14. (Currently Amended) The method of claim 13, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the second ~~network node~~ eNB and used as a data path for a second radio bearer of the UE.

15. (Canceled)

16. (Currently Amended) The method of claim 13, further comprising:

transmitting a confirmation message from the second ~~network node~~ eNB to the first ~~network node~~ eNB for changing the data path for the first radio bearer.

17. (Currently Amended) The method of claim 13, wherein the UE has multiple paths via different ~~network nodes~~ eNBs after the data path for the first radio bearer change.

18. (Canceled)

19. (Currently Amended) The method of claim 13, wherein the ~~first network node is an eNB (evolved Node B) controlling the first serving cell or the SCell of the UE, and the second network node is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE~~ the second request comprises information about loading status of a cell controlled by the first eNB.

20. (Canceled)

21. (Currently Amended) The method of claim 6, wherein the first ~~network node~~ eNB terminates transmission and/or reception of the first radio bearer when receiving a confirmation message for the second request.

22. (Currently Amended) A communication device to handle inter-node connectivity in a wireless communication system, comprising:

a control circuit;

a processor installed in the control circuit;

a memory installed in the control circuit and operatively coupled to the processor;



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wherein the processor is configured to execute a program code stored in the memory to handle inter-node connectivity by:

receiving, by a first ~~network node~~ evolved node B (eNB), a first request from a second ~~network node~~ eNB for aggregating a ~~SCell (Secondary Cell)~~ Secondary Cell (SCell) for a ~~UE (User Equipment)~~ User Equipment (UE);

transmitting an accept message from the first ~~network node~~ eNB to the second ~~network node~~ eNB in response to the first request; and

transmitting a second request from the first ~~network node~~ eNB, which controls ~~a first serving cell~~ the SCell of the UE, to the second ~~network node~~ eNB, which controls ~~a second serving cell~~ a Primary Cell (PCell) of the UE, to change a data path for a first radio bearer of the UE, wherein the second request does not indicate to change the data path for a third radio bearer of the UE;

wherein a first path is via the first ~~network node~~ eNB and used as the data path for the first radio bearer and the third radio bearer before changing the data path for the first radio bearer.

23. (Currently Amended) The communication device of claim 22, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the ~~network node~~ second eNB and used as a data path for a second radio bearer of the UE.

24. (Canceled)

25. (Previously Presented) The communication device of claim 22, wherein the second request includes a cause for data path changing.

26. (Currently Amended) The communication device of claim 22, wherein the UE has multiple paths via different ~~network nodes~~ eNBs after the data path for the first radio bearer change.

27. (Currently Amended) The communication device of claim 22, wherein the program code further comprises:



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**IPR2024-00991**

receiving, by the ~~communication device~~ first eNB, a confirmation message from the ~~network node~~ second eNB for changing the data path for the first radio bearer.

28. (Currently Amended) The communication device of claim 22, wherein ~~the communication device is an eNB (evolved Node B) controlling the first serving cell or the SCell of the UE, and the network node is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE~~ the second request comprises information about loading status of a cell controlled by the first eNB.

29. (Currently Amended) The communication device of claim 22, wherein the ~~communication device~~ first eNB terminates transmission and/or reception of the first radio bearer when receiving a confirmation message for the second request.

30. (Currently Amended) A communication device to handle inter-node connectivity in a wireless communication system, comprising:

a control circuit;

a processor installed in the control circuit;

a memory installed in the control circuit and operatively coupled to the processor;

wherein the processor is configured to execute a program code stored in the memory to handle inter-node connectivity by:

transmitting a first request from a second ~~network node~~ evolved Node B (eNB) to a first ~~network node~~ evolved Node B (eNB) for aggregating a ~~SCell (Secondary Cell)~~ Secondary Cell (SCell) for a ~~UE (User Equipment)~~ User Equipment (UE);

receiving, by the second ~~network node~~ eNB, an accept message from the first ~~network node~~ eNB in response to the first request;

receiving, by the second ~~network node~~ eNB which controls a ~~second serving cell~~ Primary Cell (PCell) of the UE, a second request from the first ~~network node~~ eNB which controls ~~a first serving cell~~ the SCell of the UE; and

changing a data path for a first radio bearer of the UE and not changing a data path for a third radio bearer of the UE based on the second request;



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wherein a first path is via the first ~~network node~~ eNB and used as the data path for the first radio bearer and the third radio bearer before changing the data path for the first radio bearer.

31. (Currently Amended) The communication device of claim 30, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the ~~communication device~~ second eNB and used as a data path for a second radio bearer of the UE.

32. (Canceled)

33. (Currently Amended) The communication device of claim 30, wherein the program code further comprises:

transmitting a confirmation message from the ~~communication device~~ second eNB to the ~~network node~~ first eNB for changing the data path for the first radio bearer.

34. (Currently Amended) The communication device of claim 30, wherein the UE has multiple paths via different ~~network nodes~~ eNBs after the data path for the first radio bearer change.

35. (Currently Amended) The communication device of claim 30, wherein ~~the network node is an eNB (evolved Node B) controlling the first serving cell or the SCell of the UE, and the communication device is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE~~ the second request comprises information about loading status of a cell controlled by the first eNB.



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## REMARKS

Claims 6-7, 9-14, 16-17, 19, 21-23, 25-31 and 33-35 are pending in the application. In the Office Action, claims 6-7, 11-12, 21-23, and 27-28 stand rejected under 35 U.S.C. § 103(a) based on the combination of Sambhwani (U.S. Patent Publication No. 2013/0303224; based on U.S. Provisional Application Serial No. 61/646,233), Chen (U.S. Patent Publication No. 2013/0183970), and Horn (U.S. Patent Publication No. 2014/0010207). *See* Office Action, Page 3. Claims 13-14, 16, 19, 29-31, 33, and 35 also stand rejected under 35 U.S.C. § 103(a) based on the combination of Sambhwani, Chen, and Horn. *See* Office Action, Page 8.

Claims 6, 13, 22, and 30 have been amended to incorporate limitations recited in claims 12, 19, 28, and 35 respectively. Furthermore, claims 7, 10, 11, 14, 16, 17, 21, 23, 26, 27, 33, and 34 have been amended to reflect the amendments made to claims 6, 13, 22, and 30. Also, claims 12, 19, 28, and 35 have been amended based on at least the disclosure in Paragraph [0053] of the present application. No new matter has been added. Applicants respectfully request reconsideration of the claims as amended.

As recited in amended claims 6, 13, 22, and 30, the first eNB is generally responsible for (1) receiving a request for SCell aggregation, (2) responding with an accept message to provide and control the SCell, and (3) transmitting a request for data path changing. Furthermore, the second eNB is generally responsible for (1) providing and controlling the PCell, (2) transmitting a request for SCell aggregation, (3) receiving an accept message for SCell aggregation, (4) receiving a request for data path changing, and (5) changing the data path.

In contrast, Sambhwani discloses that the S-RNC is responsible for (1) establishing a first flow between S-RNC and a first network entity (a base station or NodeB) controlled by S-RNC, (2) transmitting a request to D-RNC to establish a second flow between S-RNC and a second network entity controlled by D-RNC, and (3) receiving a response from D-RNC. Sambhwani also discloses that the D-RNC is responsible for (1) receiving a request from S-RNC to establish a second flow between S-RNC and a second network entity controlled by D-RNC, (2) requesting a second network entity to setup a multi-flow leg, and (3) transmitting a response to the S-RNC. Since S-RNC and D-RNC are network nodes which control base stations or nodeBs, the S-RNC and D-RNC disclosed in Sambhwani are ***different and distinguishable*** from the eNBs recited in claims 6 and 13.



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Furthermore, Chen discloses that the target base station is responsible for (1) receiving a switching request from source base station, (2) configuring the SCell, and (3) transmitting a switching request response to source base station. Chen also discloses that the source base station is responsible for (1) transmitting a switching request to the target base station, and (2) receiving a switching request response from the target base station.

As discussed in Sambhwani, S-RNC and D-RNC are network nodes which control base stations or NodeBs. Therefore, it would not be obvious to consider the base stations disclosed in Chen as the RNCs disclosed in Sambhwani. A more straightforward combination would perhaps be to consider the base stations disclosed in Chen as network entities (or base stations) controlled by the RNCs disclosed in Sambhwani. Additionally, there is no teaching that the target base station disclosed in Chen should be considered as the S-RNC disclosed in Sambhwani, and that the source base station disclosed in Chen should be considered as the D-RNC disclosed in Sambhwani.

In addition, Horn discloses that the first base station is responsible for (1) determining to offload at least one data bearer to the second base station, and (2) communicating with the second base station to offload data bearer. Horn also discloses that the second base station is responsible for (1) receiving an offload request message for at least one data bearer sent from the first base station, and (2) admitting the at least one data bearer.

Similarly, it would not be obvious to consider base stations disclosed in Horn as the RNCs disclosed in Sambhwani. Additionally, there is no teaching that the first base station (or the anchor eNB) disclosed in Horn should be considered as the S-RNC disclosed in Sambhwani, and that second base station (or the booster eNB) disclosed in Horn should be considered as the D-RNC disclosed in Sambhwani. There is also no teaching that the first base station disclosed in Horn should be considered as the target base station disclosed in Chen, and that the second base station disclosed in Horn should be considered as the source base station disclosed in Chen.

In summary, there is no incentive to combine Sambhwani, Chen, and Horn in the way described in the Office Action (i.e., combining the S-RNC disclosed in Sambhwani, the target base station disclosed in Chen, and the anchor eNB disclosed in Horn as a single entity). In other words, the Office Action is not evaluating the invention as a whole but rather is picking individual parts of the invention relative to the prior art; which is contrary to 35 U.S.C. § 103(a) as expounded in *Graham v. John Deere Co.* (383 U.S. 1, 148 USPQ 459 (1966)). Applicant respectfully submits that the rationale for combining the prior art can only be based on hindsight



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reasoning, which is improper. Applicant respectfully submits that the Office Action has used the knowledge obtained from the present application to then reconstruct the elements of the claims based on the three prior art references applied in the Office Action.

Based on the foregoing, Applicant respectfully submits that claims 6-7, 9-14, 16-17, 19, 21-23, 25-31, and 33-35 are patentable over any combination of Sambhwani, Chen, and/or Horn.

In view of the foregoing it is respectfully submitted that the pending claims are in condition for allowance. Reconsideration of the rejections is requested. Allowance of the claims is solicited. The Examiner is invited to contact Applicant's undersigned counsel by telephone at (714) 839-3800 to expedite the prosecution of this case should there be any unresolved matters remaining.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made.

Respectfully submitted,
Sang N. Dang
**BLUE CAPITAL LAW FIRM, P.C.**

Dated: October 24, 2016

/Sang N. Dang/
Reg. No. 51,186
Tel.: (714) 839-3800



**Petitioners' Exhibit 1002, p. 398**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | | |
|---|---|---|
| Applicants: | Yu-Hsuan Guo and Meng-Hui Ou | |
| Title: | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM | |
| Serial No.: | 14/167,405 | Filed: January 29, 2014 |
| Examiner: | Hector E. Reyes Ortiz | Group Art Unit: 2472 |
| Attorney Docket No.: | 1291-235.101 (IS102004-US-D1) | |

---

**CERTIFICATE OF EFS-WEB TRANSMISSION**
**UNDER 37 CFR § 1.8**

I hereby certify that the enclosed 2 Page Amendment Transmittal; and 10 Page Amendment are being transmitted to the United States Patent and Trademark Office via EFS-Web on October 24, 2016.

Date: October 24, 2016 /Sandy Kim/

Sandy Kim

Mailing Address:

**BLUE CAPITAL LAW FIRM, P.C. (Customer No.: 106622)**
650 Town Center Drive, Suite 1530
Costa Mesa, California 92626
Tel: 714-839-3800
Fax: 714-795-2995

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 27300343 |
| **Application Number:** | 14167405 |
| **International Application Number:** | |
| **Confirmation Number:** | 6471 |
| **Title of Invention:** | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| **First Named Inventor/Applicant Name:** | Yu-Hsuan Guo |
| **Customer Number:** | 106622 |
| **Filer:** | Sang N. Dang/Sandy Kim |
| **Filer Authorized By:** | Sang N. Dang |
| **Attorney Docket Number:** | 1291-235.101 |
| **Receipt Date:** | 24-OCT-2016 |
| **Filing Date:** | 29-JAN-2014 |
| **Time Stamp:** | 14:39:17 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | no |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | | 1291-235-101--ROAof7272016asFiled10242016.pdf | 132448<br>a3748ddc604336143fbee0386b65fb7a5da24293 | yes | 13 |

| | Multipart Description/PDF files in .zip description | | |
|---|---|---|---|
| | **Document Description** | **Start** | **End** |
| | Transmittal Letter | 1 | 2 |
| | Amendment/Req. Reconsideration-After Non-Final Reject | 3 | 3 |
| | Claims | 4 | 9 |
| | Applicant Arguments/Remarks Made in an Amendment | 10 | 12 |
| | Miscellaneous Incoming Letter | 13 | 13 |

| | |
|---|---|
| **Warnings:** | |
| **Information:** | |
| **Total Files Size (in bytes):** | 132448 |

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

# Amendment Transmittal Letter

| Docket Number |
|---|
| 1291-235.101 |

**Address To**
**Commissioner for Patents**
**P.O. Box 1450**
**Alexandria, Virginia 22313-1450**

**Title of Invention**

**METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM**

| | |
|---|---|
| First Named Inventor | **Yu-Hsuan Guo** |
| Application No. | **14/167,405** |
| Filing Date | **January 29, 2014** |
| Examiner | **Hector E. Reyes Ortiz** |
| Art Unit | **2472** |

Transmitted herewith is an amendment in the above-identified application.

