PTO/AIA/15 (03-13)
Approved for use through 01/31/2014. 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

UTILITY PATENT APPLICATION TRANSMITTAL

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

Attorney Docket No.	1426-136.101
First Named Inventor	Wei-Yu Chen
Title	Method and Apparatus for Improving Msg3 Transmission of Random...
Express Mail Label No.	

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**

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* 41] 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* 19]
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

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: 106622 **OR** [ ] Correspondence address below

Name					
Address					
City		State		Zip Code	
Country		Telephone		Email	

Signature	/Sang N. Dang/	Date	July 28, 2017
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.**

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

PTO/SB/17 (03-13)
Approved for use through 04/30/2017. 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

FEE TRANSMITTAL

Complete if known	
Application Number	Not Yet Assigned
Filing Date	Herewith
First Named Inventor	Wei-Yu Chen
Examiner Name	Not Yet Assigned
Art Unit	Not Yet Assigned
Practitioner Docket No.	1426-136.101

☐ 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 ($) 2,340.00

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 ($)		Fee Paid ($)
24	-20 or HP =	4	x 320	=	

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

Indep. Claims		Extra Claims	Fee ($)		Fee Paid ($)
4	-3 or HP =	1	x 420	=	

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 ($)		Fee Paid ($)
60	- 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	/Sang N. Dang/	Registration No. (Attorney/Agent) 51,186	Telephone (714) 839-3800
Name (Print/Type)	Sang N. Dang		Date July 28, 2017

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.**

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

Attorney Docket No.: 1426-136.101
Client Docket No.: 1050153-US
Filed Via EFS

METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE 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. 62/367,875 filed on July 28, 2016, the entire disclosure of which is incorporated herein in their entirety by reference.

FIELD

[0002] This disclosure generally relates to wireless communication networks, and more particularly, to a method and apparatus for improving Msg3 transmission of random access procedure 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 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. A new radio technology for the next generation (e.g., 5G) is currently being discussed 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.

Samsung Exhibit 1009, Page 3 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

SUMMARY

[0005] A method and apparatus are disclosed, from the perspective of the UE, for performing random access procedure. In one embodiment, the method includes the UE receiving a message from a network. The message includes a TTI (Transmission Time Interval) information of Msg3. In addition, the method includes the UE transmitting a preamble to the network. The method also includes the UE receiving a Msg2 from the network for responding the preamble. The method further includes the UE performing a Msg3 transmission to the network according to the TTI information of Msg3.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. 1 shows a diagram of a wireless communication system according to one exemplary embodiment.

[0007] 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.

[0008] FIG. 3 is a functional block diagram of a communication system according to one exemplary embodiment.

[0009] FIG. 4 is a functional block diagram of the program code of FIG. 3 according to one exemplary embodiment.

[0010] FIG. 5 is a reproduction of Figure 10.1.5.1-1 of 3GPP TS 36.300 v13.2.0.

[0011] FIG. 6 is a reproduction of Figure 10.1.5.2-1 of 3GPP TS 36.300 v13.2.0.

[0012] FIG. 7 is a diagram according to one exemplary embodiment.

[0013] FIG. 8 is a diagram according to one exemplary embodiment.

[0014] FIG. 9 is a diagram according to one exemplary embodiment.

[0015] FIG. 10 is a diagram according to one exemplary embodiment.

[0016] FIG. 11 is a diagram according to one exemplary embodiment.

[0017] FIG. 12 is a flow chart according to one exemplary embodiment.

Samsung Exhibit 1009, Page 4 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

[0018] FIG. 13 is a flow chart according to one exemplary embodiment.

[0019] FIG. 14 is a flow chart according to one exemplary embodiment.

[0020] FIG. 15 is a flow chart according to one exemplary embodiment.

[0021] FIG. 16 is a flow chart according to one exemplary embodiment.

[0022] FIG. 17 is a flow chart according to one exemplary embodiment.

[0023] FIG. 18 is a flow chart according to one exemplary embodiment.

[0024] FIG. 19 is a flow chart according to one exemplary embodiment.

DETAILED DESCRIPTION

[0025] 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.

[0026] 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: TR 38.913 v0.3.0, "Study on Scenarios and Requirements for Next Generation Access Technologies"; TS 36.300 v13.2.0, "Overall Description; Stage 2"; TS 36.913, v13.0.0, "Requirements for further advancements for Evolved Universal Terrestrial Radio Access (E-UTRA)"; TS 36.331 v13.2.0, "Radio Resource Control (RRC); Protocol specification"; TS 36.321 v13.1.0, "Medium Access Control (MAC) protocol specification"; and R2-163445, "Scheduling Framework and Requirements", Nokia and Alcatel-Lucent Shanghai Bell. The standards and documents listed above are hereby expressly incorporated by reference in their entirety.

[0027] 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.

[0028] 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.

[0029] 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.

[0030] 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 evolved Node B (eNB), or some other terminology. An access terminal (AT) may also be called user equipment (UE), a wireless communication device, terminal, access terminal or some other terminology.

[0031] 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.

[0032] 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.

[0033] 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.

[0034] 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.

[0035] 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.

[0036] 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.

[0037] 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.

[0038] 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.

[0039] 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.

[0040] 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.

[0041] 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 realizing the UEs (or ATs) 116 and 122 in FIG. 1 or the base station (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. The communication device 300 in a wireless communication system can also be utilized for realizing the AN 100 in FIG. 1.

[0042] 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.

[0043] One of the general objectives of the present application is to study the frame structure used in New RAT (NR) for 5G, to accommodate various type of requirement (discussed in 3GPP TR 38.913) for time and frequency resource, e.g., from ultra-low latency (~0.5 ms) to expected longer TTI (Transmission Time Interval) for MTC (Machine Type Communication), from high peak rate for eMBB (enhanced Mobile Broadband) to very low data rate for MTC. An important focus is low latency aspect, while other aspect of mixing/adapting different TTIs can also be considered in the study. In addition to diverse services and requirements, forward compatibility is an important consideration in initial NR frame structure design as not all features of NR would be included in the beginning phase/release.

[0044] 3GPP TS 36.300 includes the following random access (RA) procedure related description:

10.1.5 Random Access Procedure

The random access procedure is characterized by:

- Common procedure for FDD and TDD;

- One procedure irrespective of cell size and the number of serving cells when CA is configured;

The random access procedure is performed for the following events related to the PCell:

- Initial access from RRC_IDLE;
- RRC Connection Re-establishment procedure;
- Handover;
- DL data arrival during RRC_CONNECTED requiring random access procedure:
  - E.g. when UL synchronisation status is "non-synchronised".
- UL data arrival during RRC_CONNECTED requiring random access procedure:
  - E.g. when UL synchronisation status is "non-synchronised" or there are no PUCCH resources for SR available.
- For positioning purpose during RRC_CONNECTED requiring random access procedure;
  - E.g. when timing advance is needed for UE positioning.

The random access procedure is also performed on a SCell to establish time alignment for the corresponding sTAG.

In DC, the random access procedure is also performed on at least PSCell upon SCG addition/modification, if instructed, or upon DL/UL data arrival during RRC_CONNECTED requiring random access procedure. The UE initiated random access procedure is performed only on PSCell for SCG.

Furthermore, the random access procedure takes two distinct forms:

- Contention based (applicable to first five events);
- Non-contention based (applicable to only handover, DL data arrival, positioning and obtaining timing advance alignment for a sTAG).

Normal DL/UL transmission can take place after the random access procedure.

An RN supports both contention-based and non-contention-based random access. When an RN performs the random access procedure, it suspends any current RN subframe configuration, meaning it temporarily disregards the RN subframe configuration. The RN subframe configuration is resumed at successful random access procedure completion.

10.1.5.1 Contention based random access procedure

The contention based random access procedure is outlined on Figure 10.1.5.1-1 below:

[Figure 10.1.5.1-1 of 3GPP TS 36.300 v13.2.0 is reproduced as FIG. 5]

The four steps of the contention based random access procedures are:

1) Random Access Preamble on RACH in uplink:
   - There are two possible groups defined and one is optional. If both groups are configured the size of message 3 and the pathloss are used to determine which group a preamble is selected from. The group to which a preamble belongs provides an indication of the size of the message 3 and the radio conditions at the UE. The preamble group information along with the necessary thresholds are broadcast on system information.
2) Random Access Response generated by MAC on DL-SCH:
   - Semi-synchronous (within a flexible window of which the size is one or more TTI) with message 1;
   - No HARQ;
   - Addressed to RA-RNTI on PDCCH;
   - Conveys at least RA-preamble identifier, Timing Alignment information for the pTAG, initial UL grant and assignment of Temporary C-RNTI (which may or may not be made permanent upon Contention Resolution);
   - Intended for a variable number of UEs in one DL-SCH message.
3) First scheduled UL transmission on UL-SCH:
   - Uses HARQ;
   - Size of the transport blocks depends on the UL grant conveyed in step 2.
   - For initial access:
     - Conveys the RRC Connection Request generated by the RRC layer and transmitted via CCCH;

- Conveys at least NAS UE identifier but no NAS message;
- RLC TM: no segmentation.

- For RRC Connection Re-establishment procedure:
  - Conveys the RRC Connection Re-establishment Request generated by the RRC layer and transmitted via CCCH;
  - RLC TM: no segmentation;
  - Does not contain any NAS message.
- After handover, in the target cell:
  - Conveys the ciphered and integrity protected RRC Handover Confirm generated by the RRC layer and transmitted via DCCH;
  - Conveys the C-RNTI of the UE (which was allocated via the Handover Command);
  - Includes an uplink Buffer Status Report when possible.
- For other events:
  - Conveys at least the C-RNTI of the UE.

4) Contention Resolution on DL:
   - Early contention resolution shall be used i.e. eNB does not wait for NAS reply before resolving contention;
   - Not synchronised with message 3;
   - HARQ is supported;
   - Addressed to:
     - The Temporary C-RNTI on PDCCH for initial access and after radio link failure;
     - The C-RNTI on PDCCH for UE in RRC_CONNECTED.
   - HARQ feedback is transmitted only by the UE which detects its own UE identity, as provided in message 3, echoed in the Contention Resolution message;
   - For initial access and RRC Connection Re-establishment procedure, no segmentation is used (RLC-TM).

The Temporary C-RNTI is promoted to C-RNTI for a UE which detects RA success and does not already have a C-RNTI; it is dropped by others. A UE which detects RA success and already has a C-RNTI, resumes using its C-RNTI.

When CA is configured, the first three steps of the contention based random access procedures occur on the PCell while contention resolution (step 4) can be cross-scheduled by the PCell.

When DC is configured, the first three steps of the contention based random access procedures occur on the PCell in MCG and PSCell in SCG. When CA is configured in SCG, the first three steps of the contention based random access procedures occur on the PSCell while contention resolution (step 4) can be cross-scheduled by the PSCell.

10.1.5.2 Non-contention based random access procedure

The non-contention based random access procedure is outlined on Figure 10.1.5.2-1 below:

[Figure 10.1.5.2-1 of 3GPP TS 36.300 v13.2.0 is reproduced as FIG. 6]

The three steps of the non-contention based random access procedures are:

0) Random Access Preamble assignment via dedicated signalling in DL:
   - eNB assigns to UE a non-contention Random Access Preamble (a Random Access Preamble not within the set sent in broadcast signalling).
   - Signalled via:
     - HO command generated by target eNB and sent via source eNB for handover;
     - PDCCH in case of DL data arrival or positioning;
     - PDCCH for initial UL time alignment for a sTAG.
1) Random Access Preamble on RACH in uplink:
   - UE transmits the assigned non-contention Random Access Preamble.
2) Random Access Response on DL-SCH:
   - Semi-synchronous (within a flexible window of which the size is two or more TTIs) with message 1;
   - No HARQ;

- Addressed to RA-RNTI on PDCCH;
- Conveys at least:
  - Timing Alignment information and initial UL grant for handover;
  - Timing Alignment information for DL data arrival;
  - RA-preamble identifier;
  - Intended for one or multiple UEs in one DL-SCH message.

When performing non-contention based random access on the PCell while CA is configured, the Random Access Preamble assignment via PDCCH of step 0, step 1 and 2 of the non-contention based random access procedure occur on the PCell. In order to establish timing advance for a sTAG, the eNB may initiate a non-contention based random access procedure with a PDCCH order (step 0) that is sent on a scheduling cell of activated SCell of the sTAG. Preamble transmission (step 1) is on the indicated SCell and Random Access Response (step 2) takes place on PCell.

When performing non-contention based random access on the PCell or PSCell while DC is configured, the Random Access Preamble assignment via PDCCH of step 0, step 1 and 2 of the non-contention based random access procedure occur on the corresponding cell. In order to establish timing advance for a sTAG, the eNB may initiate a non-contention based random access procedure with a PDCCH order (step 0) that is sent on a scheduling cell of activated SCell of the sTAG not including PSCell. Preamble transmission (step 1) is on the indicated SCell and Random Access Response (step 2) takes place on PCell for MCG and PSCell for SCG.

[0045] Details of each random access step and related control element are described in Sections 5.1, 5.4, 6, and 7 of 3GPP TS 36.321. Furthermore, some configurations for random access and obtaining procedure are discussed in 3GPP 36.331.

[0046] One NR requirement listed in 3GPP TR 38.913 lists the following NR requirement: "*Control plane latency refers to the time to move from a battery efficient state (e.g., IDLE) to start of continuous data transfer (e.g., ACTIVE). The target for control plane latency should be **10ms***." Regarding similar requirement in LTE, the control plane latency requirement is set to 50ms (as discussed in 3GPP TS 36.913). There is a huge gap between latency

requirement of LTE and latency requirement of NR. Therefore, it would be better to reduce possible transmission and processing latency as much as possible. As discussed below, the present application first focuses on random access latency.

[0047] In LTE, there are two kinds of random access procedure, contention and non-contention. The contention random access procedure consists of 4 steps, including: Msg1, Msg2, Msg3, and Msg4. FIG. 5 is an exemplary embodiment for the contention random access. The Msg1 and Msg3 are transmitted from a UE to a network. And the resource for performing Msg1 transmission and Msg3 transmission are contention resource. If the network can successfully receive a Msg3, the network could identify the UE based on contents in Msg3, and transmit a Msg4 to the UE for finishing the contention.

[0048] On the other hand, a dynamic TTI adjusting concept is discussed in 3GPP R2-163445, which proposes to set the TTI size per scheduling grant for optimizing TCP (Transmission Control Protocol) transmission case. In particular, short TTI can be used to accelerate TCP slow start process, and long TTI can be used in steady transmission rate state for reduce control signaling overhead.

[0049] Considering such dynamic TTI concept, the present application further discusses whether it can also be used to accelerate random access procedure and how to achieve dynamic TTI change in random access. The following discussion mainly focuses on the Msg3 transmission step in a random access procedure. In addition, the discussion below does not include UE's RF/Baseband capability differentiation (e.g., differentiation between normal cell phone in LTE and NB-IoT devices in LTE) case.

[0050] In LTE, there could be three different random access configurations in LTE system. The first configuration is generally for normal UEs with enough RF/Baseband capability to monitor whole system bandwidth (e.g., cell phones, high end MTC devices). The second configuration is generally for low-end MTC devices and normal UEs with enough RF/Baseband capability but worked in power limited condition. The third configuration is generally for NB-IoT (Narrow Band-Internet of Thing) UEs which pool RF/Baseband capability and can only perform transmission/reception on a narrow band (e.g., 1.4MHz). The last configuration is generally defined as a new RAT (Radio Access Technology). Normally, low-end MTC devices

will only worked on the second configuration, and NB-IoT devices will work only on the third configuration. For a normal UE with enough RF/Baseband capability, the UE will only change RA configuration when it enters the power limited state (e.g., cell edge or even far away).

[0051] If short TTI applies to Msg3 transmission, the average random access latency could be reduced due to early start to monitor Msg4. A possible case for such benefit is shown in FIG. 7. As shown in FIG. 7, although the processing delay is a fixed period, the UE could start to receive Msg4 earlier owing to early Msg3 transmission. Moreover, two possibilities for monitoring Msg4 are shown in FIG. 7. The UE may expect either TTI format if the TTI length information is not be carried in scheduling control signal. Otherwise, the UE may expect multiple possibilities of TTI length.

[0052] Another possible benefit may be improving resource efficiency. If the dynamic TTI concept is applied to Msg3, the network can more flexibly adjust resource allocation. In LTE, the TTI length for Msg3 is fixed. In the same modulation scheme condition, LTE system could only schedule radio resource in PRB level, while NR may be able to schedule in symbol level.

[0053] To achieve dynamic TTI concept, a UE needs to derive TTI information (e.g., TTI length, numerology) for transmitting Msg3 on air interface. In this aspect, possible candidates for the UE are proposed to obtain such information. One or multiple solutions can be applied in a NR system.