The fee has been calculated and is transmitted as shown below.

☐ **Applicant claims Small Entity Status.** See 37 CFR 1.27.

**Fee Calculation**

Claims as Amended

| For | #Filed | #Previously Paid For | #Extra | Rate | Fee |
|---|---|---|---|---|---|
| Total Claims | 29 | - 29 = | | x 80 = | |
| Total Indep. Claims | 4 | - 5 = | | x 420 = | |
| Multiple Dependent Claims (check if applicable) ☐ | | | | | |
| | | | | **TOTAL** | **$0** |

**Method of Payment**

☐ Deposit Account ☐ Credit Card ☐ Check ☐ Money Order ☐ Other: _____

Deposit Account Number

**For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)**

☐ Charge the fee(s) set forth above
☐ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17
☐ Charge fee(s) indicated above, **except for the filing fee**
☐ Credit any overpayments

**WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on form PTO-2038.**

Amount Grand Total **$0**



**Petitioners' Exhibit 1002, p. 402**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

# Amendment Transmittal Letter

| Docket Number |
|---|
| 1291-235.101 |

| Correspondence Address | | | |
|---|---|---|---|
| Customer Number | 106622 | | |
| -OR- | | | |
| Name | | | |
| Address | | | |
| City | | State | |
| Country | | Postal Code | |
| Phone Number | | | |
| E-mail Address | | | |

## Certificate of Mailing by Express Mail

I hereby certify that this Amendment, accompanying documents, and fee (if appropriate) are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on the date indicated below:

*(Date of Mailing)*

*(Typed or Printed Name of Person Mailing Correspondence)*

*(Signature of Person Mailing Correspondence)*

*("Express Mail" Mailing Label Number)*

## Certificate of Mailing by First Class Mail

I hereby certify that this Amendment, accompanying documents, and fee (if appropriate) are being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on the date indicated below:

*(Date of Mailing)* *(Name of Person Mailing Correspondence)*

*(Signature of Person Mailing Correspondence)*

## Certificate of Transmission

I hereby certify that this Amendment, accompanying documents, and fee (if appropriate) authorization are being facsimile transmitted to the United States Patent and Trademark Office on the date indicated below:

*(Date of Transmission)* *(Name of Person Transmitting Correspondence)*

*(Signature of Person Transmitting Correspondence)*

### Signature Instructions

Select the name of the person who will electronically sign the Amendment from the drop-down box below.

If a practitioner is not present in the drop-down list, you must close this form and select 'Add Practitioner...' in the Form Manager's Utility menu.

**Verify that the signatory information is correct and press the 'eSign' button to electronically sign the submission. If you prefer to sign the form manually, simply do not click the 'eSign' button; just print and manually sign.**

**Signatory Drop-Down Box** Sang N. Dang

| Name | Sang N. Dang | | Registration Number | 51,186 |
|---|---|---|---|---|
| Signatory Capacity | Attorney for Applicant(s) | E-mail Address | sdang@bluecapitallaw.com | |
| eSign | /Sang N. Dang/ | | Date Signed | 10/24/2016 |



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IPR2024-00991

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

| PATENT APPLICATION FEE DETERMINATION RECORD<br>Substitute for Form PTO-875 | Application or Docket Number<br>14/167,405 | Filing Date<br>01/29/2014 | ☐ To be Mailed |
|---|---|---|---|

**ENTITY:** ☒ LARGE ☐ SMALL ☐ MICRO

## APPLICATION AS FILED – PART I

| FOR | (Column 1) NUMBER FILED | (Column 2) NUMBER EXTRA | RATE ($) | FEE ($) |
|---|---|---|---|---|
| ☐ BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | |
| ☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | N/A | |
| ☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | minus 20 = | * | X $ = | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | minus 3 = | * | X $ = | |
| ☐ APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | |
| ☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | |

## APPLICATION AS AMENDED – PART II

AMENDMENT **10/24/2016**

| | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|
| Total (37 CFR 1.16(i)) | * 24 | Minus | ** 33 | = 0 | X $80 = | 0 |
| Independent (37 CFR 1.16(h)) | * 4 | Minus | ***5 | = 0 | X $420 = | 0 |
| ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | TOTAL ADD'L FEE | 0 |

AMENDMENT

| | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|
| Total (37 CFR 1.16(i)) | * | Minus | ** | = | X $ = | |
| Independent (37 CFR 1.16(h)) | * | Minus | *** | = | X $ = | |
| ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | TOTAL ADD'L FEE | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
ANNIE C. SINGLETON

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

UNITED STATES PATENT AND TRADEMARK OFFICE

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www.uspto.gov

106622 e 2016-10-31

Blue Capital Law Firm, P.C.
650 Town Center Drive, Suite 1530
Costa Mesa, CA 92626

**Paper No.**

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| | | | |
|---|---|---|---|
| **Application No.:** | **14/167,405** | **Date Mailed:** | **2016-10-31**<br>**ELECTRONIC** |
| First Named Inventor: | Yu-Hsuan Guo | Examiner: | REYES ORTIZ, HECTOR E |
| Attorney Docket No.: | 1291-235.101 | Art Unit: | 2472 |
| Confirmation No.: | 6471 | Filing Date: | 01/29/2014 |

**Please find attached an Office communication concerning this application or proceeding.**

**Commissioner for Patents**

PTO-90c (Rev.08-06)

| Notice of Non-Compliant Amendment (37 CFR 1.121) | Application No. 14/167,405 | Applicant(s) GUO ET AL. |
|---|---|---|

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

The amendment document filed on *24 October, 2016* is considered non-compliant because it has failed to meet the requirements of 37 CFR 1.121 or 1.4. In order for the amendment document to be compliant, correction of the following item(s) is required.

THE FOLLOWING MARKED (X) ITEM(S) CAUSE THE AMENDMENT DOCUMENT TO BE NON-COMPLIANT:

- ☐ 1. Amendments to the specification:
  - ☐ A. Amended paragraph(s) do not include markings.
  - ☐ B. New paragraph(s) should not be underlined.
  - ☐ C. Other _____.
- ☐ 2. Abstract:
  - ☐ A. Not presented on a separate sheet. 37 CFR 1.72.
  - ☐ B. Other _____.
- ☐ 3. Amendments to the drawings:
  - ☐ A. The drawings are not properly identified in the top margin as "Replacement Sheet," "New Sheet," or "Annotated Sheet" as required by 37 CFR 1.121(d).
  - ☐ B. The practice of submitting proposed drawing correction has been eliminated. Replacement drawings showing amended figures, without markings, in compliance with 37 CFR 1.84 are required.
  - ☐ C. Other _____.
- ☒ 4. Amendments to the claims:
  - ☐ A. A complete listing of all of the claims is not present.
  - ☒ B. The listing of claims does not include the text of all pending claims (including withdrawn claims)
  - ☐ C. Each claim has not been provided with the proper status identifier, and as such, the individual status of each claim cannot be identified. Note: the status of every claim must be indicated after its claim number by using one of the following status identifiers: (Original), (Currently amended), (Canceled), (Previously presented), (New), (Not entered), (Withdrawn) and (Withdrawn-currently amended).
  - ☐ D. The claims of this amendment paper have not been presented in ascending numerical order.
  - ☐ E. Other: _____.
- ☐ 5. Other (e.g., the amendment is unsigned or not signed in accordance with 37 CFR 1.4): For further explanation of the amendment format required by 37 CFR 1.121, see MPEP § 714.

TIME PERIODS FOR FILING A REPLY TO THIS NOTICE:

1. Applicant is given **no new time period if the non-compliant amendment is an** after-final amendment or an amendment filed after allowance, or a drawing submission (only) If applicant wishes to resubmit the non-compliant after-final amendment with corrections, the **entire corrected amendment** must be resubmitted.

2. Applicant is given **two months** from the mail date of this notice to supply the correction, if the non-compliant amendment is one of the following: a preliminary amendment, a non-final amendment (including a submission for a request for continued examination (RCE) under 37 CFR 1.114), a supplemental amendment filed within a suspension period under 37 CFR 1.103(a) or (c), and an amendment filed in response to a Quayle action. If any of above boxes 1 to 4 are checked, the correction required is only the corrected section of the non-compliant amendment in compliance with 37 CFR 1.121.

**Extensions of time** are available under 37 CFR 1.136(a) only if the non-compliant amendment is a non-final amendment or an amendment filed in response to a *Quayle* action.

**Failure to timely respond** to this notice will result in:

**Abandonment** of the application if the non-compliant amendment is a non-final amendment or an amendment filed in response to a *Quayle* action; or

**Non-entry** of the amendment if the non-compliant amendment is a preliminary amendment or supplemental amendment.

Legal Instruments Examiner (LIE), if applicable ANNIE C. SINGLETON Telephone No: (571)272-1049



**Petitioners' Exhibit 1002, p. 406**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

| | |
|---|---|
| Appl. No. | : 14/167,405 |
| Confirmation No. | : 6471 |
| Applicant | : Yu-Hsuan Guo |
| Filed | : January 29, 2014 |
| Title | : METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| TC/A.U. | : 2472 |
| Examiner | : Hector E. Reyes Ortiz |
| Docket No. | : 1291-235.101 (IS 1020044-US-D1) |
| Customer No. | : 106622 |

**Response to Notice of Non-Compliant Amendment**

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In response to the Notice of Non-Compliant Amendment mailed on October 31, 2016, Applicant respectfully submits the following amendments.

**Claims** begin on page 2.

**Remarks** begin on page 8.



**Petitioners' Exhibit 1002, p. 407**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

**IN THE CLAIMS:**

1. (Withdrawn) A method for handling inter-node connectivity in a wireless communication system, comprising:

transmitting a request from a first network node to a second network node to stop aggregating a SCell (Secondary Cell) for a UE (User Equipment);

wherein the first network node controls the SCell and the second network node controls PCell (Primary Cell) of the UE.

2. (Withdrawn) The method of claim 1, wherein the request is a SCell release request message.

3. (Withdrawn) The method of claim 1, wherein the first network node and the second network node are eNBs (evolved Node B).

4. (Withdrawn) The method of claim 1, wherein the SCell is a small cell and the PCell is a macro cell.

5. (Withdrawn) The method of claim 1, wherein the request is triggered based on factors including a loading of the SCell and/or whether or not a QoS for the UE could be guaranteed.

6. (Currently Amended) A method for handling inter-node connectivity in a wireless communication system, comprising:

receiving, by a first ~~network node~~ evolved node B (eNB), a first request from a second ~~network node~~ eNB for aggregating a ~~SCell (Secondary Cell)~~ Secondary Cell (SCell) for a ~~UE (User Equipment)~~ User Equipment (UE);

transmitting an accept message from the first ~~network node~~ eNB to the second ~~network node~~ eNB in response to the first request; and

transmitting a second request from the first ~~network node~~ eNB, which controls ~~a first serving cell~~ the SCell of the UE, to the second ~~network node~~ eNB, which controls ~~a second serving cell~~ a Primary Cell (PCell) of the UE, to change a data path for a first radio bearer of the



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UE, wherein the second request does not indicate to change the data path for a third radio bearer of the UE;

wherein a first path is via the first ~~network node~~ eNB and used as the data path for the first radio bearer and the third radio bearer before changing the data path for the first radio bearer.

7. (Currently Amended) The method of claim 6, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the second ~~network node~~ eNB and used as a data path for a second radio bearer of the UE.

8. (Canceled)

9. (Previously Presented) The method of claim 6, wherein the second request includes a cause for data path changing.

10. (Currently Amended) The method of claim 6, wherein the UE has multiple paths via different ~~network nodes~~ eNBs after the data path for the first radio bearer change.