[0054] **Solution 1 – RAR (Random Access Response).** In LTE, Msg3 transmission is scheduled by UL grant field in RAR. A RAR is a response for a preamble transmitted at a Msg1 transmission opportunity from UE(s). The format of RAR in LTE is shown in FIG. 8.

[0055] The Msg3 transmission is scheduled according to UL (Uplink) grant field in the RAR. In this solution, additional TTI information is added into RAR for scheduling Msg3. In one embodiment, the new TTI information can be a new field in RAR or a new field in Msg2 for a specific preamble or added into UL grant field. A possible exemplary embodiment is shown in FIG. 9.

[0056] **Solution 2 – Common field in Msg2.** In Solution 2, the TTI information is also carried in Msg2 similar to Solution 1. The Msg2 may include multiple RARs. And sub-header of a RAR will indicate the RAR is for which preamble. However, since the TTI length has limited choices, there may be no need to repeatedly include the redundant information. Hence, it is proposed to use common field(s) in Msg2 to carry TTI information. A possible example is shown in FIG. 10. The TTI information 1 could be provided to preamble set 1 (e.g., rapid 0~20), and the TTI information 2 could be provided to preamble set 2 (e.g., rapid 21~40).

[0057] The TTI information carried in a common field will be applied to UEs performed different Msg1 transmission (e.g., different preamble). The different Msg1 transmissions are differentiable by receiving side in Code domain and/or Time domain and/or Frequency domain. Preferably, the common field(s) may be carried as control element. Alternatively, the common field(s) may be carried as part of MAC (sub-)header, as data (e.g., RRC configuration), or in control signal (e.g., PDCCH signal) for scheduling Msg2.

[0058] If multiple common fields are included in a Msg2, a UE could select one of them to apply to Msg3 transmission. In one embodiment, the UE could select common field based on its Msg1 transmission (e.g., preamble group set in RA configuration used by Msg1, PRACH resource set in RA configuration used by Msg1, Msg1 length or format, RA configuration used by Msg1, etc.). The UE could also select common field based on service types (e.g., URLLC, eMBB, delay sensitive, ...). For example, if the UE triggers RA for transmitting a specific service type data (e.g., URLLC service type), then the UE could select common field for the specific service type. Moreover, the UE may understand the data belonging to which service type based on a service type indication (similar to logical channel priority) in configuration of logical channel/RB having available data. The service type indication may be used in multiplexing procedure. For instance, the UE may not multiplex data with different service type indications into a TB for transmission. Alternatively, the UE may understand the data belonging to which service type based on header field of the data (e.g., RLC header field, PDCP field), or based on delivering user plane protocol type/category (e.g., category 1 maps to URLLC). As an example, if the UE triggers RA when the UE has registered/authorized for URLLC service type, the UE could select common field for URLLC service type. As another example, if higher layer (e.g., NAS layer, application layer, RRC layer) in a UE sends a service indication to lower

layer(e.g., MAC, PHY) in the UE when the UE triggers and/or performs RA, the UE could select common field based on the service type indicated by the service indication.

[0059] In one embodiment, the UE selects common field based on random access purpose (e.g., request system information, paging, positioning, location update, control plane establishment, beam recovery, etc.). And the random access purpose may be indicated by higher layer (e.g. NAS, RRC, application layer) in the UE.

[0060] In one embodiment, the UE selects common field based on potential Msg3 size. For example, if the pending available data in a UE larger than a threshold when a UE is performing RA, the UE selects common field for potential message size larger than the threshold.

[0061] In one embodiment, the UE selects common field based on its DL measurement, based on connection establishment cause (e.g., emergency call, mo-data, mt-data, …), based on its current power ramping result (e.g., ramping over threshold times or threshold power, changing based on mapping table between ramping steps and TTI information), based on UE priority (e.g., access class, etc.) provided from network or UE subscription, or based on Msg3 contents (e.g., which type control element could be included, BSR reporting for which LCG or which RB/LC, data from which user plane protocol stock, data from which radio bearer, data from which logical channel, …). For example, if Msg3 could include data from a specific (set of) LC or RB (e.g. URLLC type RB, CCCH, …), the UE could select common field related to the LC or RB based on the UE's configuration(e.g., association between LC/RB and random access configuration, association between LC/RB and service configuration, association between LC/RB and transport channel configuration, etc). As another example, if Msg3 could include a special control element/special message, the UE could select common field related to the special control element/message. Preferably, the UE will select another common field if the Msg3 doesn't include the special control element and/or the special message (e.g., RRC message).

[0062] In one embodiment, the UE selects common field based on highest priority of radio bearers having available data. For example, the UE has available data belonging to radio bearer with priority 2 and priority 8 when the UE is performing RA. The UE could select common field based on whether priority 2 is over a threshold or not.

[0063] In one embodiment, the UE selects common field based on highest priority of logical channels having available data, or based on which user plane protocol stock (e.g., URLLC or eMBB type user plane protocol, protocol stock category/index 1 or 2, …) performing the random access.

[0064] **Solution 3 – Broadcast Information**. In Solution 3, a UE could derive TTI length for Msg3 transmission through a broadcast message (e.g., system information(s), MIB, etc.) from a network (e.g., gNB, base station, TRP, etc.). If multiple TTI information for Msg3 transmission are included in the broadcast message, a UE could select one of them to apply to Msg3 transmission.

[0065] In one embodiment, the UE selects TTI information in the broadcast message based on its Msg1 transmission (e.g., preamble group set in RA configuration used by Msg1, PRACH resource set in RA configuration used by Msg1, Msg1 length or format, RA configuration used by Msg1, etc.). For example, if the UE triggers RA for transmitting a specific service type data (e.g., URLLC service type), then the UE could select TTI information in the broadcast message for the specific service type. Moreover, the UE may understand the data belonging to which service type based on a service type indication (similar to logical channel priority) in configuration of logical channel/RB having available data.

[0066] The service type indication may be used in multiplexing procedure. For instance, the UE may not multiplex data with different service type indications into a TB for transmission. Alternatively, the UE may understand the data belonging to which service type based on header field of the data (e.g., RLC header field, PDCP field). The UE may also understand the data belonging to which service type based on delivering user plane protocol type/category (e.g., category 1 maps to URLLC). As another example, if the UE triggers RA when the UE has registered/authorized for URLLC service type, the UE could select TTI information in the broadcast message for URLLC service type. As a further example, if higher layer (e.g., NAS layer, application layer, RRC layer) in a UE sends a service indication to lower layer(e.g., MAC, PHY) in the UE when the UE triggers and/or performs RA, the UE could select TTI information in the broadcast message based on the service type indicated by the service indication.

[0067] In one embodiment, the UE selects TTI information in the broadcast message

based on random access purpose (e.g., request broadcast message, paging, positioning, location update, control plane establishment, beam recovery, etc.). And the random access purpose may be indicated by higher layer (e.g., NAS, RRC, application layer) in the UE.

[0068] In one embodiment, the UE selects TTI information in the broadcast message based on potential Msg3 size. For example, if the pending available data in the UE larger than a threshold when the UE is performing RA, the UE selects TTI information in the broadcast message for potential message size larger than the threshold.

[0069] In one embodiment, the UE selects TTI information in the broadcast message based on its DL measurement, based on connection establishment cause (e.g., emergency call, mo-data, mt-data, …), based on its current power ramping result (e.g., ramping over threshold times or threshold power, changing based on mapping table between ramping steps and TTI information), based on UE priority provided from network or UE subscription (e.g., access class, etc.), or based on Msg3 contents (e.g., which type control element could be included, BSR reporting for which LCG or which RB/LC, data from which user plane protocol stock, data from which radio bearer, data from which logical channel, …). For example, if Msg3 could include data from a specific or a set of LC or RB (e.g., URLLC type RB, CCCH, …), the UE could select TTI information in the broadcast message related to the LC or RB based on the UE's configuration. As another example, if Msg3 could include a special control element / special message, the UE could select TTI information in the broadcast message related to the special control element/message. Preferably, the UE will select another TTI information if the Msg3 doesn't include the special control element and/or the special message (e.g., RRC message).

[0070] In one embodiment, the UE selects TTI information in the broadcast message based on highest priority of radio bearers having available data. For example, the UE has available data belonging to radio bearer with priority 2 and priority 8 when the UE is performing RA. The UE could select TTI information in the broadcast message based on whether priority 2 is over a threshold or not.

[0071] In one embodiment, the UE selects TTI information in the broadcast message based on highest priority of logical channels having available data, or based on which user plane protocol stock (e.g., URLLC or eMBB type user plane protocol, protocol stock category/index 1

or 2, …) performing the random access.

[0072] **Solution 4 – Dedicated message.** In Solution 4, a UE could derive TTI length for Msg3 transmission through a dedicated message (e.g., RRC reconfiguration message, paging message, PDCCH for initiating RA, …) from a network. If multiple TTI information for Msg3 transmission are (implicitly or explicitly) included in the dedicated message, a UE could select one of them to apply to Msg3 transmission.

[0073] In one embodiment, the UE selects TTI information in dedicated message based on its Msg1 transmission (e.g., preamble group set in RA configuration used by Msg1, PRACH resource set in RA configuration used by Msg1, Msg1 length or format, RA configuration used by Msg1, etc.). For example, if the UE triggers RA for transmitting a specific service type data (e.g., URLLC service type), then the UE could select TTI information in dedicated message for the specific service type. Moreover, the UE may understand the data belonging to which service type based on a service type indication (similar to logical channel priority) in configuration of logical channel/RB having available data. The service type indication may be used in multiplexing procedure. For instance, the UE may not multiplex data with different service type indications into a TB for transmission. Alternatively, the UE may understand the data belonging to which service type based on header field of the data (e.g., RLC header field, PDCP field)), or based on delivering user plane protocol type/category (e.g., category 1 maps to URLLC).

[0074] As another example, if the UE triggers RA when the UE has registered/authorized for URLLC service type, the UE could select TTI information in the dedicated message for URLLC service type. As a further example, if higher layer (e.g., NAS layer, application layer, RRC layer) in the UE sends a service indication to lower layer(e.g., MAC, PHY) in the UE when the UE triggers and/or performs RA, the UE could select TTI information in the dedicated message based on the service type indicated by the service indication.

[0075] In one embodiment, the UE selects TTI information in the dedicated message based on random access purpose (e.g., request system information, paging, positioning, location update, control plane establishment, beam recovery, etc.). And the random access purpose may be indicated by higher layer (e.g., NAS, RRC, application layer) in the UE.

[0076] In one embodiment, the UE selects TTI information in the dedicated message based on potential Msg3 size. For example, if the pending available data in the UE larger than a threshold when the UE is performing RA, the UE selects TTI information in the dedicated message for potential message size larger than the threshold.

[0077] In one embodiment, the UE selects TTI information in the dedicated message based on its DL measurement, based on connection establishment cause (e.g., emergency call, mo-data, mt-data, …), based on its current power ramping result (e.g., ramping over threshold times or threshold power, changing based on mapping table between ramping steps and TTI information), based on UE priority provided from network or UE subscription (e.g., access class, etc.), or based on Msg3 contents (e.g., which type control element could be included, BSR reporting for which LCG or which RB/LC, data from which user plane protocol stock, data from which radio bearer, data from which logical channel, …). For example, if Msg3 could include data from a specific (set of) LC or RB (e.g. URLLC type RB, CCCH, …), the UE could select TTI information in dedicated message related to the LC or RB based on the UE's configuration. As another example, if Msg3 could include a special control element/special message, the UE could select TTI information in the dedicated message related to the special control element/message. Preferably, the UE will select another TTI information if the Msg3 doesn't include the special control element and/or the special message (e.g., RRC message).

[0078] In one embodiment, the UE selects TTI information in the dedicated message based on highest priority of radio bearers having available data. For example, the UE has available data belonging to radio bearer with priority 2 and priority 8 when the UE is performing RA. The UE could select TTI information in dedicated message based on whether priority 2 is over a threshold or not.

[0079] In one embodiment, the UE selects TTI information in the dedicated message based on highest priority of logical channels having available data, or based on which user plane protocol stock (e.g., URLLC or eMBB type user plane protocol, protocol stock category/index 1 or 2, …) performing the random access.

[0080] **Solution 5 – Implicitly derive from Msg2 Transmission.** In this solution, a UE could derive TTI length for Msg3 transmission based on implicit information of Msg2. In one

embodiment, a UE derives TTI length based on TTI length used by Msg2. The TTI duration of Msg3 transmission may be N times of TTI duration of Msg2. N value can be integer or decimal. The N value may be obtained by the UE based on one or multiple solutions mentioned above. For example, the UE may obtain the N value through the broadcast message from a network. And the UE could overwrite the N value provided in the broadcast message, if the UE receives another N value in a dedicated message.

[0081] In another embodiment, a UE derives TTI length based on frequency carrier used by Msg2. Each frequency carrier may have corresponding different TTI lengths. The corresponding TTI information may be predefined and/or provided through system information and/or dedicated RRC message.

[0082] *Msg3 start timing offset* - In LTE, there is a fixed gap period between Msg2 reception and Msg3 transmission. The fixed gap period is designed for covering UE's Msg2/3 processing time (e.g., decode, (de-)multiplexing transport block). However, in NR, some possible methods can bring benefits to reduce such fixed gap period. For example, if short TTI is applied to both Msg2/Msg3 transmissions as FIG. 11, the minimum of the fixed gap between Msg2 and Msg3 can be set to short TTI. Otherwise, the minimum gap could only be set to normal sub-frame length like without short TTI case.

[0083] There are also many other ways to reduce processing time (e.g., provision TB size). These methods will bring some benefits, as well as some limitations and/or complexity. As a conclusion, we think that it could be beneficial for network be capable to decide the length of gap period. For achieving the concept, a UE will need to know the gap information (or called Msg3 start timing offset) by information provided from network. The possible solutions are listed below.

[0084] **Solution 1 – RAR (Random Access Response).** In LTE, Msg3 transmission is scheduled by UL grant field in RAR. A RAR is a response for a preamble transmitted at a Msg1 transmission opportunity from UE(s). The format of RAR in LTE is shown in FIG. 8.

[0085] The Msg3 transmission is scheduled according to UL (Uplink) grant field in the RAR. In this solution, additional information is added into RAR for adjusting Msg3 start timing

offset. In one embodiment, the additional information can be a new field in RAR or a new field in Msg2 for a specific preamble or added into UL grant field.

[0086] **Solution 2 – Common field in Msg2.** In Solution 2, the Msg3 start timing offset is also carried in Msg2 similar to Solution 1. The Msg2 may include multiple RARs. And MAC sub-header of a RAR will indicate the RAR is for which preamble. However, since the TTI length has limited choices, there may be no need to repeatedly include the redundant information. Hence, it is proposed to use common field(s) in Msg2 to carry Msg3 start timing offset.

[0087] The Msg3 start timing offset carried in a common field will be applied to UEs performed different Msg1 transmission (e.g., different preamble). The different Msg1 transmissions are differentiable by receiving side in Code domain and/or Time domain and/or Frequency domain. Preferably, the common field(s) may be carried as control element. Alternatively, the common field(s) may be carried as part of MAC (sub-)header, as data (e.g., RRC configuration), or in control signal (e.g., PDCCH signal) for scheduling Msg2.

[0088] If multiple common fields are included in a Msg2, a UE could select one of them to apply to Msg3 transmission. In one embodiment, the UE could select common field based on its Msg1 transmission (e.g., preamble group set in RA configuration used by Msg1, PRACH resource set in RA configuration used by Msg1, Msg1 length or format, RA configuration used by Msg1, etc.). The UE could also select common field based on service types (e.g., URLLC, eMBB, delay sensitive, ...). For example, if the UE triggers RA for transmitting a specific service type data (e.g., URLLC service type), then the UE could select common field for the specific service type. Moreover, the UE may understand the data belonging to which service type based on a service type indication (similar to logical channel priority) in configuration of logical channel/RB having available data. The service type indication may be used in multiplexing procedure. For instance, the UE may not multiplex data with different service type indications into a TB for transmission.

[0089] Alternatively, the UE may understand the data belonging to which service type based on header field of the data (e.g., RLC header field, PDCP field), or based on delivering user plane protocol type/category (e.g., category 1 maps to URLLC). As an example, if the UE

triggers RA when the UE has registered/authorized for URLLC service type, the UE could select common field for URLLC service type. As another example, if higher layer (e.g., NAS layer, application layer, RRC layer) in a UE sends a service indication to lower layer(e.g., MAC, PHY) in the UE when the UE triggers and/or performs RA, the UE could select common field based on the service type indicated by the service indication.

[0090] In one embodiment, the UE selects common field based on random access purpose (e.g., request system information, paging, positioning, location update, control plane establishment, beam recovery, etc.). And the random access purpose may be indicated by higher layer (e.g., NAS, RRC, application layer) in the UE.