11. (Currently Amended) The method of claim 6, further comprising:

receiving, by the first ~~network node~~ eNB, a confirmation message from the second ~~network node~~ eNB for changing the data path for the first radio bearer.

12. (Currently Amended) The method of claim 6, wherein ~~the first network node is an eNB (evolved Node B) controlling the first serving cell or the SCell of the UE, and the second network node is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE~~ the second request comprises information about loading status of a cell controlled by the first eNB.

13. (Currently Amended) A method for handling inter-node connectivity in a wireless communication system, comprising:

transmitting a first request from a second ~~network node~~ evolved Node B (eNB) to a first ~~network node~~ evolved Node B (eNB) for aggregating a ~~SCell (Secondary Cell)~~ Secondary Cell (SCell) for a ~~UE (User Equipment)~~ User Equipment (UE);



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receiving, by the second ~~network node~~ eNB, an accept message from the first ~~network node~~ eNB in response to the first request;

receiving, by the second ~~network node~~ eNB which controls a ~~second serving cell~~ Primary Cell (PCell) of the UE, a second request from the first ~~network node~~ eNB which controls ~~a first serving cell~~ the SCell of the UE; and

changing a data path for a first radio bearer of the UE and not changing a data path for a third radio bearer of the UE based on the second request;

wherein a first path is via the first ~~network node~~ eNB and used as the data path for the first radio bearer and the third radio bearer before changing the data path for the first radio bearer.

14. (Currently Amended) The method of claim 13, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the second ~~network node~~ eNB and used as a data path for a second radio bearer of the UE.

15. (Canceled)

16. (Currently Amended) The method of claim 13, further comprising:

transmitting a confirmation message from the second ~~network node~~ eNB to the first ~~network node~~ eNB for changing the data path for the first radio bearer.

17. (Currently Amended) The method of claim 13, wherein the UE has multiple paths via different ~~network nodes~~ eNBs after the data path for the first radio bearer change.

18. (Canceled)

19. (Currently Amended) The method of claim 13, wherein the ~~first network node is an eNB (evolved Node B) controlling the first serving cell or the SCell of the UE, and the second network node is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE~~ the second request comprises information about loading status of a cell controlled by the first eNB.

20. (Canceled)



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21. (Currently Amended) The method of claim 6, wherein the first ~~network node~~ eNB terminates transmission and/or reception of the first radio bearer when receiving a confirmation message for the second request.

22. (Currently Amended) A communication device to handle inter-node connectivity in a wireless communication system, comprising:

a control circuit;

a processor installed in the control circuit;

a memory installed in the control circuit and operatively coupled to the processor;

wherein the processor is configured to execute a program code stored in the memory to handle inter-node connectivity by:

receiving, by a first ~~network node~~ evolved node B (eNB), a first request from a second ~~network node~~ eNB for aggregating a ~~SCell (Secondary Cell)~~ Secondary Cell (SCell) for a ~~UE (User Equipment)~~ User Equipment (UE);

transmitting an accept message from the first ~~network node~~ eNB to the second ~~network node~~ eNB in response to the first request; and

transmitting a second request from the first ~~network node~~ eNB, which controls ~~a first serving cell~~ the SCell of the UE, to the second ~~network node~~ eNB, which controls ~~a second serving cell~~ a Primary Cell (PCell) of the UE, to change a data path for a first radio bearer of the UE, wherein the second request does not indicate to change the data path for a third radio bearer of the UE;

wherein a first path is via the first ~~network node~~ eNB and used as the data path for the first radio bearer and the third radio bearer before changing the data path for the first radio bearer.

23. (Currently Amended) The communication device of claim 22, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the ~~network node~~ second eNB and used as a data path for a second radio bearer of the UE.

24. (Canceled)



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25. (Previously Presented) The communication device of claim 22, wherein the second request includes a cause for data path changing.

26. (Currently Amended) The communication device of claim 22, wherein the UE has multiple paths via different ~~network nodes~~ eNBs after the data path for the first radio bearer change.

27. (Currently Amended) The communication device of claim 22, wherein the program code further comprises:

receiving, by the ~~communication device~~ first eNB, a confirmation message from the ~~network node~~ second eNB for changing the data path for the first radio bearer.

28. (Currently Amended) The communication device of claim 22, wherein ~~the communication device is an eNB (evolved Node B) controlling the first serving cell or the SCell of the UE, and the network node is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE~~ the second request comprises information about loading status of a cell controlled by the first eNB.

29. (Currently Amended) The communication device of claim 22, wherein the ~~communication device~~ first eNB terminates transmission and/or reception of the first radio bearer when receiving a confirmation message for the second request.

30. (Currently Amended) A communication device to handle inter-node connectivity in a wireless communication system, comprising:

a control circuit;

a processor installed in the control circuit;

a memory installed in the control circuit and operatively coupled to the processor;

wherein the processor is configured to execute a program code stored in the memory to handle inter-node connectivity by:

transmitting a first request from a second ~~network node~~ evolved Node B (eNB) to a first ~~network node~~ evolved Node B (eNB) for aggregating a ~~SCell (Secondary Cell)~~ Secondary Cell (SCell) for a ~~UE (User Equipment)~~ User Equipment (UE);



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receiving, by the second ~~network node~~ eNB, an accept message from the first ~~network node~~ eNB in response to the first request;

receiving, by the second ~~network node~~ eNB which controls a ~~second serving cell~~ Primary Cell (PCell) of the UE, a second request from the first ~~network node~~ eNB which controls ~~a first serving cell~~ the SCell of the UE; and

changing a data path for a first radio bearer of the UE and not changing a data path for a third radio bearer of the UE based on the second request;

wherein a first path is via the first ~~network node~~ eNB and used as the data path for the first radio bearer and the third radio bearer before changing the data path for the first radio bearer.

31. (Currently Amended) The communication device of claim 30, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the ~~communication device~~ second eNB and used as a data path for a second radio bearer of the UE.

32. (Canceled)

33. (Currently Amended) The communication device of claim 30, wherein the program code further comprises:

transmitting a confirmation message from the ~~communication device~~ second eNB to the ~~network node~~ first eNB for changing the data path for the first radio bearer.

34. (Currently Amended) The communication device of claim 30, wherein the UE has multiple paths via different ~~network nodes~~ eNBs after the data path for the first radio bearer change.

35. (Currently Amended) The communication device of claim 30, wherein ~~the network node is an eNB (evolved Node B) controlling the first serving cell or the SCell of the UE, and the communication device is an eNB controlling the second serving cell or PCell (Primary Cell) of the UE~~ the second request comprises information about loading status of a cell controlled by the first eNB.



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## REMARKS

Claims 6-7, 9-14, 16-17, 19, 21-23, 25-31 and 33-35 are pending in the application. In the Office Action, claims 6-7, 11-12, 21-23, and 27-28 stand rejected under 35 U.S.C. § 103(a) based on the combination of Sambhwani (U.S. Patent Publication No. 2013/0303224; based on U.S. Provisional Application Serial No. 61/646,233), Chen (U.S. Patent Publication No. 2013/0183970), and Horn (U.S. Patent Publication No. 2014/0010207). *See* Office Action, Page 3. Claims 13-14, 16, 19, 29-31, 33, and 35 also stand rejected under 35 U.S.C. § 103(a) based on the combination of Sambhwani, Chen, and Horn. *See* Office Action, Page 8.

Claims 6, 13, 22, and 30 have been amended to incorporate limitations recited in claims 12, 19, 28, and 35 respectively. Furthermore, claims 7, 10, 11, 14, 16, 17, 21, 23, 26, 27, 33, and 34 have been amended to reflect the amendments made to claims 6, 13, 22, and 30. Also, claims 12, 19, 28, and 35 have been amended based on at least the disclosure in Paragraph [0053] of the present application. No new matter has been added. Applicants respectfully request reconsideration of the claims as amended.

As recited in amended claims 6, 13, 22, and 30, the first eNB is generally responsible for (1) receiving a request for SCell aggregation, (2) responding with an accept message to provide and control the SCell, and (3) transmitting a request for data path changing. Furthermore, the second eNB is generally responsible for (1) providing and controlling the PCell, (2) transmitting a request for SCell aggregation, (3) receiving an accept message for SCell aggregation, (4) receiving a request for data path changing, and (5) changing the data path.

In contrast, Sambhwani discloses that the S-RNC is responsible for (1) establishing a first flow between S-RNC and a first network entity (a base station or NodeB) controlled by S-RNC, (2) transmitting a request to D-RNC to establish a second flow between S-RNC and a second network entity controlled by D-RNC, and (3) receiving a response from D-RNC. Sambhwani also discloses that the D-RNC is responsible for (1) receiving a request from S-RNC to establish a second flow between S-RNC and a second network entity controlled by D-RNC, (2) requesting a second network entity to setup a multi-flow leg, and (3) transmitting a response to the S-RNC. Since S-RNC and D-RNC are network nodes which control base stations or nodeBs, the S-RNC and D-RNC disclosed in Sambhwani are ***different and distinguishable*** from the eNBs recited in claims 6 and 13.



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Furthermore, Chen discloses that the target base station is responsible for (1) receiving a switching request from source base station, (2) configuring the SCell, and (3) transmitting a switching request response to source base station. Chen also discloses that the source base station is responsible for (1) transmitting a switching request to the target base station, and (2) receiving a switching request response from the target base station.

As discussed in Sambhwani, S-RNC and D-RNC are network nodes which control base stations or NodeBs. Therefore, it would not be obvious to consider the base stations disclosed in Chen as the RNCs disclosed in Sambhwani. A more straightforward combination would perhaps be to consider the base stations disclosed in Chen as network entities (or base stations) controlled by the RNCs disclosed in Sambhwani. Additionally, there is no teaching that the target base station disclosed in Chen should be considered as the S-RNC disclosed in Sambhwani, and that the source base station disclosed in Chen should be considered as the D-RNC disclosed in Sambhwani.

In addition, Horn discloses that the first base station is responsible for (1) determining to offload at least one data bearer to the second base station, and (2) communicating with the second base station to offload data bearer. Horn also discloses that the second base station is responsible for (1) receiving an offload request message for at least one data bearer sent from the first base station, and (2) admitting the at least one data bearer.

Similarly, it would not be obvious to consider base stations disclosed in Horn as the RNCs disclosed in Sambhwani. Additionally, there is no teaching that the first base station (or the anchor eNB) disclosed in Horn should be considered as the S-RNC disclosed in Sambhwani, and that second base station (or the booster eNB) disclosed in Horn should be considered as the D-RNC disclosed in Sambhwani. There is also no teaching that the first base station disclosed in Horn should be considered as the target base station disclosed in Chen, and that the second base station disclosed in Horn should be considered as the source base station disclosed in Chen.

In summary, there is no incentive to combine Sambhwani, Chen, and Horn in the way described in the Office Action (i.e., combining the S-RNC disclosed in Sambhwani, the target base station disclosed in Chen, and the anchor eNB disclosed in Horn as a single entity). In other words, the Office Action is not evaluating the invention as a whole but rather is picking individual parts of the invention relative to the prior art; which is contrary to 35 U.S.C. § 103(a) as expounded in *Graham v. John Deere Co.* (383 U.S. 1, 148 USPQ 459 (1966)). Applicant respectfully submits that the rationale for combining the prior art can only be based on hindsight



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reasoning, which is improper. Applicant respectfully submits that the Office Action has used the knowledge obtained from the present application to then reconstruct the elements of the claims based on the three prior art references applied in the Office Action.

Based on the foregoing, Applicant respectfully submits that claims 6-7, 9-14, 16-17, 19, 21-23, 25-31, and 33-35 are patentable over any combination of Sambhwani, Chen, and/or Horn.

In view of the foregoing it is respectfully submitted that the pending claims are in condition for allowance. Reconsideration of the rejections is requested. Allowance of the claims is solicited. The Examiner is invited to contact Applicant's undersigned counsel by telephone at (714) 839-3800 to expedite the prosecution of this case should there be any unresolved matters remaining.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made.

Respectfully submitted,
Sang N. Dang
**BLUE CAPITAL LAW FIRM, P.C.**

Dated: October 31, 2016

/Sang N. Dang/
Reg. No. 51,186
Tel.: (714) 839-3800



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**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | | |
|---|---|---|
| Applicants: | Yu-Hsuan Guo and Meng-Hui Ou | |
| Title: | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM | |
| Serial No.: | 14/167,405 | Filed: January 29, 2014 |
| Examiner: | Hector E. Reyes Ortiz | Group Art Unit: 2472 |
| Attorney Docket No.: | 1291-235.101 (IS102004-US-D1) | |

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**CERTIFICATE OF EFS-WEB TRANSMISSION**
**UNDER 37 CFR § 1.8**

I hereby certify that the enclosed 2 Page Amendment Transmittal; and 10 Page Response to Notice of Non-Compliant Amendment are being transmitted to the United States Patent and Trademark Office via EFS-Web on October 31, 2016.