[0091] In one embodiment, the UE selects common field based on potential Msg3 size. For example, if the pending available data in a UE larger than a threshold when a UE is performing RA, the UE selects common field for potential message size larger than the threshold.

[0092] In one embodiment, the UE selects common field based on its DL measurement, based on connection establishment cause (e.g., emergency call, mo-data, mt-data, …), based on its current power ramping result (e.g., ramping over threshold times or threshold power, changing based on mapping table between ramping steps and Msg3 start timing offset), based on UE priority (e.g., access class, etc.) provided from network or UE subscription, or based on Msg3 contents (e.g., which type control element could be included, BSR reporting for which LCG or which RB/LC, data from which user plane protocol stock, data from which radio bearer, data from which logical channel, …). For example, if Msg3 could include data from a specific (set of) LC or RB (e.g. URLLC type RB, CCCH, …), the UE could select common field related to the LC or RB based on the UE's configuration (e.g., association between LC/RB and random access configuration, association between LC/RB and service configuration, association between LC/RB and transport channel configuration, etc.). As another example, if Msg3 could include a special control element / special message, the UE could select common field related to the special control element/message. Preferably, the UE will select another common field if the Msg3 doesn't include the special control element and/or the special message (e.g., RRC message).

[0093] In one embodiment, the UE selects common field based on highest priority of radio bearers having available data. For example, the UE has available data belonging to radio bearer with priority 2 and priority 8 when the UE is performing RA. The UE could select common field based on whether priority 2 is over a threshold or not.

[0094] In one embodiment, the UE selects common field based on highest priority of logical channels having available data, or based on which user plane protocol stock (e.g., URLLC or eMBB type user plane protocol, protocol stock category/index 1 or 2, …) performing the random access.

[0095] **Solution 3 – Broadcast Information**. In Solution 3, a UE could derive Msg3 start timing offset for Msg3 transmission through a broadcast message (e.g., system information(s), MIB, etc.) from a network (e.g., gNB, base station, TRP, etc.). If multiple Msg3 start timing offsets for Msg3 transmission are included in the broadcast message, a UE could select one of them to apply to Msg3 transmission.

[0096] In one embodiment, the UE selects Msg3 start timing offsets in the broadcast message based on its Msg1 transmission (e.g., preamble group set in RA configuration used by Msg1, PRACH resource set in RA configuration used by Msg1, Msg1 length or format, RA configuration used by Msg1, etc.), or based on service types (e.g., URLLC, eMBB, delay sensitive, ...). For example, if the UE triggers RA for transmitting a specific service type data (e.g., URLLC service type), then the UE could select Msg3 start timing offset in the broadcast message for the specific service type. Moreover, the UE may understand the data belonging to which service type based on a service type indication (similar to logical channel priority) in configuration of logical channel/RB having available data.

[0097] The service type indication may be used in multiplexing procedure. For instance, the UE may not multiplex data with different service type indications into a TB for transmission. Alternatively, the UE may understand the data belonging to which service type based on header field of the data (e.g., RLC header field, PDCP field). The UE may also understand the data belonging to which service type based on delivering user plane protocol type/category (e.g., category 1 maps to URLLC). As another example, if the UE triggers RA when the UE has registered/authorized for URLLC service type, the UE could select Msg3 start timing offset in

the broadcast message for URLLC service type. As a further example, if higher layer (e.g., NAS layer, application layer, RRC layer) in a UE sends a service indication to lower layer(e.g., MAC, PHY) in the UE when the UE triggers and/or performs RA, the UE could select Msg3 start timing offset in the broadcast message based on the service type indicated by the service indication.

[0098] In one embodiment, the UE selects Msg3 start timing offset in the broadcast message based on random access purpose (e.g., request broadcast message, paging, positioning, location update, control plane establishment, beam recovery, etc.). And the random access purpose may be indicated by higher layer (e.g., NAS, RRC, application layer) in the UE.

[0099] In one embodiment, the UE selects Msg3 start timing offset in the broadcast message based on potential Msg3 size. For example, if the pending available data in the UE larger than a threshold when the UE is performing RA, the UE selects Msg3 start timing offset in the broadcast message for potential message size larger than the threshold.

[00100] In one embodiment, the UE selects Msg3 start timing offset in the broadcast message based on its DL measurement, based on connection establishment cause (e.g., emergency call, mo-data, mt-data, …), based on its current power ramping result (e.g., ramping over threshold times or threshold power, changing based on mapping table between ramping steps and Msg3 start timing offset), based on UE priority provided from network or UE subscription (e.g., access class, etc.), or based on Msg3 contents (e.g., which type control element could be included, BSR reporting for which LCG or which RB/LC, data from which user plane protocol stock, data from which radio bearer, data from which logical channel, …). For example, if Msg3 could include data from a specific or a set of LC or RB (e.g., URLLC type RB, CCCH, …), the UE could select Msg3 start timing offset in the broadcast message related to the LC or RB based on the UE's configuration. As another example, if Msg3 could include a special control element / special message, the UE could select Msg3 start timing offset in the broadcast message related to the special control element/message. Preferably, the UE will select another Msg3 start timing offset if the Msg3 doesn't include the special control element and/or the special message (e.g., RRC message).

[00101] In one embodiment, the UE selects Msg3 start timing offset in the broadcast

message based on highest priority of radio bearers having available data. For example, the UE has available data belonging to radio bearer with priority 2 and priority 8 when the UE is performing RA. The UE could select Msg3 start timing offset in the broadcast message based on whether priority 2 is over a threshold or not.

[00102] In one embodiment, the UE selects Msg3 start timing offset in the broadcast message based on highest priority of logical channels having available data, or based on which user plane protocol stock (e.g., URLLC or eMBB type user plane protocol, protocol stock category/index 1 or 2, …) performing the random access.

[00103] **Solution 4 – Dedicated message.** In Solution 4, a UE could derive Msg3 start timing offset for Msg3 transmission through a dedicated message (e.g., RRC reconfiguration message, paging message, PDCCH for initiating RA, …) from a network. If multiple Msg3 start timing offsets for Msg3 transmission are (implicitly or explicitly) included in the dedicated message, a UE could select one of them to apply to Msg3 transmission.

[00104] In one embodiment, the UE selects Msg3 start timing offset in dedicated message based on its Msg1 transmission (e.g., preamble group set in RA configuration used by Msg1, PRACH resource set in RA configuration used by Msg1, Msg1 length or format, RA configuration used by Msg1, etc), or based on service types (e.g., URLLC, eMBB, delay sensitive, ...). For example, if the UE triggers RA for transmitting a specific service type data (e.g., URLLC service type), then the UE could select Msg3 start timing offset in dedicated message for the specific service type. Moreover, the UE may understand the data belonging to which service type based on a service type indication (similar to logical channel priority) in configuration of logical channel/RB having available data. The service type indication may be used in multiplexing procedure. For instance, the UE may not multiplex data with different service type indications into a TB for transmission. Alternatively, the UE may understand the data belonging to which service type based on header field of the data (e.g., RLC header field, PDCP field)), or based on delivering user plane protocol type/category (e.g., category 1 maps to URLLC).

[00105] As another example, if the UE triggers RA when the UE has registered/authorized for URLLC service type, the UE could select Msg3 start timing offset in the dedicated message

for URLLC service type. As a further example, if higher layer (e.g., NAS layer, application layer, RRC layer) in the UE sends a service indication to lower layer (e.g., MAC, PHY) in the UE when the UE triggers and/or performs RA, the UE could select Msg3 start timing offset in the dedicated message based on the service type indicated by the service indication.

[00106] In one embodiment, the UE selects Msg3 start timing offset in the dedicated message based on random access purpose (e.g., request system information, paging, positioning, location update, control plane establishment, beam recovery, etc.). And the random access purpose may be indicated by higher layer (e.g., NAS, RRC, application layer) in the UE.

[00107] In one embodiment, the UE selects Msg3 start timing offset in the dedicated message based on potential Msg3 size. For example, if the pending available data in the UE larger than a threshold when the UE is performing RA, the UE selects Msg3 start timing offset in the dedicated message for potential message size larger than the threshold.

[00108] In one embodiment, the UE selects Msg3 start timing offset in the dedicated message based on its DL measurement, based on connection establishment cause (e.g., emergency call, mo-data, mt-data, …), based on its current power ramping result (e.g., ramping over threshold times or threshold power, changing based on mapping table between ramping steps and Msg3 start timing offset), based on UE priority provided from network or UE subscription (e.g., access class, etc), or based on Msg3 contents (e.g., which type control element could be included, BSR reporting for which LCG or which RB/LC, data from which user plane protocol stock, data from which radio bearer, data from which logical channel, …). For example, if Msg3 could include data from a specific (set of) LC or RB (e.g., URLLC type RB, CCCH, …), the UE could select Msg3 start timing offset in dedicated message related to the LC or RB based on the UE's configuration. As another example, if Msg3 could include a special control element / special message, the UE could select Msg3 start timing offset in the dedicated message related to the special control element/message. Preferably, the UE will select another Msg3 start timing offset if the Msg3 doesn't include the special control element and/or the special message (e.g., RRC message).

[00109] In one embodiment, the UE selects Msg3 start timing offset in the dedicated message based on highest priority of radio bearers having available data. For example, the UE

Samsung Exhibit 1009, Page 29 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

has available data belonging to radio bearer with priority 2 and priority 8 when the UE is performing RA. The UE could select Msg3 start timing offset in dedicated message based on whether priority 2 is over a threshold or not.

[00110] In one embodiment, the UE selects Msg3 start timing offset in the dedicated message based on highest priority of logical channels having available data, or based on which user plane protocol stock (e.g., URLLC or eMBB type user plane protocol, protocol stock category/index 1 or 2, …) performing the random access.

[00111] **Solution 5 – Implicitly derive from Msg2 Transmission.** In this solution, a UE could derive Msg3 start timing offset for Msg3 transmission based on implicit information of Msg2. In one embodiment, a UE derives Msg3 start timing offset based on start timing offset used by Msg2. The Msg3 start timing offset of Msg3 transmission may be N times of start timing offset of Msg2. N value can be integer or decimal. The N value may be obtained by the UE based on one or multiple solutions mentioned above. For example, the UE may obtain the N value through the broadcast message from a network. And the UE could overwrite the N value provided in the broadcast message, if the UE receives another N value in a dedicated message.

[00112] In another embodiment, a UE derives Msg3 start timing offset based on frequency carrier used by Msg2. Each frequency carrier may have corresponding different Msg3 start timing offsets. The corresponding Msg3 start timing offset may be predefined and/or provided through system information and/or dedicated RRC message.

[00113] The Msg3 start timing offset can be derived through the solution 1 to 5 mentioned above or combination of those solutions, while Msg3 start timing offset and TTI information of Msg3 can apply the same or different solutions. The Msg3 start timing offset can be indicated in TTI duration, numerology, symbol, slot, microsecond, millisecond or N times of periodicity of periodic behavior. N can be an integer or a decimal number.

[00114] FIG. 12 is a flow chart 1200 according to one exemplary embodiment from the perspective of a UE. In step 1205, the UE receives a dedicated message from a network to set a TTI duration of Msg3 transmission and/or a start timing offset for Msg3 transmission. In step 1210, the UE transmits a Msg1 to the network. In step 1215, the UE receives a Msg2 from the

network in response to the Msg1. In step 1220, the UE transmits a Msg3 to the network according to the TTI duration and/or the start timing offset.

[00115] Referring back to FIGS. 3 and 4, in one exemplary embodiment of a UE, the device 300 includes a program code 312 stored in the memory 310. The CPU 308 could execute program code 312 to enable the UE (i) to receive a dedicated message from a network to set a TTI duration of Msg3 transmission and/or a start timing offset for Msg3 transmission, (ii) to transmit a Msg1 to the network, (iii) to receive a Msg2 from the network in response to the Msg1, and (iv) to transmit a Msg3 to the network according to the TTI duration and/or the start timing offset. Furthermore, the CPU 308 can execute the program code 312 to perform all of the above-described actions and steps or others described herein.

[00116] FIG. 13 is a flow chart 1300 according to one exemplary embodiment from the perspective of a UE. In step 1305, the UE receives a broadcast message from a network to set TTI duration of Msg3. In step 1310, the UE transmits a Msg1 to the network. In step 1315, the UE receives a Msg2 from the network in response to the Msg1. In step 1320, the UE transmits a Msg3 to the network according to the TTI duration of Msg3.

[00117] Referring back to FIGS. 3 and 4, in one exemplary embodiment of a UE, the device 300 includes a program code 312 stored in the memory 310. The CPU 308 could execute program code 312 to enable the UE (i) to receive a broadcast message from a network to set TTI duration of Msg3, (ii) to transmit a Msg1 to the network, (iii) to receive a Msg2 from the network in response to the Msg1, and (iv) to transmit a Msg3 to the network according to the TTI duration of Msg3. Furthermore, the CPU 308 can execute the program code 312 to perform all of the above-described actions and steps or others described herein.

[00118] FIG. 14 is a flow chart 1400 according to one exemplary embodiment from the perspective of a UE. In step 1405, the UE transmits a preamble to a network. In step 1410, the UE receives a Msg2 from the network in response to the Msg1, wherein the Msg2 contains a TTI information of Msg3 transmission and/or a start timing offset of Msg3 transmission. In one embodiment, the TTI information of Msg3 transmission is indicated in a common field for multiple RARs in the Msg2. In another embodiment, the TTI information of Msg3 is indicated in a RAR in response to the Msg1 transmission. In one embodiment, the start timing offset of

Msg3 is indicated in a common field for multiple RARs in the Msg2. In another embodiment, the start timing offset of Msg3 is indicated in a RAR in response to the Msg1 transmission. In step 1415, the UE transmits a Msg3 to the network according to the TTI information of Msg3 and/or the start timing offset of Msg3.

[00119] Referring back to FIGS. 3 and 4, in one exemplary embodiment of a UE, the device 300 includes a program code 312 stored in the memory 310. The CPU 308 could execute program code 312 to enable the UE (i) to transmit a preamble to a network, (ii) to receive a Msg2 from the network in response to the preamble, wherein the Msg2 contains a TTI duration of Msg3 transmission and/or a start timing offset of Msg3 transmission, and (iii) to perform a Msg3 transmission to the network according to the TTI information of Msg3 and/or the start timing offset of Msg3. Furthermore, the CPU 308 can execute the program code 312 to perform all of the above-described actions and steps or others described herein.

[00120] FIG. 15 is a flow chart 1500 according to one exemplary embodiment from the perspective of a UE. In step 1505, the UE transmits a Msg1 to a network. In step 1510, the UE receives a Msg2 from the network in response to the Msg1. In step 1515, the UE transmits a Msg3 to the network according to a TTI duration of the Msg3, wherein the TTI duration of the Msg3 is decided based on a TTI duration of Msg2.

[00121] Referring back to FIGS. 3 and 4, in one exemplary embodiment of a UE, the device 300 includes a program code 312 stored in the memory 310. The CPU 308 could execute program code 312 to enable the UE (i) to transmit a Msg1 to a network, (ii) to receive a Msg2 from the network in response to the Msg1, and (iii) to transmit a Msg3 to the network according to a TTI duration of the Msg3, wherein the TTI duration of the Msg3 is decided based on a TTI duration of Msg2. Furthermore, the CPU 308 can execute the program code 312 to perform all of the above-described actions and steps or others described herein.

[00122] FIG. 16 is a flow chart 1600 according to one exemplary embodiment from the perspective of a UE. In step 1605, the UE receives a dedicated message from a network to set a start timing offset for Msg3 transmission. In step 1610, the UE transmits a Msg1 to the network. In step 1615, the UE receives a Msg2 from the network in response to the Msg1. In step 1620,

the UE transmits a Msg3 to the network after the start timing offset passes from when the UE received the Msg2.

[00123] Referring back to FIGS. 3 and 4, in one exemplary embodiment of a UE, the device 300 includes a program code 312 stored in the memory 310. The CPU 308 could execute program code 312 to enable the UE (i) to receive a dedicated message from a network to set a start timing offset for Msg3 transmission, (ii) to transmit a Msg1 to the network, (iii) to receive a Msg2 from the network in response to the Msg1, and (iv) to transmit a Msg3 to the network after the start timing offset passes from when the UE received the Msg2. Furthermore, the CPU 308 can execute the program code 312 to perform all of the above-described actions and steps or others described herein.

[00124] FIG. 17 is a flow chart 1700 according to one exemplary embodiment from the perspective of a UE. In step 1705, the UE receives a broadcast message from a network to set a start timing offset for Msg3 transmission. In step 1710, the UE transmits a Msg1 to the network. In step 1715, the UE receives a Msg2 from the network in response to the Msg1. In step 1720, the UE transmits a Msg3 to the network after the start timing offset passes from when the UE received the Msg2.