Date: October 31, 2016 /Sandy Kim/
Sandy Kim

Mailing Address:

**BLUE CAPITAL LAW FIRM, P.C. (Customer No.: 106622)**
650 Town Center Drive, Suite 1530
Costa Mesa, California 92626
Tel: 714-839-3800
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# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 27374254 |
| **Application Number:** | 14167405 |
| **International Application Number:** | |
| **Confirmation Number:** | 6471 |
| **Title of Invention:** | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| **First Named Inventor/Applicant Name:** | Yu-Hsuan Guo |
| **Customer Number:** | 106622 |
| **Filer:** | Sang N. Dang/Sandy Kim |
| **Filer Authorized By:** | Sang N. Dang |
| **Attorney Docket Number:** | 1291-235.101 |
| **Receipt Date:** | 31-OCT-2016 |
| **Filing Date:** | 29-JAN-2014 |
| **Time Stamp:** | 16:57:17 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | no |

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | | 1291-235-101--ResponsetoNtcofNonComplian t10312016.pdf | 98341<br>f9870b2f7d0e13dd86490faaec061b23487e d051 | yes | 13 |

| | Multipart Description/PDF files in .zip description | | |
|---|---|---|---|
| | **Document Description** | **Start** | **End** |
| | Transmittal Letter | 1 | 2 |
| | Amendment/Req. Reconsideration-After Non-Final Reject | 3 | 3 |
| | Claims | 4 | 9 |
| | Applicant Arguments/Remarks Made in an Amendment | 10 | 12 |
| | Miscellaneous Incoming Letter | 13 | 13 |
| **Warnings:** | | | |
| **Information:** | | | |
| | **Total Files Size (in bytes):** | 98341 | |

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**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

# Amendment Transmittal Letter

| Docket Number |
|---|
| 1291-235.101 |

**Address To**
**Commissioner for Patents**
**P.O. Box 1450**
**Alexandria, Virginia 22313-1450**

**Title of Invention**

**METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM**

| | |
|---|---|
| First Named Inventor | **Yu-Hsuan Guo** |
| Application No. | **14/167,405** |
| Filing Date | **January 29, 2014** |
| Examiner | **Hector E. Reyes Ortiz** |
| Art Unit | **2472** |

Transmitted herewith is an amendment in the above-identified application.

The fee has been calculated and is transmitted as shown below.

☐ **Applicant claims Small Entity Status.** See 37 CFR 1.27.

**Fee Calculation**

Claims as Amended

| For | #Filed | #Previously Paid For | #Extra | Rate | Fee |
|---|---|---|---|---|---|
| Total Claims | 29 | - 29 = | | x 80 = | |
| Total Indep. Claims | 4 | - 5 = | | x 420 = | |
| Multiple Dependent Claims (check if applicable) ☐ | | | | | |
| | | | | **TOTAL** | **$0** |

**Method of Payment**

☐ Deposit Account ☐ Credit Card ☐ Check ☐ Money Order ☐ Other: _____

Deposit Account Number

**For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)**

☐ Charge the fee(s) set forth above
☐ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17
☐ Charge fee(s) indicated above, **except for the filing fee**
☐ Credit any overpayments

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Amount Grand Total **$0**



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**IPR2024-00991**

# Amendment Transmittal Letter

| Docket Number |
|---|
| 1291-235.101 |

| Correspondence Address | | | |
|---|---|---|---|
| Customer Number | 106622 | | |
| -OR- | | | |
| Name | | | |
| Address | | | |
| City | | State | |
| Country | | Postal Code | |
| Phone Number | | | |
| E-mail Address | | | |

## Certificate of Mailing by Express Mail

I hereby certify that this Amendment, accompanying documents, and fee (if appropriate) are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on the date indicated below:

*(Date of Mailing)*

*(Typed or Printed Name of Person Mailing Correspondence)*

*(Signature of Person Mailing Correspondence)*

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I hereby certify that this Amendment, accompanying documents, and fee (if appropriate) are being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450 on the date indicated below:

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*(Signature of Person Mailing Correspondence)*

## Certificate of Transmission

I hereby certify that this Amendment, accompanying documents, and fee (if appropriate) authorization are being facsimile transmitted to the United States Patent and Trademark Office on the date indicated below:

*(Date of Transmission)* *(Name of Person Transmitting Correspondence)*

*(Signature of Person Transmitting Correspondence)*

### Signature Instructions

Select the name of the person who will electronically sign the Amendment from the drop-down box below.

If a practitioner is not present in the drop-down list, you must close this form and select 'Add Practitioner...' in the Form Manager's Utility menu.

**Verify that the signatory information is correct and press the 'eSign' button to electronically sign the submission. If you prefer to sign the form manually, simply do not click the 'eSign' button; just print and manually sign.**

**Signatory Drop-Down Box** Sang N. Dang

| Name | Sang N. Dang | | Registration Number | 51,186 |
|---|---|---|---|---|
| Signatory Capacity | Attorney for Applicant(s) | E-mail Address | sdang@bluecapitallaw.com | |
| eSign | /Sang N. Dang/ | | Date Signed | 10/31/2016 |



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PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

| PATENT APPLICATION FEE DETERMINATION RECORD<br>Substitute for Form PTO-875 | Application or Docket Number<br>14/167,405 | Filing Date<br>01/29/2014 | ☐ To be Mailed |
|---|---|---|---|

**ENTITY:** ☒ LARGE ☐ SMALL ☐ MICRO

## APPLICATION AS FILED – PART I

| FOR | (Column 1) NUMBER FILED | (Column 2) NUMBER EXTRA | RATE ($) | FEE ($) |
|---|---|---|---|---|
| ☐ BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | |
| ☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | N/A | |
| ☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | minus 20 = | * | X $ = | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | minus 3 = | * | X $ = | |
| ☐ APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | |
| ☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | |

## APPLICATION AS AMENDED – PART II

AMENDMENT **10/31/2016**

| | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|
| Total (37 CFR 1.16(i)) | * 29 | Minus | ** 33 | = 0 | X $80 = | 0 |
| Independent (37 CFR 1.16(h)) | * 5 | Minus | ***5 | = 0 | X $420 = | 0 |
| ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | TOTAL ADD'L FEE | 0 |

AMENDMENT

| | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|
| Total (37 CFR 1.16(i)) | * | Minus | ** | = | X $ = | |
| Independent (37 CFR 1.16(h)) | * | Minus | *** | = | X $ = | |
| ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | TOTAL ADD'L FEE | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
DIANE FLOYD

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

| PATENT APPLICATION FEE DETERMINATION RECORD<br>Substitute for Form PTO-875 | Application or Docket Number<br>14/167,405 | Filing Date<br>01/29/2014 | ☐ To be Mailed |
|---|---|---|---|

**ENTITY**: ☒ LARGE ☐ SMALL ☐ MICRO

## APPLICATION AS FILED – PART I

| FOR | (Column 1) NUMBER FILED | (Column 2) NUMBER EXTRA | RATE ($) | FEE ($) |
|---|---|---|---|---|
| ☐ BASIC FEE (37 CFR 1.16(a), (b), or (c)) | N/A | N/A | N/A | |
| ☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m)) | N/A | N/A | N/A | |
| ☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q)) | N/A | N/A | N/A | |
| TOTAL CLAIMS (37 CFR 1.16(i)) | minus 20 = | * | X $ = | |
| INDEPENDENT CLAIMS (37 CFR 1.16(h)) | minus 3 = | * | X $ = | |
| ☐ APPLICATION SIZE FEE (37 CFR 1.16(s)) | If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s). | | | |
| ☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j)) | | | | |
| * If the difference in column 1 is less than zero, enter "0" in column 2. | | | TOTAL | |

## APPLICATION AS AMENDED – PART II

| AMENDMENT | 04/14/2017 | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|---|
| | Total (37 CFR 1.16(i)) | * 24 | Minus | ** 33 | = 0 | X $80 = | 0 |
| | Independent (37 CFR 1.16(h)) | * 4 | Minus | ***5 | = 0 | X $420 = | 0 |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | | TOTAL ADD'L FEE | 0 |

| AMENDMENT | | (Column 1) CLAIMS REMAINING AFTER AMENDMENT | | (Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR | (Column 3) PRESENT EXTRA | RATE ($) | ADDITIONAL FEE ($) |
|---|---|---|---|---|---|---|---|
| | Total (37 CFR 1.16(i)) | * | Minus | ** | = | X $ = | |
| | Independent (37 CFR 1.16(h)) | * | Minus | *** | = | X $ = | |
| | ☐ Application Size Fee (37 CFR 1.16(s)) | | | | | | |
| | ☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j)) | | | | | | |
| | | | | | | TOTAL ADD'L FEE | |

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
DONNA 1. SMALLS LOGAN

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

# NOTICE OF ALLOWANCE AND FEE(S) DUE

106622 7590 04/20/2017

Blue Capital Law Firm, P.C.
650 Town Center Drive, Suite 1530
Costa Mesa, CA 92626

| EXAMINER |
|---|
| REYES ORTIZ, HECTOR E |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2472 | |

DATE MAILED: 04/20/2017

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 14/167,405 | 01/29/2014 | Yu-Hsuan Guo | 1291-235.101 | 6471 |

TITLE OF INVENTION: METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM

| APPLN. TYPE | ENTITY STATUS | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE |
|---|---|---|---|---|---|---|
| nonprovisional | UNDISCOUNTED | $960 | $0 | $0 | $960 | 07/20/2017 |

**THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.**

**THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.**

**HOW TO REPLY TO THIS NOTICE:**

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.**





Petitioners' Exhibit 1002, p. 424
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

# PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail** **Mail Stop ISSUE FEE**
**Commissioner for Patents**
**P.O. Box 1450**
**Alexandria, Virginia 22313-1450**
**or Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

106622 7590 04/20/2017
Blue Capital Law Firm, P.C.
650 Town Center Drive, Suite 1530
Costa Mesa, CA 92626

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

**Certificate of Mailing or Transmission**
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

| |
|---|
| (Depositor's name) |
| (Signature) |
| (Date) |

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 14/167,405 | 01/29/2014 | Yu-Hsuan Guo | 1291-235.101 | 6471 |

TITLE OF INVENTION: METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM

| APPLN. TYPE | ENTITY STATUS | ISSUE FEE DUE | PUBLICATION FEE DUE | PREV. PAID ISSUE FEE | TOTAL FEE(S) DUE | DATE DUE |
|---|---|---|---|---|---|---|
| nonprovisional | UNDISCOUNTED | $960 | $0 | $0 | $960 | 07/20/2017 |

| EXAMINER | ART UNIT | CLASS-SUBCLASS |
|---|---|---|
| REYES ORTIZ, HECTOR E | 2472 | 370-331000 |

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
- ❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:
- ❑ Issue Fee
- ❑ Publication Fee (No small entity discount permitted)
- ❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
- ❑ A check is enclosed.
- ❑ Payment by credit card. Form PTO-2038 is attached.
- ❑ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
- ❑ Applicant certifying micro entity status. See 37 CFR 1.29 — NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
- ❑ Applicant asserting small entity status. See 37 CFR 1.27 — NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
- ❑ Applicant changing to regular undiscounted fee status. — NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____



Petitioners' Exhibit 1002, p. 425
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 14/167,405 | 01/29/2014 | Yu-Hsuan Guo | 1291-235.101 | 6471 |

106622 7590 04/20/2017

Blue Capital Law Firm, P.C.
650 Town Center Drive, Suite 1530
Costa Mesa, CA 92626

| EXAMINER | |
|---|---|
| REYES ORTIZ, HECTOR E | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2472 | |

DATE MAILED: 04/20/2017

**Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)**
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.



Petitioners' Exhibit 1002, p. 426
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

## OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

## Privacy Act Statement

**The Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

| Notice of Allowability | Application No. 14/167,405 | Applicant(s) GUO ET AL. | |
|---|---|---|---|
| | Examiner HECTOR REYES | Art Unit 2472 | AIA (First Inventor to File) Status No |

***-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--***

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *the amendments filed on 10/31/2016*.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on_____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *6-7, 9-14, 16-17, 19, 21-23, 25-31, and 33-35*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   **Certified copies:**

   a) ☐ All b) ☐ Some *c) ☐ None of the:
   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE**.

5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   **Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
5. ☒ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☒ Other *See Continuation Sheet*.

/ANH-VU LY/
Primary Examiner, Art Unit 2472



**Petitioners' Exhibit 1002, p. 428**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

Continuation of Attachment(s) 7. Other: Examiner amendments.pdf on the OA appendix..



**Petitioners' Exhibit 1002, p. 429**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

| Issue Classification | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 14167405 | GUO ET AL. |
| | **Examiner** | **Art Unit** |
| | HECTOR REYES ORTIZ | 2472 |

| CPC | | | | | | |
|---|---|---|---|---|---|---|
| **Symbol** | | | | | **Type** | **Version** |
| H04W | | 76 | / | 064 | F | 2013-01-01 |
| H04W | | 36 | / | 28 | A | 2013-01-01 |
| H04W | | 92 | / | 20 | A | 2013-01-01 |
| H04L | | 5 | / | 0098 | A | 2013-01-01 |
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| **Symbol** | | | | | **Type** | **Set** | **Ranking** | **Version** |
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|---|---|---|---|
| /H.R./<br>Examiner.Art Unit 2472<br><br>(Assistant Examiner) | 04/13/2017<br><br>(Date) | **Total Claims Allowed:**<br>24 | |
| /ANH-VU LY/<br>Primary Examiner.Art Unit 2472<br><br>(Primary Examiner) | 04/13/2017<br><br>(Date) | O.G. Print Claim(s)<br>1 | O.G. Print Figure<br>6 |

| Issue Classification | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 14167405 | GUO ET AL. |
| | **Examiner** | **Art Unit** |
| | HECTOR REYES ORTIZ | 2472 |

| US ORIGINAL CLASSIFICATION | | INTERNATIONAL CLASSIFICATION | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CLASS | SUBCLASS | CLAIMED | | | | | NON-CLAIMED | | | | | |
| | | H | 0 | 4 | W | 36 / 08 (2009.01.01) | | | | | | |
| CROSS REFERENCE(S) | | | | | | | | | | | | |
| CLASS | SUBCLASS (ONE SUBCLASS PER BLOCK) | | | | | | | | | | | |
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| /H.R./<br>Examiner.Art Unit 2472 | 04/13/2017 | **Total Claims Allowed:** | |
| (Assistant Examiner) | (Date) | 24 | |
| /ANH-VU LY/<br>Primary Examiner.Art Unit 2472 | 04/13/2017 | O.G. Print Claim(s) | O.G. Print Figure |
| (Primary Examiner) | (Date) | 1 | 6 |



**Petitioners' Exhibit 1002, p. 431**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

| Issue Classification | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 14167405 | GUO ET AL. |
| | **Examiner** | **Art Unit** |
| | HECTOR REYES ORTIZ | 2472 |

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

| Final | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original | Final | Original |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| - | 1 | 10 | 17 | 22 | 33 | | | | | | | | | | |
| - | 2 | - | 18 | 23 | 34 | | | | | | | | | | |
| - | 3 | 11 | 19 | 24 | 35 | | | | | | | | | | |
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| - | 5 | 12 | 21 | | | | | | | | | | | | |
| 1 | 6 | 13 | 22 | | | | | | | | | | | | |
| 2 | 7 | 14 | 23 | | | | | | | | | | | | |
| - | 8 | - | 24 | | | | | | | | | | | | |
| 3 | 9 | 15 | 25 | | | | | | | | | | | | |
| 4 | 10 | 16 | 26 | | | | | | | | | | | | |
| 5 | 11 | 17 | 27 | | | | | | | | | | | | |
| 6 | 12 | 18 | 28 | | | | | | | | | | | | |
| 7 | 13 | 19 | 29 | | | | | | | | | | | | |
| 8 | 14 | 20 | 30 | | | | | | | | | | | | |
| - | 15 | 21 | 31 | | | | | | | | | | | | |
| 9 | 16 | - | 32 | | | | | | | | | | | | |

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| /H.R./<br>Examiner.Art Unit 2472<br><br>(Assistant Examiner) | 04/13/2017<br><br>(Date) | **Total Claims Allowed:**<br>24 | |
| /ANH-VU LY/<br>Primary Examiner.Art Unit 2472<br><br>(Primary Examiner) | 04/13/2017<br><br>(Date) | O.G. Print Claim(s)<br>1 | O.G. Print Figure<br>6 |



**Petitioners' Exhibit 1002, p. 432**
**AT&T et al v. Innovative Sonic & Celerity**
**IPR2024-00991**

## Examiner Amendments

1. (Cancel)

2. (Cancel)

3. (Cancel)

4. (Cancel)

5. (Cancel)

6. (Previously Presented) A method for handling inter-node connectivity in a wireless communication system, comprising:

receiving, by a first evolved node B (eNB), a first request from a second eNB for aggregating a Secondary Cell (SCell) for a User Equipment (UE);

transmitting an accept message from the first eNB to the second eNB in response to the first request; and

transmitting a second request from the first eNB, which controls the SCell of the UE, to the second eNB, which controls a Primary Cell (PCell) of the UE, to change a data path for a first radio bearer of the UE, wherein the second request does not indicate to change the data path for a third radio bearer of the UE;

wherein a first path is via the first eNB and used as the data path for the first radio bearer and the third radio bearer before changing the data path for the first radio bearer.

7. (Previously Presented) The method of claim 6, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the second eNB and used as a data path for a second radio bearer of the UE.

8. (Cancel)

9. (Previously Presented) The method of claim 6, wherein the second request includes a cause for data path changing.

10. (Previously Presented) The method of claim 6, wherein the UE has multiple paths via different eNBs after the data path for the first radio bearer change.

11. (Previously Presented) The method of claim 6, further comprising:

receiving, by the first eNB, a confirmation message from the second eNB for changing the data path for the first radio bearer.

12. (Previously Presented) The method of claim 6, wherein the second request comprises information about loading status of a cell controlled by the first eNB.

13. (Previously Presented) A method for handling inter-node connectivity in a wireless communication system, comprising:

transmitting a first request from a second evolved Node B (eNB) to a first evolved Node B (eNB) for aggregating a Secondary Cell (SCell) for a User Equipment (UE);

receiving, by the second eNB, an accept message from the first eNB in response to the first request;

receiving, by the second eNB which controls a Primary Cell (PCell) of the UE, a second request from the first eNB which controls the SCell of the UE; and

changing a data path for a first radio bearer of the UE and not changing a data path for a third radio bearer of the UE based on the second request;

wherein a first path is via the first eNB and used as the data path for the first radio bearer and the third radio bearer before changing the data path for the first radio bearer.

14. (Previously Presented) The method of claim 13, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the second eNB and used as a data path for a second radio bearer of the UE.

15. (Cancel)

16. (Previously Presented) The method of claim 13, further comprising:

transmitting a confirmation message from the second eNB to the first eNB for changing the data path for the first radio bearer.

17. (Previously Presented) The method of claim 13, wherein the UE has multiple paths via different eNBs after the data path for the first radio bearer change.

18. (Cancel)

19. (Previously Presented) The method of claim 13, wherein the second request comprises information about loading status of a cell controlled by the first eNB.

20. (Cancel)

21. (Previously Presented) The method of claim 6, wherein the first eNB terminates transmission and/or reception of the first radio bearer when receiving a confirmation message for the second request.

22. (Previously Presented) A communication device to handle inter-node connectivity in a wireless communication system, comprising:

a control circuit;

a processor installed in the control circuit;

a memory installed in the control circuit and operatively coupled to the processor;

wherein the processor is configured to execute a program code stored in the memory to handle inter-node connectivity by:

receiving, by a first evolved node B (eNB), a first request from a second eNB for aggregating a Secondary Cell (SCell) for a User Equipment (UE);

transmitting an accept message from the first eNB to the second eNB in response to the first request; and

transmitting a second request from the first eNB, which controls the SCell of the UE, to the second eNB, which controls a Primary Cell (PCell) of the UE, to change a data path for a first radio bearer of the UE, wherein the second request does not indicate to change the data path for a third radio bearer of the UE;

wherein a first path is via the first eNB and used as the data path for the first radio bearer and the third radio bearer before changing the data path for the first radio bearer.

23. (Previously Presented) The communication device of claim 22, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the second eNB and used as a data path for a second radio bearer of the UE.

24. (Cancel)

25. (Previously Presented) The communication device of claim 22, wherein the second request includes a cause for data path changing.

26. (Previously Presented) The communication device of claim 22, wherein the UE has multiple paths via different eNBs after the data path for the first radio bearer change.

27. (Previously Presented) The communication device of claim 22, wherein the program code further comprises:

receiving, by the first eNB, a confirmation message from the second eNB for changing the data path for the first radio bearer.

28. (Previously Presented) The communication device of claim 22, wherein the second request comprises information about loading status of a cell controlled by the first eNB.

29. (Previously Presented) The communication device of claim 22, wherein the first eNB terminates transmission and/or reception of the first radio bearer when receiving a confirmation message for the second request.

30. (Previously Presented) A communication device to handle inter-node connectivity in a wireless communication system, comprising:

a control circuit;

a processor installed in the control circuit;

a memory installed in the control circuit and operatively coupled to the processor;

wherein the processor is configured to execute a program code stored in the memory to handle inter-node connectivity by:

transmitting a first request from a second evolved Node B (eNB) to a first evolved Node B (eNB) for aggregating a Secondary Cell (SCell) for a User Equipment (UE);

receiving, by the second eNB, an accept message from the first eNB in response to the first request;

receiving, by the second eNB which controls a Primary Cell (PCell) of the UE, a second request from the first eNB which controls the SCell of the UE; and

changing a data path for a first radio bearer of the UE and not changing a data path for a third radio bearer of the UE based on the second request;

wherein a first path is via the first eNB and used as the data path for the first radio bearer and the third radio bearer before changing the data path for the first radio bearer.

31. (Previously Presented) The communication device of claim 30, wherein the data path for the first radio bearer is changed to a second path, wherein the second path is via the second eNB and used as a data path for a second radio bearer of the UE.

32. (Cancel)

33. (Previously Presented) The communication device of claim 30, wherein the program code further comprises:

transmitting a confirmation message from the second eNB to the first eNB for changing the data path for the first radio bearer.

34. (Previously Presented) The communication device of claim 30, wherein the UE has multiple paths via different eNBs after the data path for the first radio bearer change.

35. (Previously Presented) The communication device of claim 30, wherein the second request comprises information about loading status of a cell controlled by the first eNB.

**EAST Search History**

**EAST Search History (Interference)**

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|---|---|---|---|---|---|---|
| S120 | 0 | (PCell SAME SCELL SAME path SAME chang$3).CLM. | US-PGPUB; USPAT | ADJ | ON | 2017/04/13 14:39 |
| S121 | 4 | (PCell SAME SCELL SAME path).CLM. | US-PGPUB; USPAT | ADJ | ON | 2017/04/13 14:39 |
| S123 | 3 | (PCell SAME SCELL SAME bearer).CLM. | US-PGPUB; USPAT | ADJ | ON | 2017/04/13 14:40 |
| S124 | 12 | (PCell SAME SCELL SAME (chang$3 \| modif$7)).CLM. | US-PGPUB; USPAT | ADJ | ON | 2017/04/13 14:42 |

**4/13/2017 2:56:46 PM**
**C:\Users\hreyes\Desktop\Work\Applications\14167405_Carrier Aggregation - Path selection_F\14167405_EAST.wsp**

| Search Notes | Application/Control No. | Applicant(s)/Patent Under Reexamination |
|---|---|---|
| | 14167405 | GUO ET AL. |
| | Examiner | Art Unit |
| | HECTOR REYES ORTIZ | 2472 |

| CPC- SEARCHED | | |
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| Symbol | Date | Examiner |
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| CPC COMBINATION SETS - SEARCHED | | |
|---|---|---|
| Symbol | Date | Examiner |
| | | |

| US CLASSIFICATION SEARCHED | | | |
|---|---|---|---|
| Class | Subclass | Date | Examiner |
| | | | |

| SEARCH NOTES | | |
|---|---|---|
| Search Notes | Date | Examiner |
| Consulted Restriction | 9/29/2015 | HR |
| Consulted CPC | 9/29/2015 | HR |
| Consulted Search Strategy | 9/29/2015 | HR |
| Performed Double Patenting search | 9/29/2015 | HR |
| Performed NPL search | 9/29/2015 | HR |
| Performed text search in combination with the following CPC groups: H04W76/025, 064; H04L5/0096; H04W92/20; H04W36/385, 30, 04-08; H04W28/10,12 -- See EAST printout | 9/29/2015 | HR |
| Performed search update | 4/1/2016 | HR |
| Performed search update | 7/22/2016 | HR |
| Consulted allowability | 4/13/2017 | HR |

| INTERFERENCE SEARCH | | | |
|---|---|---|---|
| US Class/ CPC Symbol | US Subclass / CPC Group | Date | Examiner |
| | Performed interference search -- See EAST printout | 4/13/2017 | HR |

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| /H.R./<br>Examiner.Art Unit 2472 | |



Petitioners' Exhibit 1002, p. 440
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