[00125] Referring back to FIGS. 3 and 4, in one exemplary embodiment of a UE, the device 300 includes a program code 312 stored in the memory 310. The CPU 308 could execute program code 312 to enable the UE (i) to receive a broadcast message from a network to set a start timing offset for Msg3 transmission, (ii) to transmit a Msg1 to the network, (iii) to receive a Msg2 from the network in response to the Msg1, and (iv) to transmit a Msg3 to the network after the start timing offset passes from when the UE received the Msg2. Furthermore, the CPU 308 can execute the program code 312 to perform all of the above-described actions and steps or others described herein.

[00126] FIG. 18 is a flow chart 1800 according to one exemplary embodiment from the perspective of a UE. In step 1805, the UE transmits a Msg1 to the network. In step 1810, the UE receives a Msg2 from the network in response to the Msg1, wherein the Msg2 contains a start timing offset for Msg3 transmission. In step 1815, the UE transmits a Msg3 to the network after the start timing offset passes from when the UE received the Msg2.

[00127] Referring back to FIGS. 3 and 4, in one exemplary embodiment of a UE, the device 300 includes a program code 312 stored in the memory 310. The CPU 308 could execute program code 312 to enable the UE (i) to transmit a Msg1 to the network, (iii) to receive a Msg2 from the network in response to the Msg1, (ii) to receive a Msg2 from the network in response to the Msg1, wherein the Msg2 contains a start timing offset for Msg3 transmission, and (iii) to transmit a Msg3 to the network after the start timing offset passes from when the UE received the Msg2. Furthermore, the CPU 308 can execute the program code 312 to perform all of the above-described actions and steps or others described herein.

[00128] FIG. 19 is a flow chart 1900 according to one exemplary embodiment from the perspective of a UE. In step 1905, the UE receives a message from a network, wherein the message includes a TTI information of Msg3. In step 1910, the UE transmits a preamble to a network. In step 1915, the UE receives a Msg2 from the network in response to the preamble. In one embodiment, the TTI information of Msg3 is indicated in a common field for multiple RARs in the Msg2. In another embodiment, the TTI information of Msg3 is indicated in a RAR in response to the Msg1 transmission. In step 1915, the UE performs a Msg3 transmission to the network according to the TTI information of Msg3.

[00129] Referring back to FIGS. 3 and 4, in one exemplary embodiment of a UE, the device 300 includes a program code 312 stored in the memory 310. The CPU 308 could execute program code 312 to enable the UE (i) to receive a message from a network, wherein the message includes a TTI information of Msg3, (ii) to transmit a preamble to a network, (ii) to receive a Msg2 from the network in response to the preamble, and (iii) to perform a Msg3 transmission to the network according to the TTI information of Msg3. Furthermore, the CPU 308 can execute the program code 312 to perform all of the above-described actions and steps or others described herein.

[00130] With respect to the embodiments illustrated in FIGS. 12 through 19 and discussed above, in one embodiment, the UE selects a TTI information of Msg3 if there are multiple TTI information of Msg3 in the dedicated message, the broadcast message, or the Msg2. Furthermore, the TTI information of Msg3 could be included in a RAR in response to Msg1 or in a common field for multiple RARs in a Msg2.

[00131] In one embodiment, the UE selects a TTI information of Msg3 if there are multiple start timing offsets for Msg3 transmission in the dedicated message, the broadcast message, or the Msg2. Furthermore, the start timing offset of Msg3 could be included in a RAR in response to Msg1 or in a common field for multiple RARs in a Msg2.

[00132] 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.

[00133] 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.

[00134] 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.

[00135] 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.

[00136] 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.

[00137] 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.

[00138] While the invention has been described in connection with various aspects, it could 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 a UE (User Equipment) for performing random access procedure, comprising:

the UE receives a message from a network, wherein the message includes a TTI (Transmission Time Interval) information of Msg3;

the UE transmits a preamble to the network;

the UE receives a Msg2 from the network for responding the preamble; and

the UE performs a Msg3 transmission to the network according to the TTI information of Msg3.

2. The method of claim 1, further comprising:

the UE selects the TTI information of Msg3 based on a PRACH (Physical Random Access Channel) resource set of the preamble or preamble set of the preamble, if there are multiple TTI information of Msg3 in the message.

3. The method of claim 1, further comprising:

the UE selects the TTI information of Msg3 based on random access purpose, if there are multiple TTI information in the message.

4. The method of claim 1, further comprising:

the UE selects the TTI information of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple TTI information of Msg3 in the message.

5. The method of claim 1, wherein the message is a downlink control signal.

6. The method of claim 1, wherein the message is a RRC (Radio Resource Control) message.

7. The method of claim 1, further comprising:

the UE selects the TTI information of Msg3 based on a random access configuration of the preamble transmission, if there are multiple TTI information of Msg3 in the message.

8. A method of a UE (User Equipment) for performing random access procedure, comprising:

the UE transmits a preamble to a network;

the UE receives a Msg2 from the network in response to the preamble, wherein the Msg2 contains a TTI (Transmission Time Interval) information of Msg3; and

the UE performs a Msg3 transmission to the network according to the TTI information.

9. The method of claim 8, further comprising:

the UE selects the TTI information of Msg3 based on random access purpose, if there are multiple TTI information of Msg3 in the Msg2.

10. The method of claim 8, further comprising:

the UE selects the TTI information of Msg3 based on a PRACH (Physical Random Access Channel) resource set of the preamble transmission or a preamble set of the preamble transmission, if there are multiple TTI information of Msg3 in the Msg2.

11. The method of claim 8, further comprising:

the UE selects the TTI information of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple TTI information of Msg3 in the Msg2.

12. The method of claim 8, wherein the TTI information of Msg3 is included in a RAR (Random Access Response) for responding the preamble.

13. The method of claim 8, wherein the TTI information of Msg3 is included in a common field for multiple RARs in the Msg2.

14. The method of claim 8, wherein the TTI information of Msg3 includes a TTI duration of Msg3.

15. The method of claim 8, wherein the TTI information of Msg3 includes a start timing offset of Msg3.

16. A User Equipment (UE), comprising:

a control circuit;

a processor installed in the control circuit; and

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:

receive a message from a network, wherein the message includes a TTI (Transmission Time Interval) information of Msg3;

transmit a preamble to the network;

receive a Msg2 from the network for responding the preamble; and

perform a Msg3 transmission to the network according to the TTI information of Msg3.

17. The UE of claim 16, wherein the processor is further configured to execute the program code stored in the memory to:

select the TTI information of Msg3 based on a PRACH (Physical Random Access Channel) resource set of the preamble transmission or a preamble set of the preamble transmission, if there are multiple TTI information of Msg3 in the message.

18. The UE of claim 16, wherein the processor is further configured to execute the program code stored in the memory to:

select the TTI information of Msg3 based on random access purpose, if there are multiple TTI information of Msg3 in the message.

19. The UE of claim 16, wherein the processor is further configured to execute the program code stored in the memory to:

select the TTI information of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple TTI information of Msg3 in the message.

20. The UE of claim 16, wherein the processor is further configured to execute the program code stored in the memory to:

select the TTI information of Msg3 based on a random access configuration of the preamble transmission, if there are multiple TTI information of Msg3 in the message.

21. A User Equipment (UE), comprising:

a control circuit;

a processor installed in the control circuit; and

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:

transmit a preamble to a network;

receive a Msg2 from the network in response to the preamble, wherein the Msg2 contains a TTI (Transmission Time Interval) information of Msg3; and

perform a Msg3 transmission to the network according to the TTI information of Msg3.

22. The UE of claim 21, wherein the processor is further configured to execute the program code stored in the memory to:

the UE selects the TTI information of Msg3 based on random access purpose, if there are multiple TTI information of Msg3 in the Msg2.

23. The UE of claim 21, wherein the processor is further configured to execute the program code stored in the memory to:

the UE selects the TTI information of Msg3 based on a PRACH (Physical Random Access Channel) resource set of the preamble or a preamble set of the preamble transmission, if there are multiple TTI information of Msg3 in the Msg2.

24. The UE of claim 21, wherein the processor is further configured to execute the program code stored in the memory to:

the UE selects the TTI information of Msg3 based on highest priority of logical channel having available data, if there are multiple TTI information of Msg3 in the Msg2.

ABSTRACT

A method and apparatus are disclosed, from the perspective of the UE, for performing random access procedure. In one embodiment, the method includes the UE receiving a message from a network. The message includes a TTI information of Msg3. In addition, the method includes the UE transmitting a preamble to the network. The method also includes the UE receiving a Msg2 from the network for responding the preamble. The method further includes the UE performing a Msg3 transmission to the network according to the TTI information of Msg3.

Samsung Exhibit 1009, Page 43 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

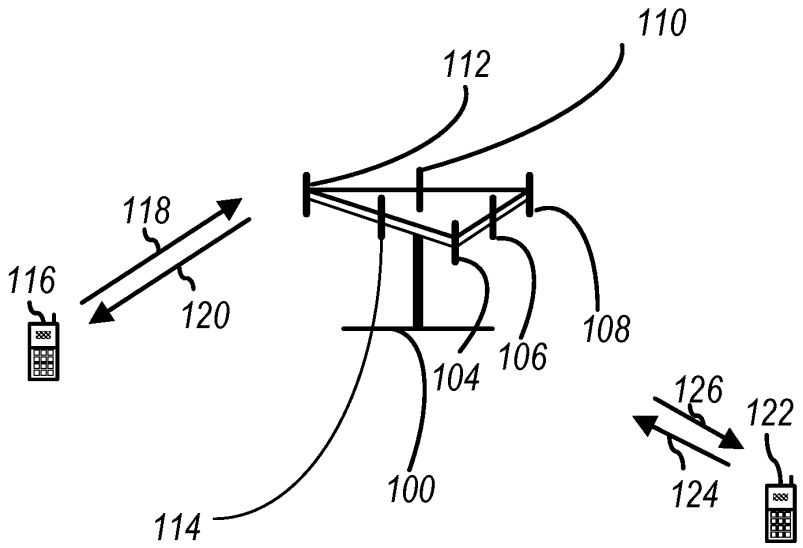


FIG. 1

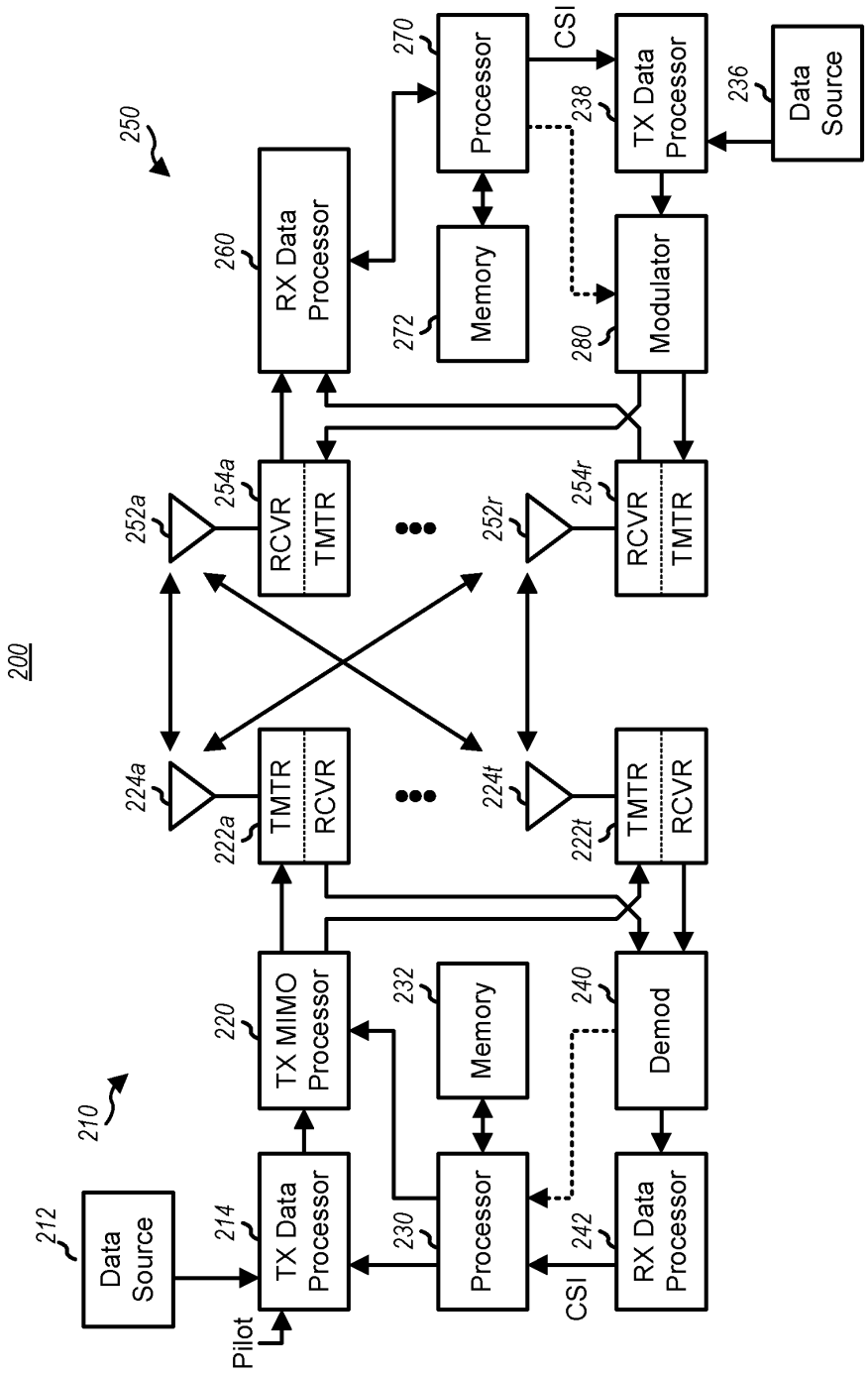

200
210
212
Data Source
214
TX Data Processor
Pilot
220
TX MIMO Processor
222a
TMTR
RCVR
224a
224t
222t
230
Processor
232
Memory
240
Demod
242
RX Data Processor
CSI
250
260
RX Data Processor
270
Processor
272
Memory
280
Modulator
238
CSI
TX Data Processor
236
Data Source
252a
254a
RCVR
TMTR
252r
254r

FIG. 2

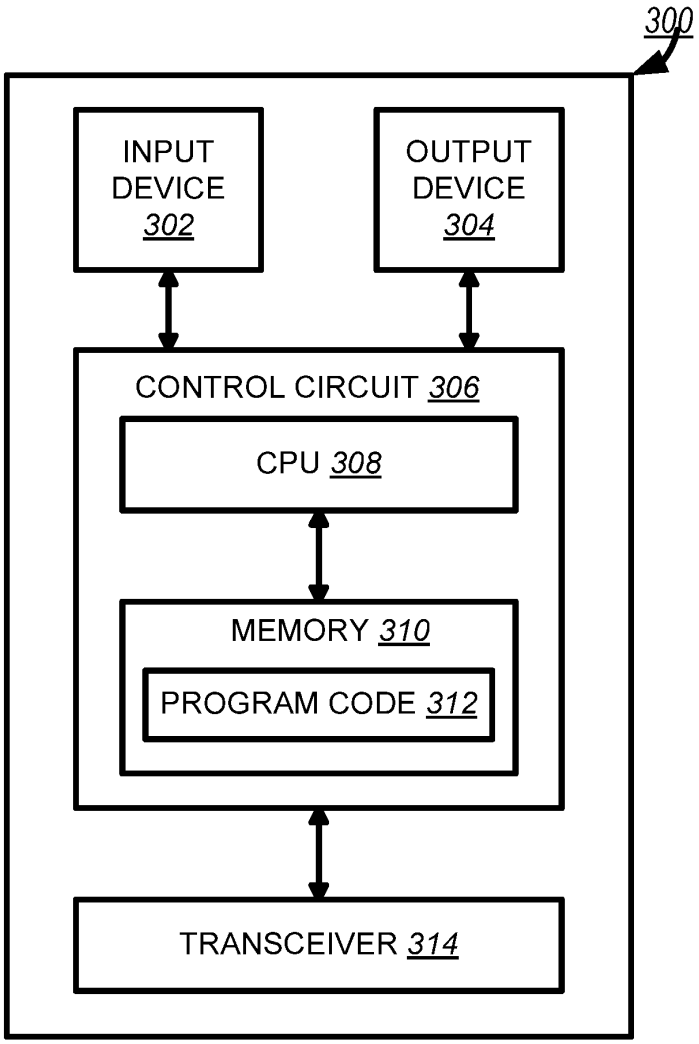

300
INPUT DEVICE 302
OUTPUT DEVICE 304
CONTROL CIRCUIT 306
CPU 308
MEMORY 310
PROGRAM CODE 312
TRANSCEIVER 314

FIG. 3

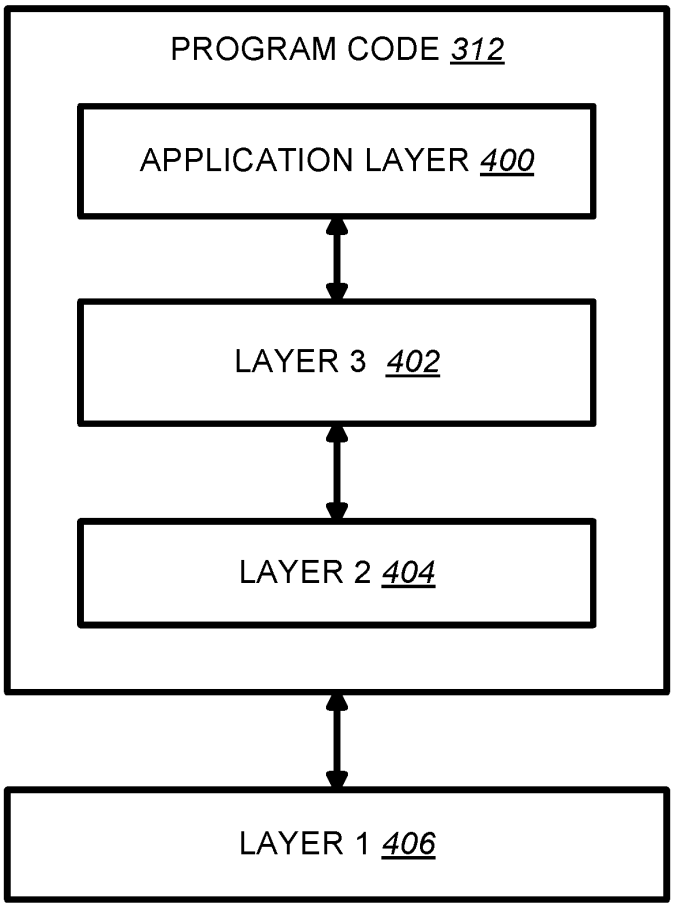

PROGRAM CODE 312
APPLICATION LAYER 400
LAYER 3 402
LAYER 2 404
LAYER 1 406

FIG. 4

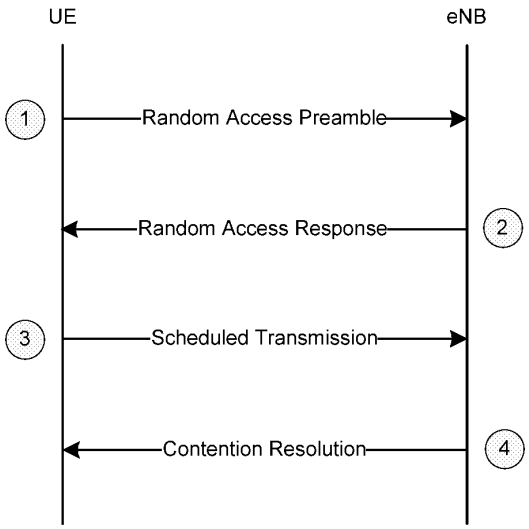


FIG. 5 (PRIOR ART)

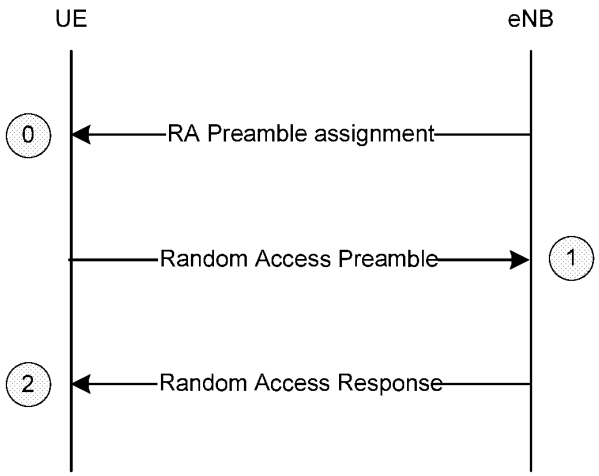


FIG. 6 (PRIOR ART)

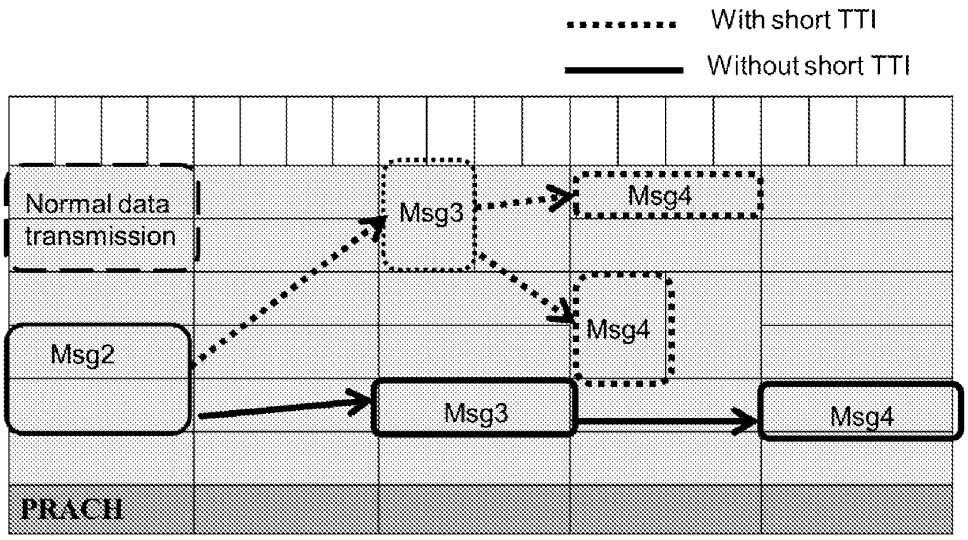

With short TTI
Without short TTI
Normal data transmission
Msg3
Msg4
Msg4
Msg2
Msg3
Msg4
PRACH

FIG. 7

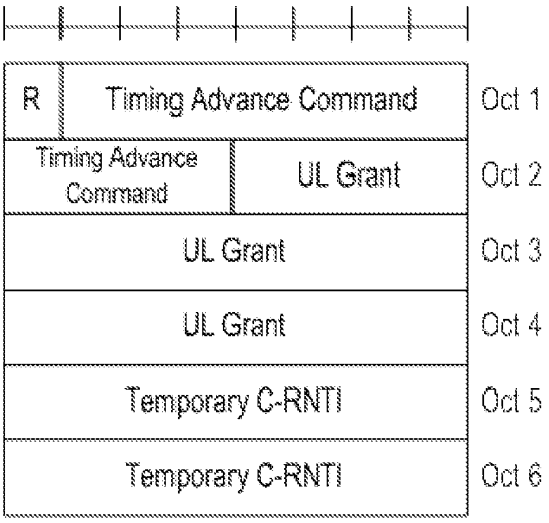

R
Timing Advance Command
Oct 1
Timing Advance Command
UL Grant
Oct 2
UL Grant
Oct 3
UL Grant
Oct 4
Temporary C-RNTI
Oct 5
Temporary C-RNTI
Oct 6

FIG. 8

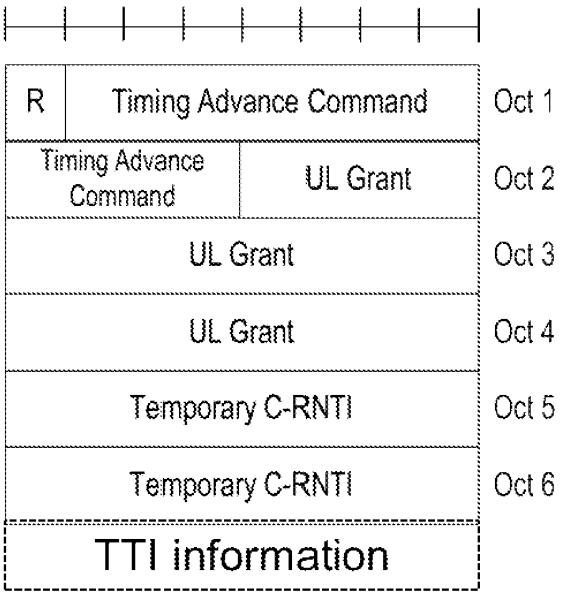

R
Timing Advance Command
Oct 1
Timing Advance Command
UL Grant
Oct 2
UL Grant
Oct 3
UL Grant
Oct 4
Temporary C-RNTI
Oct 5
Temporary C-RNTI
Oct 6
TTI information

FIG. 9

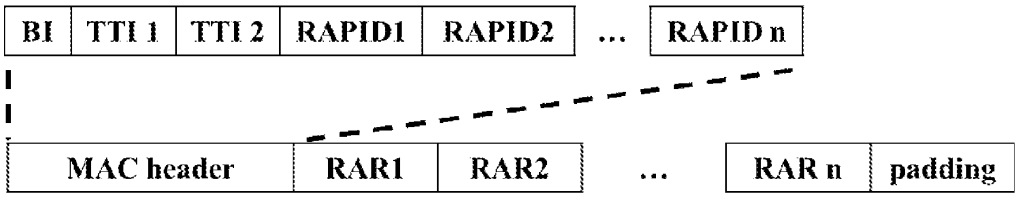

BI
TTI 1
TTI 2
RAPID1
RAPID2
…
RAPID n
MAC header
RAR1
RAR2
…
RAR n
padding

FIG. 10

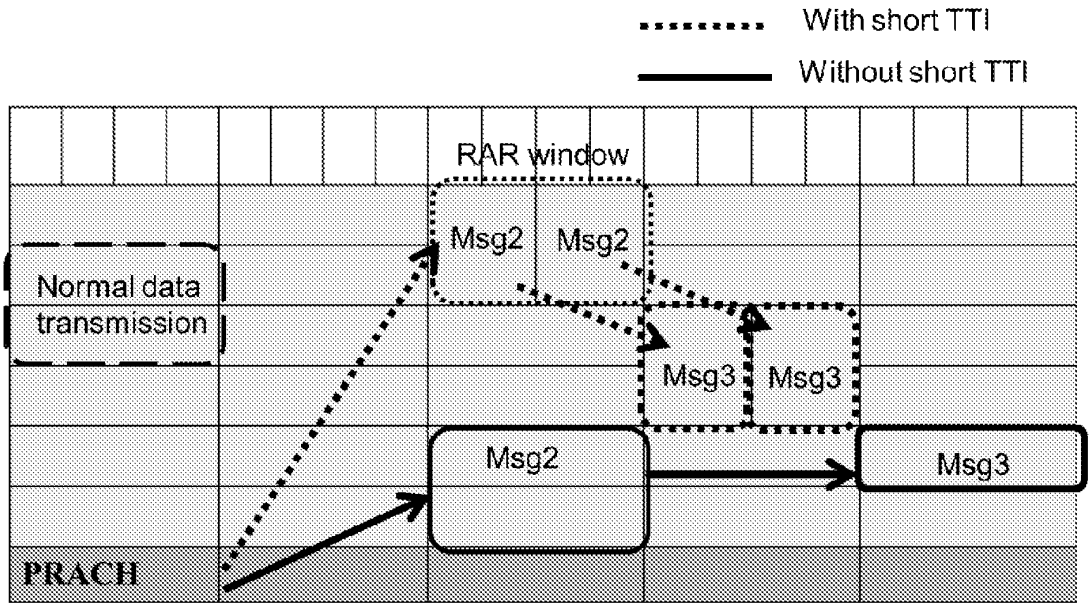

With short TTI
Without short TTI
RAR window
Msg2
Msg2
Normal data transmission
Msg3
Msg3
Msg2
Msg3
PRACH

FIG. 11

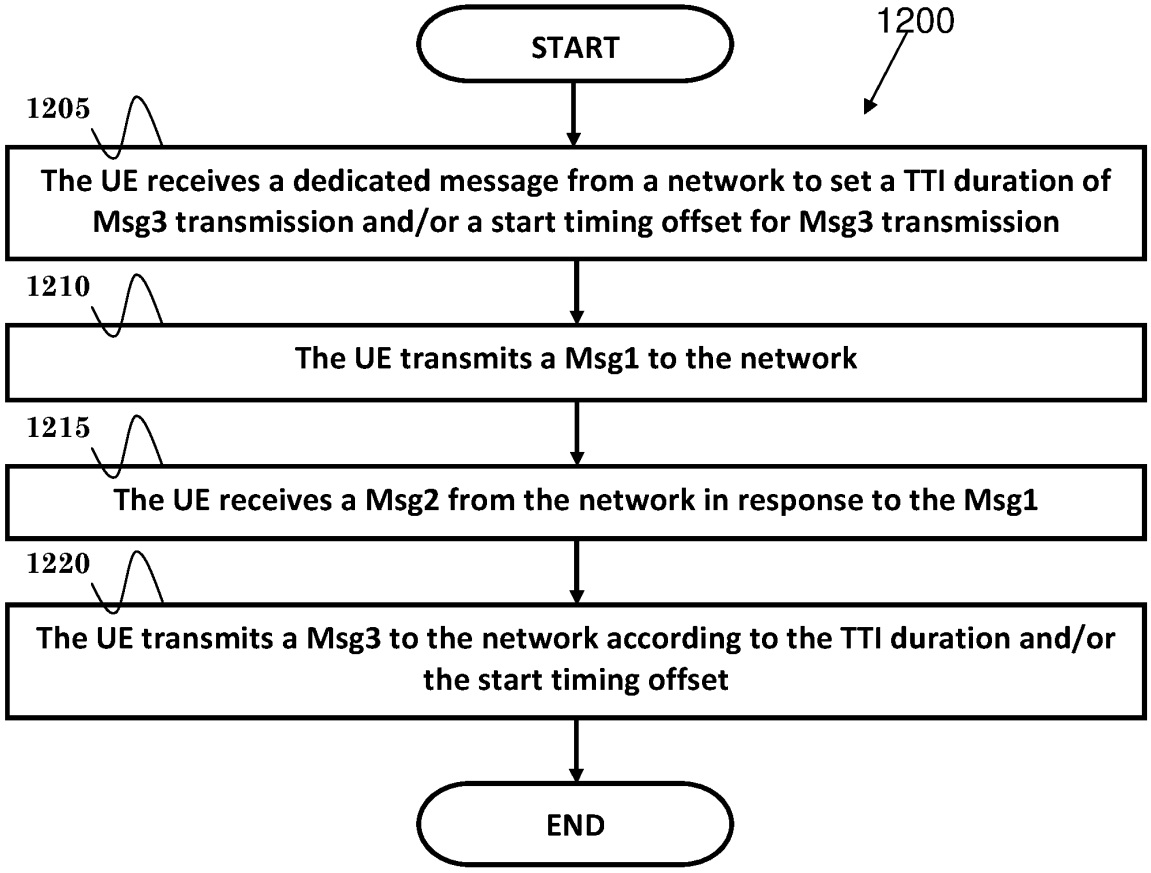

START
1200
1205
The UE receives a dedicated message from a network to set a TTI duration of Msg3 transmission and/or a start timing offset for Msg3 transmission
1210
The UE transmits a Msg1 to the network
1215
The UE receives a Msg2 from the network in response to the Msg1
1220
The UE transmits a Msg3 to the network according to the TTI duration and/or the start timing offset
END