**EAST Search History**

**EAST Search History (Prior Art)**

| Ref # | Hits | Search Query | DBs | Default Operator | Plurals | Time Stamp |
|---|---|---|---|---|---|---|
| S3 | 1 | (APP-000) \| 14/167405.APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:22 |
| S4 | 4 | (FMID-000) \| ("50002584".FMID.) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:22 |
| S5 | 99 | (INV-000) \| ( ((Yu \| Hsuan) near2 (Guo)).INV. & (( Meng \| Hui) near2 (Ou)).INV. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:24 |
| S6 | 23 | (INV-000) \| ( ((Yu \| Hsuan) near2 (Guo)).INV. & (( Meng \| Hui) near2 (Ou)).INV. ) & ( (cell).CLM. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:25 |
| S7 | 1 | (INV-000) \| ( ((Yu \| Hsuan) near2 (Guo)).INV. & (( Meng \| Hui) near2 (Ou)).INV. ) & ( (path).CLM. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:27 |
| S8 | 798 | (AS-000) \| ( (INNOVATIVE NEAR2 SONIC).AS. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:28 |
| S9 | 26 | (AS-000) \| ( (INNOVATIVE NEAR2 SONIC).AS. ) & ( path ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 16:28 |
| S10 | 256 | (CLM-000) \| ( (path).CLM. NEAR5 | US-PGPUB; | ADJ | ON | 2015/09/10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | (different \| ((first \| primary) & second$3) \| multi$3).CLM. ) SAME ( (differentiated \| service type \| QoS \| quality of service).CLM. ) | USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | | | 17:15 |
| S11 | 27 | (CLM-000) \| ( (path).CLM. NEAR5 (different \| ((first \| primary) & second$3) \| multi$3).CLM. ) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!).CLM. ) & ( (differentiated \| service type \| QoS \| quality of service).CLM. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 17:54 |
| S15 | 15 | (IDS-000) \| ( (US "20120106511") \| (EP "2448325" \| US "20120106510") \| (JP "2014022895" \| US "20150195837") \| ("1020120046692" \| KR "20120046692" \| US "20120106510") ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 18:57 |
| S18 | 176 | (CPC-Classification) \| ( (path).CLM. NEAR5 (different \| ((first \| primary) & second$3) \| multi$3) ) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) & ( (differentiated \| service type \| QoS \| quality of service) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 20:08 |
| S19 | 2058 | (CPC-Classification) \| ( (path) NEAR5 (different \| ((first \| primary) & second$3) \| multi$3) ) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) & ( (differentiated \| service type \| QoS \| quality of service) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 20:08 |
| S20 | 4 | (CPC-000-CAT) \| ( (H04W76/064 & H04L5/0096 & H04W92/20 & H04W36/28).cpc. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 20:24 |
| S21 | 4 | (CPC-000-CAT) \| ( (H04W76/064 & H04L5/0096 & H04W92/20 ).cpc. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 20:24 |
| S22 | 22 | (CPC-000-CAT) \| ( (H04W76/064 & H04L5/0096).cpc. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/10 20:25 |
| S23 | 3208 | (CPC-000-CarrierAggregation-Schedulling-ConnectionManagement) \| ( (H04L5/$ \| H04L5/009$ \| H04L5/0096).CPC. & (H04W72/$ \| H04W72/12$ \| H04W72/0406 \| H04W72/042).CPC. & (H04W76/$ \| H04W76/06$ \| | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; | ADJ | ON | 2015/09/17 10:10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | H04E76/064).CPC. ) | IBM_TDB | | | |
| S24 | 56 | (CPC-000-CarrierAggregation-Schedulling-ConnectionManagement) \| ( (H04L5/009$ \| H04L5/0096).CPC. & (H04W72/12$ \| H04W72/0406 \| H04W72/042).CPC. & (H04W76/06$ \| H04E76/064).CPC. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 10:10 |
| S25 | 217 | (CPC-000-CarrierAggregation-ConnectionManagement) \| ( (H04L5/009$ \| H04L5/0096).CPC. & (H04W76/06$ \| H04E76/064).CPC. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 10:25 |
| S27 | 133 | (CPC-000-CarrierAggregation) \| ( (H04L5/$).CPC. & (rerout$3 \| re rout$3) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 10:41 |
| S32 | 2458 | H04W$/$.CPC. & ( (path \| carrier \| CC \| componet ) NEAR5 (different \| ((first \| primary) & second$3) \| multi$3) ) NEAR10 ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) SAME10 ( (differentiated \| service type \| QoS \| quality of service \| quality) ) & (carrier aggregation \| CA! \| component carrier \| CC! \| multicomponent \| multicarrier) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 14:03 |
| S33 | 1732 | H04W$/$.CPC. & ( (path \| carrier \| CC \| componet ) NEAR5 (different \| ((first \| primary) & second$3) \| multi$3) ) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) SAME (carrier aggregation \| CA! \| component carrier \| CC! \| multicomponent \| multicarrier) ) SAME10 ( (differentiated \| service type \| QoS \| quality of service \| quality) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 14:13 |
| S34 | 195 | H04W76/$.CPC. & ( (path \| carrier \| CC \| componet ) NEAR5 (different \| ((first \| primary) & second$3) \| multi$3) ) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) SAME (carrier aggregation \| CA! \| component carrier \| CC! \| multicomponent \| multicarrier) ) SAME10 ( (differentiated \| service type \| QoS \| quality of service \| quality) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/17 14:14 |
| S35 | 1469 | H04W$/$.CPC. & ( ( (first \| primary \| serving \| PCC \| PCell) & (second$3 \| SCC \| SCell) ) NEAR5 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) SAME10 ( (differentiated \| service type \| QoS \| quality of service \| quality) & (carrier aggregation \| CA! \| component carrier \| CC! \| multicomponent \| multicarrier) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/18 10:19 |

| | | | | | | |
|---|---|---|---|---|---|---|
| S36 | 1 | ("2009/0191881").URPN. | USPAT | ADJ | ON | 2015/09/18 11:34 |
| S37 | 29 | ("20010016493" \| "20010030953" \| "20020091326" \| "20040043767" \| "20040053614" \| "20040203784" \| "20050153743" \| "20070129075" \| "20070293226" \| "20090052330" \| "20090061878" \| "20090117900" \| "20090191881" \| "20100167744" \| "20100173626" \| "20100178920" \| "20100190451" \| "20100267378" \| "20100291931" \| "20110064016" \| "20110256871" \| "20120094706" \| "4045794" \| "5095500" \| "5805666" \| "6611688" \| "8457638" \| "8472359" \| "8515415").PN. OR ("8971871").URPN. | US-PGPUB; USPAT; USOCR | ADJ | ON | 2015/09/18 11:35 |
| S38 | 4312 | H04W$/$.CPC. & ( (carrier \| CC!) NEAR5 (quality) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/18 11:41 |
| S39 | 90 | H04W$/$.CPC. & ( (carrier \| CC!) NEAR5 (quality) SAME degradat$3 ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/18 11:42 |
| S40 | 11 | (NPL-000) \|( ("8706124".pn.) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/18 13:19 |
| S41 | 27 | ("20020055343" \| "20040171384" \| "20050021885" \| "20050117601" \| "20050163093" \| "20050243849" \| "20060114813" \| "20070060082" \| "20070153729" \| "20070214490" \| "20070262913" \| "20080076353" \| "20090137206" \| "20090175374" \| "20090318075" \| "20100122284" \| "20100142416" \| "20100208633" \| "20100259682" \| "20100332822" \| "20110053521" \| "6760772" \| "7590426" \| "7639706" \| "8045922" \| "8102853" \| "8218654").PN. OR ("8706124").URPN. | US-PGPUB; USPAT; USOCR | ADJ | ON | 2015/09/18 13:20 |
| S44 | 396 | H04W76/$.CPC. & ( (path \| carrier \| CC \| componet) SAME ((first \| primary) & second$3)) SAME10 (carrier aggregation \| CA! \| component carrier \| CC! \| multicomponent \| multicarrier \| multiband \| multichannel) SAME10 ( (differentiated \| service type \| QoS \| quality of service \| quality) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/23 11:51 |
| S45 | 5 | (EDAN-14433541) \| ( ("20120094608" \| "20120236801").PN. ) | US-PGPUB; USPAT; USOCR; FPRS; | ADJ | ON | 2015/09/23 13:21 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | EPO; JPO; DERWENT; IBM_TDB | | | |
| S46 | 5 | ("2011/0103327").URPN. | USPAT | ADJ | ON | 2015/09/23 14:35 |
| S47 | 46 | H04W76/$.CPC. & ( (datapath \| path \| $3carrier \| CC \| component \| pdn ) NEAR5 (first \| primary \| serving \| second$3) ) SAME (inter (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| node) ) & ( (differentiated \| service type \| QoS \| quality of service \| quality) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 14:43 |
| S48 | 25 | H04W76/$.CPC. & H04W36/$.CPC. & H04W28/$.CPC. & (inter (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| node)) & (differentiated \| service type \| QoS \| quality of service \| quality) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 14:45 |
| S49 | 25 | (H04W76/064.CPC. \| H04W36/385.CPC. \| H04W28/0268.CPC. \| H04W40/12.CPC) & (inter (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| node)) & (differentiated \| service type \| QoS \| quality of service \| quality) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 14:56 |
| S50 | 2265 | (CPC-000-ReleaseConnection-ReselectionCore-TrafficMGMT-PathFinding) \| (H04W76/064.CPC. & (H04W36/385.CPC. \| H04W36/30 \| H04W36/04-08) \| (H04W28/0268.CPC. \| H04W40/12.CPC)) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 15:48 |
| S52 | 91 | (CPC-000-ReleaseConnection-ReselectionCore-TrafficMGMT-PathFinding) \| (H04W76/064.CPC. & (H04W36/385.CPC. \| H04W36/30 \| H04W36/04-08) \| (H04W28/0268.CPC. \| H04W40/12.CPC)) & (carrier aggregation \| component carrier \| multicomponent \| multicarrier \| multiband \| multichannel) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 15:52 |
| S54 | 175 | (CPC-000-ReleaseConnection-ReselectionCore-TrafficMGMT-PathFinding) \| ((H04W36/385.CPC. \| H04W36/30 \| H04W36/04-08)) & (carrier aggregation \| component carrier \| multicomponent \| multicarrier \| multiband \| multichannel) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 16:04 |
| S55 | 1219 | (H04W76/$) & (carrier aggregation \| component carrier \| multicomponent \| multicarrier \| multiband \| multichannel) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 16:14 |
| S56 | 178 | (H04W76/$) & (carrier aggregation \| component carrier \| multicomponent \| multicarrier \| multiband \| multichannel) & (differentiated \| service type \| QoS \| | US-PGPUB; USPAT; USOCR; FPRS; | ADJ | ON | 2015/09/24 16:15 |



**Petitioners' Exhibit 1002, p. 445**
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**IPR2024-00991**

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| | | quality of service \| quality) NOT ( (handover \| handoff \| hand (over \|off)) ) | EPO; JPO; DERWENT; IBM_TDB | | | |
| S59 | 308 | H04W$/$.CPC. & (inter (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| node)) SAME request SAME5 ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 16:42 |
| S60 | 3 | ("2013/0176988").URPN. | USPAT | ADJ | ON | 2015/09/24 16:55 |
| S61 | 144 | H04W$/$.CPC. & ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) SAME (reconfigur$5) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) WITH (request$3) WITH (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 19:19 |
| S62 | 520 | H04W76/$.CPC. & ( ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) SAME ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| first \| primary \| serving) NEAR10 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| second$3 \| serving \| other \| neighbor$5) SAME (request$3) ) SAME10 ( (quality \| service type \| differentiated \| QOS \| QOE \| CQI \| CSI \| TOS ) ) ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 20:25 |
| S63 | 8 | (EDAN-000-14224825) \|( ("20090253426" \| "20120005177" \| "20090253426" \| "20120005177" \| "20080167041" \| "20080167041").PN. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 20:57 |
| S64 | 65 | H04W28/10-12.CPC. & ( ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) SAME ( (eNB \| eNode$1 \| $1NodeB \| | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 21:34 |