FIG. 12

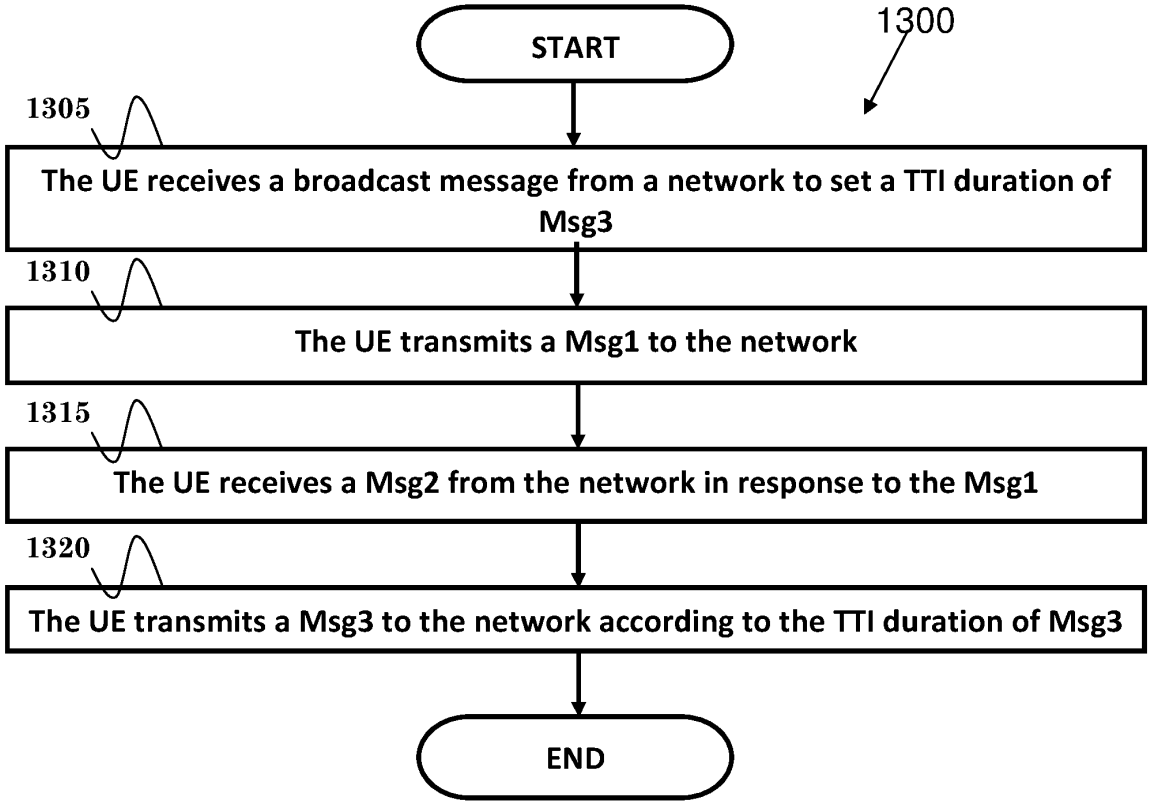

1300
START
1305
The UE receives a broadcast message from a network to set a TTI duration of Msg3
1310
The UE transmits a Msg1 to the network
1315
The UE receives a Msg2 from the network in response to the Msg1
1320
The UE transmits a Msg3 to the network according to the TTI duration of Msg3
END

FIG. 13

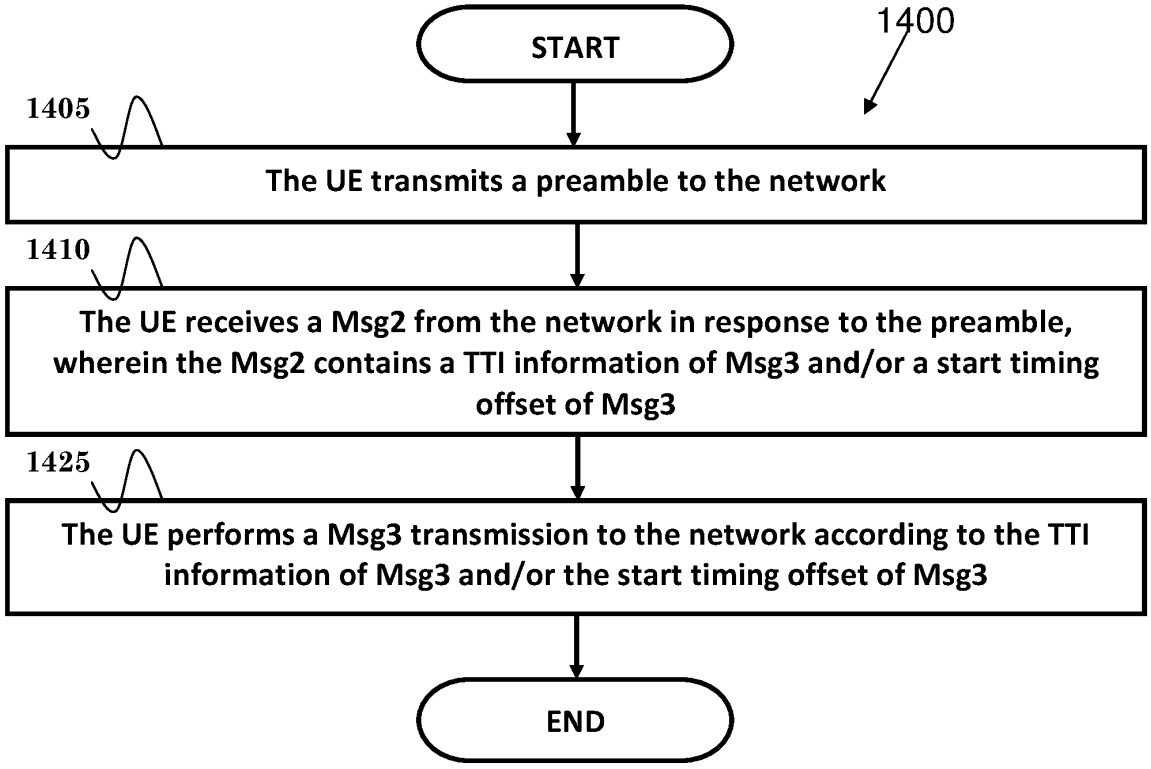

1400
START
1405
The UE transmits a preamble to the network
1410
The UE receives a Msg2 from the network in response to the preamble, wherein the Msg2 contains a TTI information of Msg3 and/or a start timing offset of Msg3
1425
The UE performs a Msg3 transmission to the network according to the TTI information of Msg3 and/or the start timing offset of Msg3
END

FIG. 14

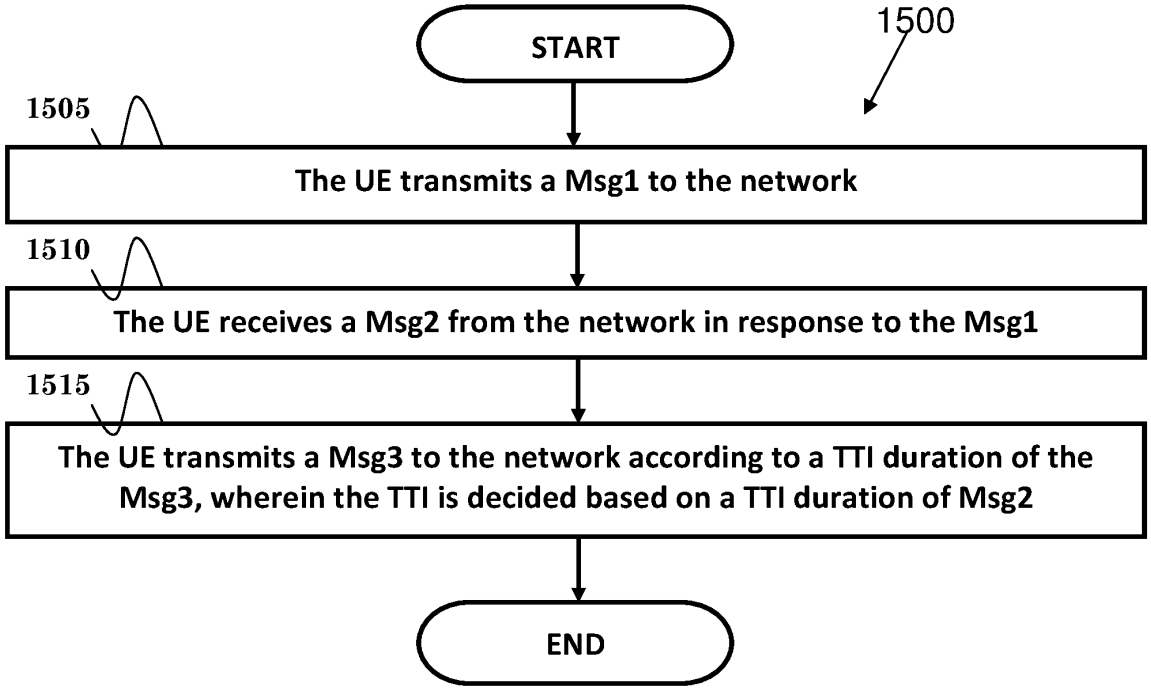

START
1500
1505
The UE transmits a Msg1 to the network
1510
The UE receives a Msg2 from the network in response to the Msg1
1515
The UE transmits a Msg3 to the network according to a TTI duration of the Msg3, wherein the TTI is decided based on a TTI duration of Msg2
END

FIG. 15

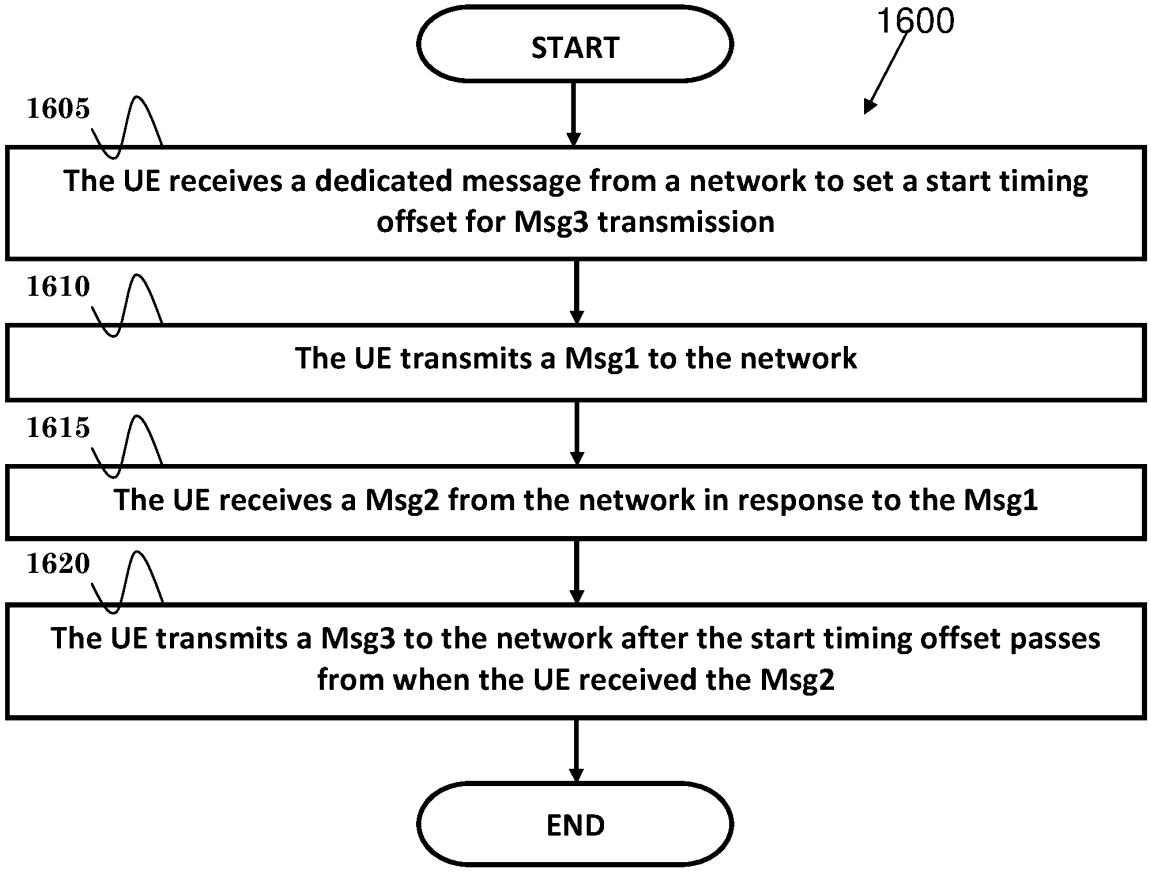

1600
START
1605
The UE receives a dedicated message from a network to set a start timing offset for Msg3 transmission
1610
The UE transmits a Msg1 to the network
1615
The UE receives a Msg2 from the network in response to the Msg1
1620
The UE transmits a Msg3 to the network after the start timing offset passes from when the UE received the Msg2
END

FIG. 16

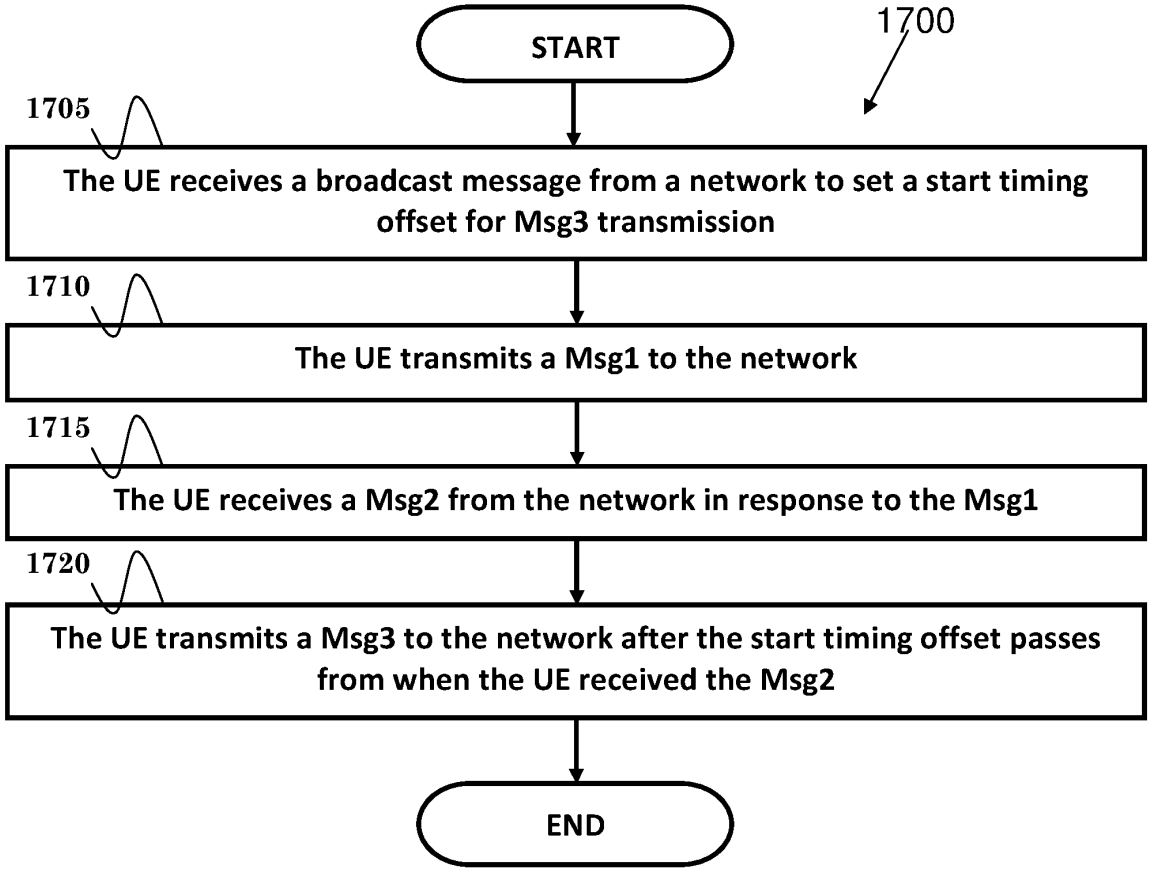

START
1700
1705
The UE receives a broadcast message from a network to set a start timing offset for Msg3 transmission
1710
The UE transmits a Msg1 to the network
1715
The UE receives a Msg2 from the network in response to the Msg1
1720
The UE transmits a Msg3 to the network after the start timing offset passes from when the UE received the Msg2
END

FIG. 17

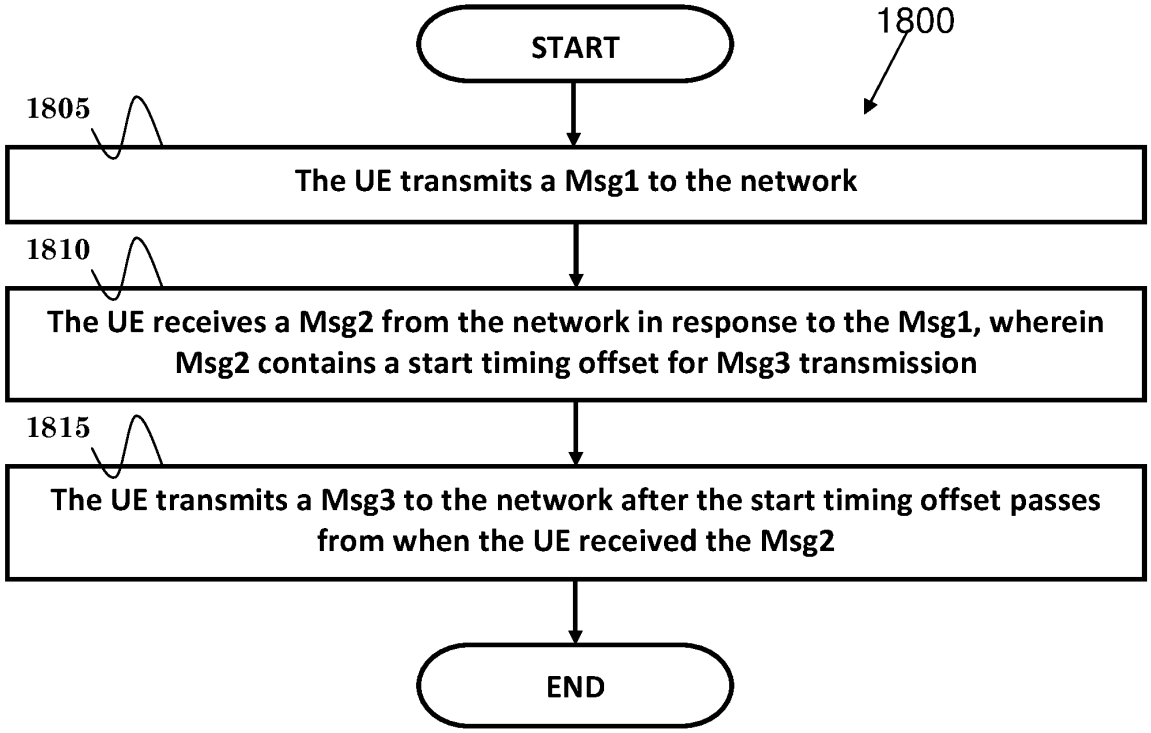

START
1800
1805
The UE transmits a Msg1 to the network
1810
The UE receives a Msg2 from the network in response to the Msg1, wherein Msg2 contains a start timing offset for Msg3 transmission
1815
The UE transmits a Msg3 to the network after the start timing offset passes from when the UE received the Msg2
END

FIG. 18

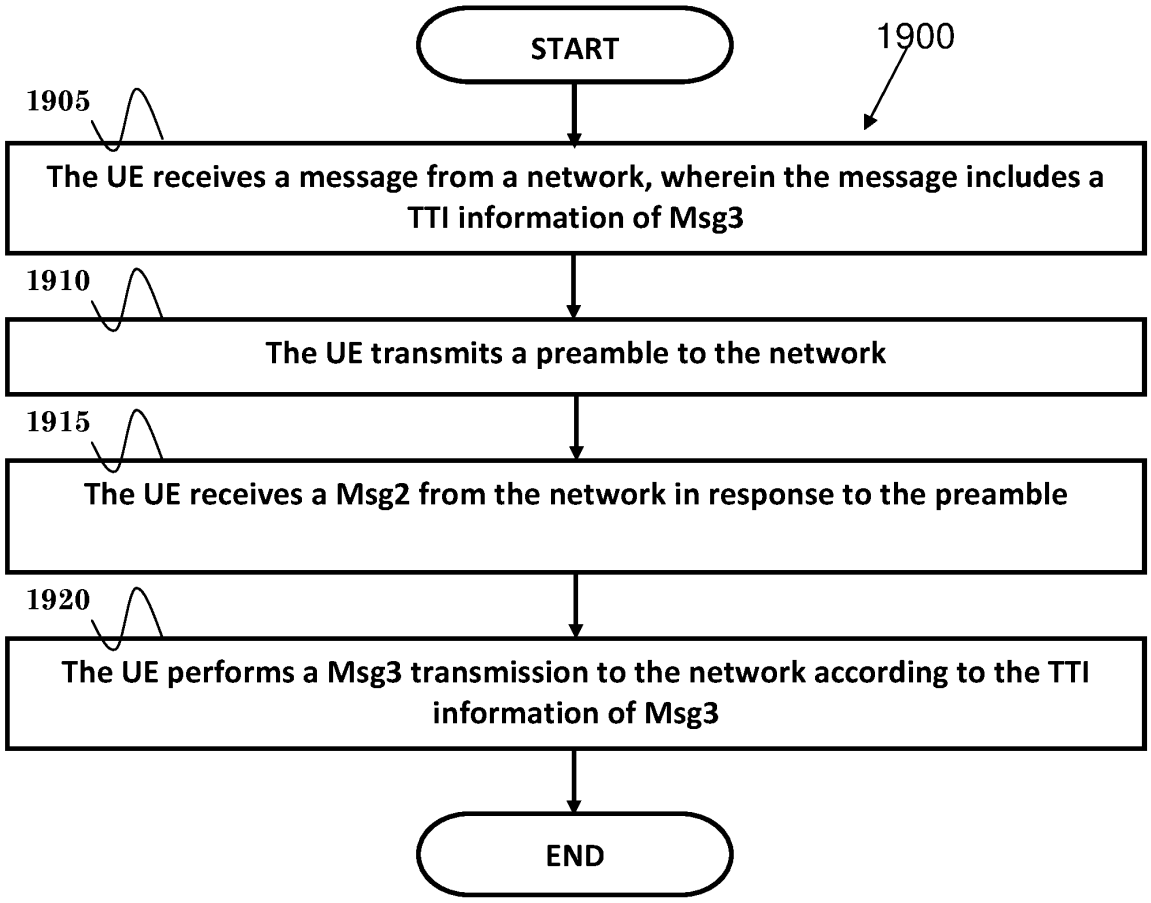

START
1900
1905
The UE receives a message from a network, wherein the message includes a TTI information of Msg3
1910
The UE transmits a preamble to the network
1915
The UE receives a Msg2 from the network in response to the preamble
1920
The UE performs a Msg3 transmission to the network according to the TTI information of Msg3
END

FIG. 19

PTO/AIA/01 (06-12)
Approved for use through 01/31/2014. 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.

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 IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE 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: Chen, Wei-Yu Date (Optional): Jul. 27. 2017

Signature: Chen, Wei-Yu

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.

PTO/AIA/01 (06-12)
Approved for use through 01/31/2014. 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.

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 IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE 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: Tseng, Li-Chih Date (Optional): Jul 27, 2017

Signature: Li-Chih Tseng

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 01/31/2018. OMB 0651-0035
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	Wei-Yu Chen
Title	METHOD AND APPARATUS FOR IMPROVING Msg3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM
Art Unit	Not Yet Assigned
Examiner Name	Not Yet Assigned
Attorney Docket Number	1426-136.101

SIGNATURE of Applicant or Patent Practitioner

Signature	/Sang N. Dang/	Date (Optional)	July 28, 2017
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.

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

PTO/AIA/82B (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

POWER OF ATTORNEY BY APPLICANT

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

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☑ I hereby appoint the Patent 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 identified above: 106622

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) 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 patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above 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 (if the Applicant is a juristic entity, list the Applicant name in the box):

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☑ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ 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) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature	/MING-HSIU HSU/	Date (Optional)	Aug. 28, 2015
Name	MING-HSIU HSU		
Title	Director of ASUSTek Computer Inc.		

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. 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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Wei-Yu Chen and Li-Chih Tseng	
Title:	METHOD AND APPARATUS FOR IMPROVING Msg3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM	
Serial No.:	TBD	Filed: Herewith
Examiner:	TBD	Group Art Unit: TBD
Attorney Docket No.:	1426-136.101 (1050153-US)	

CERTIFICATE OF EFS-WEB TRANSMISSION
UNDER 37 CFR § 1.8

I hereby certify that the enclosed 1 Page Utility Transmittal Sheet; 1 Page Fee Transmittal; 8 Page Application Data Sheet Web-ADS; 41 Page Specification; 19 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 July 28, 2017.

Date: July 28, 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

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1426-136.101
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE 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

Legal Name				
Prefix	**Given Name**	**Middle Name**	**Family Name**	**Suffix**
	Wei-Yu		Chen	

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	No. 15, Lite Rd., Peitou District		
Address 2			
City	Taipei City 112	**State/Province**	OT
Postal Code		**Country** i	TW

Inventor 2

Legal Name				
Prefix	**Given Name**	**Middle Name**	**Family Name**	**Suffix**
	Li-Chih		Tseng	

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	No. 15, Lite Rd., Peitou District		
Address 2			
City	Taipei City 112	**State/Province**	OT
Postal Code		**Country** i	TW

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

PTO/AIA/14 (08-15)
Approved for use through 04/30/2017. 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 contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1426-136.101
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE 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 IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM		
Attorney Docket Number	1426-136.101	**Small Entity Status Claimed**	☐
Application Type			
Subject Matter			
Total Number of Drawing Sheets (if any)	19	**Suggested Figure for Publication (if any)**	

Filing By Reference:

Only complete 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

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.

PTO/AIA/14 (08-15)
Approved for use through 04/30/2017. 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 contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1426-136.101
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM	

Please Select One:	(●) Customer Number	( ) US Patent Practitioner	( ) Limited Recognition (37 CFR 11.9)
Customer Number	106622		

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix	Remove
Registration Number					
Prefix	**Given Name**	Middle Name	**Family Name**	Suffix	Remove
Registration Number					

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, 365(c), or 386(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.
When referring to the current application, please leave the application number blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Claims benefit of provisional	62/367875	2016-07-28

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. 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(i)(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).

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

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

PTO/AIA/14 (08-15)
Approved for use through 04/30/2017. 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 contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	1426-136.101
		Application Number	
Title of Invention	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE 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.

PTO/AIA/14 (08-15)
Approved for use through 04/30/2017. 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 contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	1426-136.101
		Application Number	
Title of Invention	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM		

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is 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 State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

PTO/AIA/14 (08-15)
Approved for use through 04/30/2017. 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 contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1426-136.101
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM	

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	

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	ASUSTek Computer Inc.

Mailing Address Information For Applicant:

Address 1	No. 15, Lite Rd., Peitou District		
Address 2			
City	Taipei City 112	**State/Province**	OT
Country[i]	TW	Postal Code	
Phone Number		Fax Number	
Email Address			

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

PTO/AIA/14 (08-15)
Approved for use through 04/30/2017. 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 contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1426-136.101
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM	

Assignee Information including Non-Applicant Assignee 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.

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

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

PTO/AIA/14 (08-15)
Approved for use through 04/30/2017. 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 contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	1426-136.101
	Application Number	
Title of Invention	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM	

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e. g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Sang N. Dang/			Date (YYYY-MM-DD)	
First Name	Sang N.	Last Name	Dang	Registration Number	51186

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

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM
First Named Inventor/Applicant Name:	Wei-Yu Chen
Filer:	Sang N. Dang/Sandy Kim
Attorney Docket Number:	1426-136.101

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	280	280
UTILITY SEARCH FEE	1111	1	600	600
UTILITY EXAMINATION FEE	1311	1	720	720
Pages:				
Claims:				
CLAIMS IN EXCESS OF 20	1202	4	80	320
INDEPENDENT CLAIMS IN EXCESS OF 3	1201	1	420	420
Miscellaneous-Filing:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**2340**

Electronic Acknowledgement Receipt	
EFS ID:	29920720
Application Number:	15663674
International Application Number:	
Confirmation Number:	8966
Title of Invention:	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM
First Named Inventor/Applicant Name:	Wei-Yu Chen
Customer Number:	106622
Filer:	Sang N. Dang/Sandy Kim
Filer Authorized By:	Sang N. Dang
Attorney Docket Number:	1426-136.101
Receipt Date:	28-JUL-2017
Filing Date:	
Time Stamp:	22:28:54
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$2340
RAM confirmation Number	073117INTEFSW22315200
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		1426-136-101--PackageAsFiled.pdf	1776193 5c408451b8c496a7debc3c196c646942167d0ea0	yes	67

Multipart Description/PDF files in .zip description

Document Description	Start	End
Transmittal of New Application	1	1
Fee Worksheet (SB06)	2	2
Specification	3	37
Claims	38	42
Abstract	43	43
Drawings-only black and white line drawings	44	62
Oath or Declaration filed	63	64
Power of Attorney	65	66
Miscellaneous Incoming Letter	67	67

Warnings:

Information:

2	Application Data Sheet	WebADS.pdf	126217 bc86cbb30dbb68484aa6388c68ba0417cdbba115	no	8

Warnings:

Information:

3	Fee Worksheet (SB06)	fee-info.pdf	37968 71e90337beaff71e1af83048f5856c56165c222d	no	2

Warnings:	
Information:	
Total Files Size (in bytes):	1940378

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.

SCORE Placeholder Sheet for IFW Content

Application Number: 15663674 Document Date: 07/28/2017

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

- Drawings – Other than Black and White Line Drawings

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

To access the documents in the SCORE database, refer to instructions below.

At the time of document entry (noted above):

- Examiners may access SCORE content via the eDAN interface.
- Other USPTO employees can bookmark the current SCORE URL (http://Score.uspto.gov/ScoreAccessWeb/).
- External customers may access SCORE content via the Public and Private PAIR interfaces.

Form Revision Date: September 30, 2013

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 15/663,674

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))	24 minus 20 =	* 4			OR	x 80 =	320
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4 minus 3 =	* 1				x 420 =	420
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	2340

APPLICATION AS AMENDED - PART II

AMENDMENT A

	(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($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
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	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
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".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

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 NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
15/663,674	07/28/2017	2414	2340	1426-136.101	24	4

CONFIRMATION NO. 8966

106622
Blue Capital Law Firm, P.C.
650 Town Center Drive, Suite 1530
Costa Mesa, CA 92626

FILING RECEIPT

OC000000093841698

Date Mailed: 08/24/2017

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)

Wei-Yu Chen, Taipei City, TAIWAN;
Li-Chih Tseng, Taipei City, TAIWAN;

Applicant(s)

ASUSTek Computer Inc., 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 62/367,875 07/28/2016

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.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 08/23/2017

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/663,674**

Projected Publication Date: 02/01/2018

Non-Publication Request: No

Early Publication Request: No

Title

METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE 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

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

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	15663674
Filing Date	2017-07-28
First Named Inventor	Chen, Wei-Yu
Art Unit	2642
Examiner Name	Pakee Fang
Attorney Docket Number	1426-136.101

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					

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	2680651	EP		2014-01-01	Huawei Technologies Co., Ltd.		☐

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]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15663674
	Filing Date	2017-07-28
	First Named Inventor	Chen, Wei-Yu
	Art Unit	2642
	Examiner Name	Pakee Fang
	Attorney Docket Number	1426-136.101

	1	NOKIA ET AL: "Scheduling Framework and Requirements", 3GPP DRAFT; R2-163445 SCHEDULING FRAMEWORK, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-Q6921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE vol. RAN WG2, no. Nanjing, China; 20160523 -20160527 13 May 2016 (2016-05-13), XP051089702, Retrieved from the Internet: URL: http: //www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_94/Docs/	☐
	2	HUAWEI ET AL: "Low latency and low overhead transmission for NR", 3GPP DRAFT; R2-162662 LOW LATENCY AND LOW OVERHEAD TRANSMISSION FOR NR, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX vol. RAN WG2, no. Dubrovnik, Croatia; 20160411 - 20160415 1 April 2016 (2016-04-01), XP051082246, Retrieved from the Internet:	☐
	3	ZTE: "Utilization of short TTI in higher layer", 3GPP DRAFT; R2-154172 UTILIZATION OF SHORT TTI IN HIGHER LAYER, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ;FRANCE vol. RAN WG2, no. Mai mo, Sweden; 20151005 -20151009 25 September 2015 (2015-09-25), XP051023493, Retrieved from the Internet:	☐
	4	NTT DOCOMO ET AL: "Discussions on TTI shortening", 3GPP DRAFT; R1-163175, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ;FRANCE vol. RAN WG1, no. Busan, Korea; 20160411 - 2Q160415 1 April 2016 (2016-04-01), XP051Q7988Q, Retrieved from the Internet:	☐
	5	European Search Report from corresponding EP Application No. 17183827.9, dated December 12, 2017.	☐

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.

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

(11) EP 2 680 651 A1

(12) EUROPEAN PATENT APPLICATION
published in accordance with Art. 153(4) EPC

(43) Date of publication:
01.01.2014 Bulletin 2014/01

(21) Application number: **12767268.1**

(22) Date of filing: **01.04.2012**

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

(86) International application number:
PCT/CN2012/073476

(87) International publication number:
WO 2012/136130 (11.10.2012 Gazette 2012/41)

(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

(30) Priority: **02.04.2011 CN 201110083708**

(71) Applicant: **Huawei Technologies Co., Ltd.**
Shenzhen, Guangdong 518129 (CN)

(72) Inventors:
- **YAN, Kun**
  Shenzhen
  Guangdong 518129 (CN)
- **GAO, Yongqiang**
  Shenzhen
  Guangdong 518129 (CN)

(74) Representative: **Pfenning, Meinig & Partner GbR**
Theresienhöhe 13
80339 München (DE)

(54) METHOD, BASE STATION DEVICE, TERMINAL DEVICE, AND COMMUNICATION SYSTEM FOR CHANNEL RESOURCE ALLOCATION

(57) Embodiments of the present invention provide a method for allocating channel resource, a base station device, a terminal device, and a communication system. The method includes: sending a cell broadcast message to a terminal device, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; receiving indication information sent from the terminal device, where the indication information indicates that the terminal device selects the first TTI or the second TTI as a TTI for use; and allocating a common enhanced dedicated channel resource to the terminal device according to the indication information. In the embodiments of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and a network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

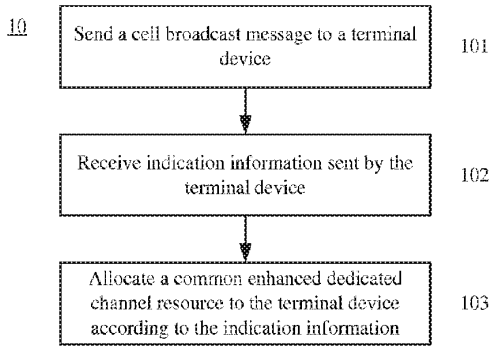


FIG. 1

Printed by Jouve, 75001 PARIS (FR)

EP 2 680 651 A1

Description

[0001] This application claims priority to Chinese Patent Application No. 201110083708.4, filed with the Chinese Patent Office on April 2, 2011 and entitled "METHOD FOR ALLOCATING CHANNEL RESOURCE, BASE STATION DEVICE, TERMINAL DEVICE, AND COMMUNICATION SYSTEM", which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] Embodiments of the present invention relate to the field of wireless communications, and in particular, to a method for allocating channel resource, a base station device, a terminal device, and a communication system.