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|---|---|---|---|---|---|---|
| | | (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| first \| primary \| serving) NEAR10 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS! \| second$3 \| serving \| other \| neighbor$5) SAME (request$3) ) SAME10 ( (quality \| service type \| differentiated \| QOS \| QOE \| CQI \| CSI \| TOS ) ) ) NOT ( (handover \| handoff \| hand (over \|off)) ) | | | | |
| S65 | 207 | (H04W28/$.CPC. & H04W76/$.CPC. & H04W36/$.CPC. & H04W92/20.CPC.) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 21:41 |
| S66 | 5 | (H04W28/10,12.CPC. & H04W76/$.CPC. & H04W36/$.CPC. & H04W92/20.CPC.) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 22:13 |
| S67 | 30 | ( H04W76/$.CPC. & H04W36/16,22,28.CPC. & H04W28/10,12.CPC. ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 22:15 |
| S68 | 356 | ( H04W76/025,064.CPC. &( H04W36/16,22,28.CPC. \| H04W28/10,12.CPC.) ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 22:19 |
| S69 | 293 | ( (H04W76/025,064.CPC. \| H04W36/16,22,28.CPC.) & H04W28/10,12.CPC. ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 22:19 |
| S70 | 413 | ( (H04W76/025,064.CPC. \| H04W28/10,12.CPC.) & H04W36/16,22,28.CPC. ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/24 22:20 |
| S71 | 724 | H04W76/$.CPC. & ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ADJ5 (request$3) ADJ5 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/28 18:29 |
| S72 | 51 | H04W76/$.CPC. & ( (eNB \| eNode$1 \| | US-PGPUB; | ADJ | ON | 2015/09/28 |

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|---|---|---|---|---|---|---|
| | | $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ADJ5 (reallocat$3 \| reconfigur$5) ADJ5 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | | | 19:00 |
| S73 | 322 | H04W$/$.CPC. & ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ADJ5 (reallocat$3 \| reconfigur$5) ADJ5 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/28 19:20 |
| S75 | 2 | (EAST-000-9084152) \| ( "20130303224".did. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/28 20:02 |
| S78 | 2 | "20140177446".did. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/28 21:21 |
| S79 | 2 | (EAST-000-2013022219) \| ( "20140177446".did. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/28 21:22 |
| S80 | 115 | (US-20140211759-$ or US-20080109695-$ or US-20020069238-$ or US-20020181395-$ or US-20030039246-$ or US-20030103465-$ or US-20030110290-$ or US-20060182119-$ or US-20070101018-$ or US-20070171816-$ or US-20070291648-$ or US-20080165683-$ or US-20080291827-$ or US-20140362829-$ or US-20150020157-$ or US-20120106511-$ or US-20150195837-$ or US-20120039200-$ or US-20070211658-$ or US-20090191881-$ or US-20110034175-$ or US-20110039593-$ or US-20110051685-$ or US-20110103221-$ or US-20110134774-$ or US-20110212693-$).did. or (US-20110317552-$ or US-20120039252-$ or US-20120082082-$ or US-20120099464-$ or US-20120213207-$ or US-20110053521-$ or US-20050163093-$ or US-20150264612-$ or US-20150263846-$ or US-20150172032-$ or US-20150133126-$ or US-20150124743-$ or US-20150110048-$ or US-20150094073-$ or US-20150055621-$ or US-20150016323-$ or US-20100303039-$ or | US-PGPUB; USPAT; FPRS; DERWENT | ADJ | ON | 2015/09/28 21:46 |



**Petitioners' Exhibit 1002, p. 448**
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**IPR2024-00991**

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|---|---|---|---|---|---|---|
| | | US-20150004981-$ or US-20150003402-$ or US-20140092787-$ or US-20140307622-$ or US-20140204777-$ or US-20130301439-$ or US-20130331077-$ or US-20130010716-$ or US-20120163205-$ or US-20110103327-$).did. or (US-20150009826-$ or US-20140050184-$ or US-20140044087-$ or US-20130183970-$ or US-20110269442-$ or US-20150156780-$ or US-20130217382-$ or US-20130176988-$ or US-20120057544-$ or US-20140295856-$ or US-20110105140-$ or US-20150201410-$ or US-20150201418-$ or US-20150117292-$ or US-20140301201-$ or US-20090253426-$ or US-20110111785-$ or US-20130329550-$ or US-20150124735-$ or US-20140321267-$ or US-20140269575-$ or US-20150140999-$ or US-20130303224-$ or US-20140177446-$).did. or (US-8724544-$ or US-8971871-$ or US-8706124-$).did. or (CN-103974459-$ or KR-20140097996-$ or EP-2448325-$ or EP-2770661-$ or WO-2014070347-$ or WO-2014171888-$ or WO-2013022219-$ or WO-2014169117-$ or WO-2014048294-$ or WO-2014003899-$ or WO-2012165893-$ or WO-2015065855-$ or EP-1418782-$).did. or (EP-2448325-$ or WO-2013191084-$ or US-20120106511-$ or EP-2257113-$ or US-20120236801-$ or WO-2014000610-$ or WO-2013022220-$ or WO-2014015734-$ or WO-2013153442-$ or WO-2013022219-$ or WO-2012006744-$ or WO-2011149081-$ or US-20140307622-$ or US-20130303224-$ or US-20110267978-$ or US-20040125748-$ or US-20150133122-$ or WO-2014017872-$ or WO-2014017874-$).did. | | | | |
| S81 | 100 | S80 & ( type \| channel \| carrier \| qos \| quality) | US-PGPUB; USPAT; FPRS; DERWENT | ADJ | ON | 2015/09/28 21:48 |
| S84 | 3 | (EAST-000-8706124) \| ( "20110065440".did. ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2015/09/29 12:45 |
| S87 | 618 | (H04W76/$) & ( type \| channel \| carrier \| qos \| quality) NEAR5 (stream \| flow) SAME5 ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) | US-PGPUB; USPAT; FPRS; DERWENT | ADJ | ON | 2015/09/29 14:53 |
| S88 | 327 | (H04W76/$) & ( type \| channel \| carrier \| qos \| quality) NEAR5 (stream \| flow) | US-PGPUB; USPAT; | ADJ | ON | 2015/09/29 18:36 |



**Petitioners' Exhibit 1002, p. 449**
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**IPR2024-00991**

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| | | SAME ($3carrier \| component \| (multi$3 \| plural$3 \| (one NEAR2 (more \| least)) (component \| carrier \| cell \| point)) \| carrier aggregation \| CA \| component carrier \| CC \| multicomponent \| multicarrier \| multicell \| multipoint \| multichannel \| multiband) & (@ad \| @rlad)<= "20130130" | FPRS; DERWENT | | | |
| S92 | 122 | (US-20140211759-$ or US-20080109695-$ or US-20020069238-$ or US-20020181395-$ or US-20030039246-$ or US-20030103465-$ or US-20030110290-$ or US-20060182119-$ or US-20070101018-$ or US-20070171816-$ or US-20070291648-$ or US-20080165683-$ or US-20080291827-$ or US-20140362829-$ or US-20150020157-$ or US-20120106511-$ or US-20150195837-$ or US-20120039200-$ or US-20070211658-$ or US-20090191881-$ or US-20110034175-$ or US-20110039593-$ or US-20110051685-$ or US-20110103221-$ or US-20110134774-$ or US-20110212693-$).did. or (US-20110317552-$ or US-20120039252-$ or US-20120082082-$ or US-20120099464-$ or US-20120213207-$ or US-20110053521-$ or US-20050163093-$ or US-20150264612-$ or US-20150263846-$ or US-20150172032-$ or US-20150133126-$ or US-20150124743-$ or US-20150110048-$ or US-20150094073-$ or US-20150055621-$ or US-20150016323-$ or US-20100303039-$ or US-20150004981-$ or US-20150003402-$ or US-20140092787-$ or US-20140307622-$ or US-20140204777-$ or US-20130301439-$ or US-20130331077-$ or US-20130010716-$ or US-20120163205-$ or US-20110103327-$).did. or (US-20150009826-$ or US-20140050184-$ or US-20140044087-$ or US-20130183970-$ or US-20110269442-$ or US-20150156780-$ or US-20130217382-$ or US-20130176988-$ or US-20120057544-$ or US-20140295856-$ or US-20110105140-$ or US-20150201410-$ or US-20150201418-$ or US-20150117292-$ or US-20140301201-$ or US-20090253426-$ or US-20110111785-$ or US-20130329550-$ or US-20150124735-$ or US-20140321267-$ or US-20140269575-$ or US-20150140999-$ or US-20130303224-$ or US-20140177446-$ or US-20110065440-$ or US-20150264738-$ or US-20150085730-$).did. or (US-20140348081-$ or US-20140334427-$ or US-20140293874-$).did. or (US-8724544-$ or US-8971871-$ or US-8706124-$).did. or (CN-103974459-$ or KR-20140097996-$ or EP-2448325-$ or EP-2770661-$ or WO-2014070347-$ or WO-2014171888-$ or WO-2013022219-$ or WO- | US-PGPUB; USPAT; FPRS; DERWENT | ADJ | OFF | 2016/04/01 08:19 |

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|---|---|---|---|---|---|---|
| | | 2014169117-$ or WO-2014048294-$ or WO-2014003899-$ or WO-2012165893-$ or WO-2015065855-$ or EP-1418782-$).did. or (EP-2448325-$ or WO-2013191084-$ or US-20120106511-$ or EP-2257113-$ or US-20120236801-$ or WO-2014000610-$ or WO-2013022220-$ or WO-2014015734-$ or WO-2013153442-$ or WO-2013022219-$ or WO-2012006744-$ or WO-2011149081-$ or US-20140307622-$ or US-20130303224-$ or US-20110267978-$ or US-20040125748-$ or US-20150133122-$ or WO-2014017872-$ or WO-2014017874-$ or US-20150085730-$).did. | | | | |
| S94 | 19 | S92 & aggregat$3 & Scell | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | OFF | 2016/04/01 08:20 |
| S95 | 35 | S92 & cause | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | OFF | 2016/04/01 09:47 |
| S96 | 16 | S92 & request WITH path | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | OFF | 2016/04/01 09:52 |
| S97 | 1 | (APP-000) \| 14/167405.APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/04/01 09:54 |
| S98 | 1 | S97 & cause | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/04/01 09:54 |
| S99 | 1 | (APP-000) \| 14/167405.APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/07/21 21:27 |
| S100 | 4 | (FMID-000) \| ("50002584".FMID.) | US-PGPUB; USPAT; USOCR; FPRS; | ADJ | ON | 2016/07/21 21:27 |

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|---|---|---|---|---|---|---|
| | | | EPO; JPO; DERWENT; IBM_TDB | | | |
| S101 | 229 | H04W76/$.CPC. & ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) SAME (bearer) SAME path ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/07/21 22:10 |
| S102 | 270 | H04W76/$.CPC. & ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) WITH(reallocat$3 \| reconfigur$5 \| chang$3) WITH (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) WITH (bearer \| flow \| stream) ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/07/21 22:19 |
| S103 | 32 | H04W76/$.CPC. & ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ADJ5 (reallocat$3 \| reconfigur$5 \| chang$3) ADJ5 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) SAME (bearer \| flow \| stream) ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/07/21 22:20 |
| S104 | 22 | H04W76/$.CPC. & ( (reallocat$3 \| reconfigur$5 \| chang$3) WITH (bearer \| flow \| stream) ) SAME5 ("X2" \| "X-2") NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/07/21 22:54 |
| S105 | 62 | H04W76/$.CPC. & ( (bearer \| flow \| stream) ) SAME ("X2" \| "X-2") NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/07/21 22:59 |
| S106 | 4 | H04W76/$.CPC. & ( (bearer) SAME (RRC) SAME ("X2" \| "X-2") ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/07/21 23:07 |
| S107 | 56 | H04W76/$.CPC. & ( (bearer) SAME (RRC) SAME5 ("X2" \| "X-2") ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2016/07/21 23:08 |
| S108 | 30 | H04W76/$.CPC. & ( (bearer) WITH (split$3) ) NOT ( (handover \| handoff \| hand (over \|off)) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; | ADJ | ON | 2016/07/21 23:32 |

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|---|---|---|---|---|---|---|
| | | | EPO; JPO; DERWENT; IBM_TDB | | | |
| S109 | 1 | (NPL-000) \| "13/934038".app. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | OFF | 2016/07/22 00:15 |
| S110 | 124 | (US-20140211759-$ or US-20080109695-$ or US-20020069238-$ or US-20020181395-$ or US-20030039246-$ or US-20030103465-$ or US-20030110290-$ or US-20060182119-$ or US-20070101018-$ or US-20070171816-$ or US-20070291648-$ or US-20080165683-$ or US-20080291827-$ or US-20140362829-$ or US-20150020157-$ or US-20120106511-$ or US-20150195837-$ or US-20120039200-$ or US-20070211658-$ or US-20090191881-$ or US-20110034175-$ or US-20110039593-$ or US-20110051685-$ or US-20110103221-$ or US-20110134774-$ or US-20110212693-$).did. or (US-20110317552-$ or US-20120039252-$ or US-20120082082-$ or US-20120099464-$ or US-20120213207-$ or US-20110053521-$ or US-20050163093-$ or US-20150264612-$ or US-20150263846-$ or US-20150172032-$ or US-20150133126-$ or US-20150124743-$ or US-20150110048-$ or US-20150094073-$ or US-20150055621-$ or US-20150016323-$ or US-20100303039-$ or US-20150004981-$ or US-20150003402-$ or US-20140092787-$ or US-20140307622-$ or US-20140204777-$ or US-20130301439-$ or US-20130331077-$ or US-20130010716-$ or US-20120163205-$ or US-20110103327-$).did. or (US-20150009826-$ or US-20140050184-$ or US-20140044087-$ or US-20130183970-$ or US-20110269442-$ or US-20150156780-$ or US-20130217382-$ or US-20130176988-$ or US-20120057544-$ or US-20140295856-$ or US-20110105140-$ or US-20150201410-$ or US-20150201418-$ or US-20150117292-$ or US-20140301201-$ or US-20090253426-$ or US-20110111785-$ or US-20130329550-$ or US-20150124735-$ or US-20140321267-$ or US-20140269575-$ or US-20150140999-$ or US-20130303224-$ or US-20140177446-$ or US-20110065440-$ or US-20150264738-$ or US-20150085730-$).did. or (US-20140348081-$ or US-20140334427-$ or US-20140293874-$ or US-20150327236-$ or US-20140010207-$).did. or (US-8724544-$ or US-8971871-$ or US-8706124-$).did. or (CN-103974459-$ or | US-PGPUB; USPAT; FPRS; DERWENT | ADJ | OFF | 2017/02/06 06:14 |



Petitioners' Exhibit 1002, p. 453
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

| | | | | | | |
|---|---|---|---|---|---|---|
| | | KR-20140097996-$ or EP-2448325-$ or EP-2770661-$ or WO-2014070347-$ or WO-2014171888-$ or WO-2013022219-$ or WO-2014169117-$ or WO-2014048294-$ or WO-2014003899-$ or WO-2012165893-$ or WO-2015065855-$ or EP-1418782-$).did. or (EP-2448325-$ or WO-2013191084-$ or US-20120106511-$ or EP-2257113-$ or US-20120236801-$ or WO-2014000610-$ or WO-2013022220-$ or WO-2014015734-$ or WO-2013153442-$ or WO-2013022219-$ or WO-2012006744-$ or WO-2011149081-$ or US-20140307622-$ or US-20130303224-$ or US-20110267978-$ or US-20040125748-$ or US-20150133122-$ or WO-2014017872-$ or WO-2014017874-$ or US-20150085730-$).did. | | | | |
| S111 | 2 | S110 & status WITH loading | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | OFF | 2017/02/06 06:14 |
| S112 | 5 | S110 & status WITH (load$3 \| congest$3) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | OFF | 2017/02/06 06:26 |
| S113 | 5 | S110 & offload$ WITH (load$3 \| congest$3) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | OFF | 2017/02/06 06:44 |
| S114 | 1 | (APP-000) \| 14/167405.APP. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2017/04/10 11:26 |
| S115 | 8 | (FMID-000) \| ("50002584".FMID.) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2017/04/10 11:26 |
| S116 | 10 | H04W76/$.CPC. & ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ADJ5 (aggregat$3) ADJ5 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) SAME (bearer \| flow \| stream \| SCell \| CC!) ) NOT ( (handover \| handoff \| hand (over \|off)) ) | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2017/04/10 11:39 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | & (@ad \| @rlad )<= "20130130" | | | | |
| S117 | 42 | H04W76/$.CPC. & ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ADJ5 (aggregat$3) ADJ5 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) SAME (bearer \| flow \| stream \| SCell \| CC!) ) & (@ad \| @rlad )<= "20130130" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2017/04/12 15:45 |
| S118 | 68 | H04W76/$.CPC. & ( (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) ADJ5 ("x 2" \| "x2") ADJ5 (eNB \| eNode$1 \| $1NodeB \| (Node NEAR ( e\| B \| evolv$3)) \| base station \| BS! \| BTS!) SAME (bearer \| flow \| stream \| SCell \| CC!) ) & (@ad \| @rlad ) <= """20130130""" | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2017/04/12 15:53 |
| S119 | 3 | (NPL-000) \| "20150055620".did. | US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB | ADJ | ON | 2017/04/12 16:07 |

**4/ 13/ 2017 2:56:36 PM**
**C:\ Users\ hreyes\ Desktop\ Work\ Applications\ 14167405_Carrier Aggregation - Path selection_F\ 14167405_EAST.wsp**

## PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to : Mail** **Mail Stop ISSUE FEE**
**Commissioner for Patents**
**P.O. Box 1450**
**Alexandria, Virginia 22313-1450**
**or Fax (571) 273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintainance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintainance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

**106622**
**Blue Capital Law Firm, P.C.**
**650 Town Center Drive, Suite 1530**
**Costa Mesa, CA 92626**

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

**Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

| |
|---|
| (Depositor's name) |
| (Signature) |
| (Date) |

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| **14/167,405** | **01/29/2014** | **Yu-Hsuan Guo** | **1291-235.101** | **6471** |

TITLE OF INVENTION:

**METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM**

| APPLN. TYPE | SMALL ENTITY | ISSUE FEE | PUBLICATION FEE | TOTAL FEE(S) DUE | DATE DUE |
|---|---|---|---|---|---|
| **nonprovisional** | **UNDISCOUNTED** | **$960** | **$0** | **$960** | **07/20/2017** |

| EXAMINER | ART UNIT | CLASS-SUBCLASS |
|---|---|---|
| **Hector E. Reyes Ortiz** | **2472** | **370-331000** |

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 **Blue Capital Law Firm, P.C.**
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: **INNOVATIVE SONIC CORPORATION**

(B) RESIDENCE: (CITY and STATE OR COUNTRY): **Taipei City, Taiwan**

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are enclosed:
☒ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s):
☐ A check in the amount of the fee(s) is enclosed.
☒ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), or credit any overpayment, to Deposit Account Number _____ .

5. **Change in Entity Status** (from status indicated above)
☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.
NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature **/Sang N. Dang/** Date **July 14, 2017**

Typed or printed name **Sang N. Dang** Registration No. **51,186**

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Comissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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Petitioners' Exhibit 1002, p. 456
AT&T et al v. Innovative Sonic & Celerity
IPR2024-00991

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

| | | |
|---|---|---|
| Applicants: | Yu-Hsuan Guo and Meng-Hui Ou | |
| Title: | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM | |
| Serial No.: | 14/167,405 | Filed: January 29, 2014 |
| Examiner: | Hector E. Reyes Ortiz | Group Art Unit: 2472 |
| Attorney Docket No.: | 1291-235.101 (IS102004-US-D1) | |

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**CERTIFICATE OF EFS-WEB TRANSMISSION**
**UNDER 37 CFR § 1.8**

I hereby certify that the enclosed 1 Page Issue Fee Transmittal Sheet; and Payment by Credit Card are being transmitted to the United States Patent and Trademark Office via EFS-Web on July 14, 2017.

Date: July 14, 2017 /Sandy Kim/
Sandy Kim

Mailing Address:

**BLUE CAPITAL LAW FIRM, P.C. (Customer No.: 106622)**
650 Town Center Drive, Suite 1530
Costa Mesa, California 92626
Tel: 714-839-3800
Fax: 714-795-2995

# Electronic Patent Application Fee Transmittal

| | |
|---|---|
| **Application Number:** | 14167405 |
| **Filing Date:** | 29-Jan-2014 |
| **Title of Invention:** | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| **First Named Inventor/Applicant Name:** | Yu-Hsuan Guo |
| **Filer:** | Sang N. Dang/Sandy Kim |
| **Attorney Docket Number:** | 1291-235.101 |

Filed as Large Entity

**Filing Fees for Utility under 35 USC 111(a)**

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Basic Filing:** | | | | |
| **Pages:** | | | | |
| **Claims:** | | | | |
| **Miscellaneous-Filing:** | | | | |
| **Petition:** | | | | |
| **Patent-Appeals-and-Interference:** | | | | |
| **Post-Allowance-and-Post-Issuance:** | | | | |
| UTILITY APPL ISSUE FEE | 1501 | 1 | 960 | 960 |

| Description | Fee Code | Quantity | Amount | Sub-Total in USD($) |
|---|---|---|---|---|
| **Extension-of-Time:** | | | | |
| **Miscellaneous:** | | | | |
| | | | **Total in USD ($)** | **960** |

# Electronic Acknowledgement Receipt

| | |
|---|---|
| **EFS ID:** | 29790902 |
| **Application Number:** | 14167405 |
| **International Application Number:** | |
| **Confirmation Number:** | 6471 |
| **Title of Invention:** | METHOD AND APPARATUS FOR HANDLING INTER-NODE CONNECTIVITY IN A WIRELESS COMMUNICATION SYSTEM |
| **First Named Inventor/Applicant Name:** | Yu-Hsuan Guo |
| **Customer Number:** | 106622 |
| **Filer:** | Sang N. Dang/Sandy Kim |
| **Filer Authorized By:** | Sang N. Dang |
| **Attorney Docket Number:** | 1291-235.101 |
| **Receipt Date:** | 14-JUL-2017 |
| **Filing Date:** | 29-JAN-2014 |
| **Time Stamp:** | 16:58:44 |
| **Application Type:** | Utility under 35 USC 111(a) |

## Payment information:

| | |
|---|---|
| Submitted with Payment | yes |
| Payment Type | CARD |
| Payment was successfully received in RAM | $960 |
| RAM confirmation Number | 071717INTEFSW16593200 |
| Deposit Account | |
| Authorized User | |

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

## File Listing:

| Document Number | Document Description | File Name | File Size(Bytes)/ Message Digest | Multi Part /.zip | Pages (if appl.) |
|---|---|---|---|---|---|
| 1 | | 1291-235-101--IssueFeeAsFiled07142017.pdf | 63112<br>f1657425aaff6f3761f4729a15d6e6e26ec3ad11 | yes | 2 |

| | Multipart Description/PDF files in .zip description | | |
|---|---|---|---|
| | Document Description | Start | End |
| | Issue Fee Payment (PTO-85B) | 1 | 1 |
| | Miscellaneous Incoming Letter | 2 | 2 |

**Warnings:**

**Information:**

| | | | | | |
|---|---|---|---|---|---|
| 2 | Fee Worksheet (SB06) | fee-info.pdf | 30551<br>80617fecab014add3d85e0887d3560e40d32e5cc | no | 2 |

**Warnings:**

**Information:**

| Total Files Size (in bytes): | 93663 |
|---|---|

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**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)
Approved for use through 07/31/2016. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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# INFORMATION DISCLOSURE STATEMENT BY APPLICANT

**( Not for submission under 37 CFR 1.99)**

| | |
|---|---|
| Application Number | 14167405 |
| Filing Date | 2014-01-29 |
| First Named Inventor | Yu-Hsuan Guo |
| Art Unit | 2472 |
| Examiner Name | REYES ORTIZ, HECTOR E |
| Attorney Docket Number | 1291-235.101 |

**U.S.PATENTS**

| Examiner Initial* | Cite No | Patent Number | Kind Code[1] | Issue Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|---|
| | 1 | | | | | |

If you wish to add additional U.S. Patent citation information please click the Add button.

**U.S.PATENT APPLICATION PUBLICATIONS**

| Examiner Initial* | Cite No | Publication Number | Kind Code[1] | Publication Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear |
|---|---|---|---|---|---|---|
| Change(s) applied to document, /S.Y.B./ 5/2/2017 | 1 | 20120140743 | A1 | 2012-06-07 | ~~InterDigital Patent Holdings, Inc.~~ Pelletier et al. | |

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**FOREIGN PATENT DOCUMENTS**

| Examiner Initial* | Cite No | Foreign Document Number[3] | Country Code[2] | Kind Code[4] | Publication Date | Name of Patentee or Applicant of cited Document | Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear | T[5] |
|---|---|---|---|---|---|---|---|---|
| | 1 | 11234719 | JP | A | 1999-08-27 | Alcatel CIT | | ☐ |
| | 2 | 2011176722 | JP | A | 2011-09-08 | SONY CORP | | ☐ |
| | 3 | 2012019313 | JP | A | 2012-01-26 | NTT DOCOMO INC | | ☐ |



ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.E.R./

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www.uspto.gov

| APPLICATION NO. | ISSUE DATE | PATENT NO. | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 14/167,405 | 08/15/2017 | 9736883 | 1291-235.101 | 6471 |

106622 7590 07/26/2017

Blue Capital Law Firm, P.C.
650 Town Center Drive, Suite 1530
Costa Mesa, CA 92626

# ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

**Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)**
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 51 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

INNOVATIVE SONIC CORPORATION, Taipei City, TAIWAN;
Yu-Hsuan Guo, Taipei City, TAIWAN;
Meng-Hui Ou, Taipei City, TAIWAN;

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IPR2024-00991