BACKGROUND

[0003] In 3GPP (The 3rd Generation Partnership Project, The 3rd Generation Partnership Project) UMTS (Universal Mobile Telecommunications System, Universal Mobile Telecommunications System) R8 version, for a UE (User Equipment, user equipment) in idle (idle) mode or a CELL_FACH (CELL Forward Access Channel, cell forward access channel) state, in order to reduce an uplink transmission delay and increase an uplink transmission rate, a new feature known as an enhanced RACH (random access channel, Random Access Channel) is adopted. The enhanced RACH enhances random access in R99 version. The enhanced random access adopts an E-DCH (Enhanced Dedicated Channel, enhanced dedicated channel) to substitute for an RACH to implement uplink transmission. An enhanced CELL_FACH procedure roughly includes a preamble access and resource allocation stage, a collision resolution stage, an E-DCH data transmission stage, and a resource release stage.

[0004] Resources allocated at the resource allocation stage refer to Common-EDCH (Common Enhanced-Dedicated Channel, common enhanced-dedicated channel) resources, which are broadcast in system information of a cell. A UE may obtain Common-EDCH resource information by reading the system information broadcast by the cell. According to the existing protocol, there are altogether 32 sets of Common-EDCH resources, including code information such as an F-DPCH (Fractional Dedicated Physical Channel, fractional dedicated physical channel), an E-RGCH (E-DCH absolute grant channel, E-DCH absolute grant channel), an E-HICH (E-DCH HARQ Acknowledgement Indicator Channel, E-DCH hybrid automatic repeat request acknowledgement indicator channel), and an uplink DPCH (Dedicated Physical Channel, dedicated physical channel). A Node B notifies, through an AICH (Acquisition Indicator Channel, acquisition indicator channel) at the resource allocation stage, the UE of using a resource index. After receiving the resource index, the UE uses the corresponding set of resources to transmit uplink data.

[0005] As for the enhanced RACH feature, only one uplink TTI (Transmission Time Interval, transmission time interval) length can be configured for each cell and the UE uses only one TTI length, which may be a 2 ms TTI or 10 ms TTI, in uplink data transmission. Therefore, the aforesaid 32 sets of resources are all configured specifically for the occasion where the UE uses one TTI length.

[0006] However, the configuration is not flexible enough. If the TTI of a cell does not match the TTI required by the UE, the utilization efficiency of system resources will be reduced.

SUMMARY

[0007] Embodiments of the present invention provide a method for allocating channel resource, a base station device, a terminal device, and a communication system, which can increase the utilization efficiency of system resources.

[0008] In one aspect, a method for allocating channel resource is provided, including: sending a cell broadcast message to a terminal device, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; receiving indication information sent from the terminal device, where the indication information indicates that the terminal device selects the first TTI or the second TTI as a TTI for use; and allocating a common enhanced dedicated channel resource to the terminal device according to the indication information.

[0009] In another aspect, a method for allocating channel resource is provided, including: receiving a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; selecting the first TTI or the second TTI as a TTI for use and generating indication information of the selected TTI; and sending the indication information to the network side, so that the network side allocates a common enhanced dedicated channel resource according to the indication information.

[0010] In another aspect, a base station device is provided, including: a broadcasting unit, configured to send a cell broadcast message to a terminal device, where the cell broadcast message includes description information

Samsung Exhibit 1009, Page 89 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; a receiving unit, configured to receive indication information sent from the terminal device, where the indication information indicates that the terminal device selects the first TTI or the second TTI as a TTI for use; and an allocating unit, configured to allocate a common enhanced dedicated channel resource to the terminal device according to the indication information.

[0011] In another aspect, a terminal device is provided, including: a receiving unit, configured to receive a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; a selecting unit, configured to select the first TTI or the second TTI as a TTI for use and generate indication information of the selected TTI; and a sending unit, configured to send the indication information to the network side, so that the network side allocates a common enhanced dedicated channel resource according to the indication information.

[0012] In another aspect, a method for allocating channel resource is provided, including: sending a cell broadcast message to a terminal device, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; selecting the first TTI or the second TTI as a TTI for use; notifying the terminal device of the selected TTI; and allocating a common enhanced dedicated channel resource to the terminal device according to the selected TTI.

[0013] In another aspect, a method for allocating channel resource is provided, including: receiving a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; receiving indication information from the network side, where the indication information indicates that the network side device selects the first TTI or the second TTI as a TTI for use; and receiving a common enhanced dedicated channel resource that is allocated by the network side according to the selected TTI.

[0014] In another aspect, a base station device is provided, including: a broadcasting unit, configured to send a cell broadcast message to a terminal device, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; a selecting unit, configured to select the first TTI or the second TTI as a TTI for use; a notifying unit, configured to notify the terminal device of the selected TTI; and an allocating unit, configured to allocate a common enhanced dedicated channel resource to the terminal device according to the selected TTI.

[0015] In another aspect, a terminal device is provided, including: a receiving unit, configured to receive a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; where, the receiving unit is further configured to receive indication information from the network side, where the indication information indicates that the network side device selects the first TTI or the second TTI as a TTI for use; and the receiving unit is further configured to receive a common enhanced dedicated channel resource that is allocated by the network side according to the selected TTI.

[0016] In another aspect, a communication system is provided, including the above base station device or the above terminal device.

[0017] In the embodiments of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and the network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

BRIEF DESCRIPTION OF DRAWINGS

[0018] To illustrate the technical solutions in the embodiments of the present invention more clearly, the following briefly introduces the accompanying drawings required for describing the embodiments or the prior art. Apparently, the accompanying drawings in the following

Samsung Exhibit 1009, Page 90 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

description show merely some embodiments of the present invention, and a person of ordinary skill in the art may still derive other drawings from these accompanying drawings without creative efforts.

FIG. 1 is a schematic flowchart of a method for allocating channel resource according to an embodiment of the present invention;

FIG. 2 is a schematic flowchart of a method for allocating channel resource according to an embodiment of the present invention;

FIG. 3A and FIG. 3B are schematic flowcharts of processes of channel resource allocation according to an embodiment of the present invention;

FIG. 4 is a schematic flowchart of a process of channel resource allocation according to an embodiment of the present invention;

FIG. 5 is a schematic block diagram of a base station device according to an embodiment of the present invention;

FIG. 6 is a schematic block diagram of a base station device according to an embodiment of the present invention;

FIG. 7 is a schematic block diagram of a terminal device according to an embodiment of the present invention;

FIG. 8 is a schematic flowchart of a method for allocating channel resource according to an embodiment of the present invention;

FIG. 9 illustrates a method for allocating channel resource according to an embodiment of the present invention;

FIG. 10 is a schematic block diagram of a base station device according to an embodiment of the present invention;

FIG. 11 is a schematic block diagram of a terminal device according to an embodiment of the present invention;

FIG. 12 is a schematic block diagram of a communication system according to an embodiment of the present invention; and

FIG. 13 is a schematic block diagram of a communication system according to another embodiment of the present invention.

DESCRIPTION OF EMBODIMENTS

[0019] The following clearly and completely describes the technical solutions in the embodiments of the present invention with reference to the accompanying drawings in the embodiments of the present invention. Apparently, the described embodiments are merely a part rather than all of the embodiments of the present invention. All other embodiments obtained by a person of ordinary skill in the art based on the embodiments of the present invention without creative efforts shall fall within the protection scope of the present invention.

[0020] The technical solutions of the present invention may be applied to various communication systems, such as GSM, code division multiple access (CDMA, Code Division Multiple Access), wideband code division multiple access (WCDMA, Wideband Code Division Multiple Access Wireless), general packet radio service (GPRS, General Packet Radio Service), and long term evolution (LTE, Long Term Evolution).

[0021] A mobile terminal (Mobile Terminal), or referred to as a mobile user (UE, User Equipment) or a mobile user equipment or the like, may communicate with one or more core networks via a radio access network (RAN, Radio Access Network). The mobile terminal may be a mobile terminal such as a mobile phone (or referred as cellular phone) or a computer equipped with a mobile terminal, such as a portable, pocket-sized, handheld, computer-embedded, or vehicle-mounted mobile apparatus. The mobile terminals exchange speeches and/or data with the radio access network.

[0022] A base station may be a base station in GSM or CDMA (BTS, Base Transceiver Station), or a base station in WCDMA (NodeB), or an evolved base station in LTE (eNB or e-NodeB, evolutional Node B), which is not limited by the present invention. For ease of description, the following embodiments take the Node B as an example for description.

[0023] The UE or the network side cannot adjust the length of the TTI dynamically according to the requirement of the UE. The UE can use only the TTI configured by the network side. For example, a cell supports only a 2 ms TTI length but the UE is located at the cell edge, where switching to a 10 ms TTI length can achieve better coverage and transmission reliability. Or, the cell supports only a 10 ms TTI length but the UE is located in the cell center, where more power is available and switching to a 2 ms TTI length will effectively increase the uplink transmission rate. In this case, the TTI of the cell does not match the TTI required by the UE, which reduces the utilization efficiency of system resources.

[0024] The embodiments of the present invention take into account the possibility of configuring two TTI lengths in each cell. That is, in one cell, a UE supporting an enhanced RACH can select one of the two TTI lengths dynamically to transmit uplink data.

[0025] Although the UE is used to represent a terminal device and the Node B is used to represent a base station device hereinafter, the embodiments of the present invention are not limited to the specific systems represented by these terms. The embodiments of the present invention are applicable to any system that can use multiple TTI lengths in one cell.

[0026] FIG. 1 is a schematic flowchart of a method for allocating channel resource according to an embodiment of the present invention. The method 10 shown in FIG. 1 is executed mainly on the network side, for example, by a base station (such as a Node B).

[0027] In step 101 of the method 10, a cell broadcast message is sent to a terminal device (such as a UE), where the cell broadcast message includes description

Samsung Exhibit 1009, Page 91 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel Common-EDCH resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI.

[0028] 102. Receive indication information sent from the terminal device, where the indication information indicates that the terminal device selects the first TTI or the second TTI as a TTI for use.

[0029] 103. Allocate a common enhanced dedicated channel resource to the terminal device according to the indication information.

[0030] In the embodiment of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and the network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0031] Corresponding operations are executed on the terminal side. FIG. 2 is a schematic flowchart of a method for allocating channel resource according to an embodiment of the present invention. The method 20 shown in FIG. 2 is executed by a terminal device (such as a UE) and includes the following:

[0032] 201. Receive a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI.

[0033] 202. Select the first TTI or the second TTI as a TTI for use and generate indication information of the selected TTI.

[0034] 203. Send the indication information to the network side, so that the network side allocates a common enhanced dedicated channel resource according to the indication information.

[0035] In the embodiment of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and the network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0036] A process of channel resource allocation in a communication system in an embodiment of present invention will be described in detail in the following. FIG. 3A is a schematic flowchart of a process of channel resource allocation according to an embodiment of the present invention.

[0037] In step S31 shown in FIG. 3A, a Node B sends a cell broadcast message to a UE. The cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to Common-EDCH resources, where the first parameter configuration is specific to a first TTI (such as 2 ms or 10 ms) and the second parameter configuration is specific to a second TTI (such as 10 ms or 2 ms) which is different from the first TTI. In other words, in addition to an existing TTI, the broadcast message in the embodiment of the present invention may include a description of an additional parameter configuration specific to another TTI length.

[0038] In step 302, after receiving the broadcast message, the UE obtains information of the two TTIs that can be supported by the cell. Therefore, the UE selects the first TTI or the second TTI as a TTI for use according to its own requirement.

[0039] In step 303, the UE generates indication information of the selected TTI and sends the indication information to the Node B in step 304. The indication information may be sent through a dedicated indication message or carried by other messages. For example, the UE notifies the Node B of the selected TTI length by selecting different signatures (signature) at the random access stage, or the UE notifies the Node B of the selected TTI length by using different preamble scramble codes (preamble scramble code) at the random access stage.

[0040] In step 305, after receiving the indication information of the TTI selected by the UE, the Node B is triggered to allocate a Common-EDCH resource. In a scenario where a 2 ms TTI and a 10 ms TTI share 32 sets of common E-DCH resources, the Node B may allocate a common E-DCH resource according to a resource allocation manner similar to that defined in the existing protocol.

[0041] In step 306, the Node B notifies the UE of the allocated Common-EDCH resource.

[0042] In step 307, after receiving the notification of the Node B, the UE selects the corresponding parameter configuration (the first parameter configuration or the second parameter configuration) according to the selected TTI.

[0043] In step 308, the UE transmits uplink data by using the selected parameter configuration.

[0044] In the embodiment of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and a network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0045] In the example shown in FIG. 3A, in a scenario where a 2 ms TTI and a 10 ms TTI share 32 sets of common E-DCH resources, the Node B may not consider

Samsung Exhibit 1009, Page 92 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

the TTI length selected by the UE when allocating a common E-DCH resource. In an embodiment of the present invention, the TTI selected by the UE may be considered when a common E-DCH resource is allocated.

[0046] FIG. 3B is a schematic flowchart of a process of channel resource allocation according to an embodiment of the present invention. In FIG. 3B, processes that are the same as or similar to those in FIG. 3A are identified by same or similar marks and the details thereof are appropriately omitted.

[0047] Step 301' is similar to step 301 in FIG. 3A, where a Node B sends a cell broadcast message to a UE. The difference is that the cell broadcast message sent in step 301' includes not only the description information of parameter configurations of two TTIs (such as a 2 ms TTI length and a 10 ms TTI length) but also indexes of common E-DCH resources respectively used by the 2 ms TTI and 10 ms TTI, that is, the existing 32 sets of common E-DCH resources are grouped in two lists (resource subsets) of the 2 ms TTI and 10 ms TTI.

[0048] Steps 302-304 are the same as steps 302-304 in FIG. 3A. In step 302, the UE obtains information of the two TTIs that can be supported by the cell after receiving the broadcast message. The UE selects the first TTI or the second TTI as a TTI for use according to its own need.

[0049] In step 303, the UE generates indication information of the selected TTI and sends the indication information to the Node B in step 304. The indication information may be sent through a dedicated indication message or carried by other messages. For example, the UE notifies the Node B of the selected TTI length by selecting different signatures (signature) at the random access stage, or the UE notifies the Node B of the selected TTI length by using different preamble scramble codes (preamble scramble code) at the random access stage.

[0050] In step 305', after receiving the indication information of the TTI selected by the UE, the Node B is triggered to allocate a Common-EDCH resource. In this case, when allocating a resource, the Node B considers the TTI selected by the UE.

[0051] For example, the indexes of the 32 sets of common E-DCH resources are 0 to 31, and in the broadcast message, 0 to 15 are allocated to the 2 ms TTI and 16 to 31 are allocated to the 10 ms TTI. In this case, if the indication message of the UE indicates that the 2 ms TTI length is selected, the Node B selects a common E-DCH resource to be allocated to the UE from the resource subset with indexes of 0-15. If the indication message of the UE indicates that the 10 ms TTI length is selected, the Node B selects a common E-DCH resource to be allocated to the UE from the resource subset with indexes of 16-31.

[0052] Steps 306-308 are the same as steps 306-308 in FIG. 3A. In step 306, the Node B notifies the UE of the allocated Common-EDCH resource.

[0053] In step 307, after receiving the notification of the Node B, the UE selects the corresponding parameter configuration (the first parameter configuration or the second parameter configuration) according to the selected TTI.

[0054] In step 308, the UE transmits uplink data by using the selected parameter configuration.

[0055] In the embodiment of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and a network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0056] When the UE notifies the Node B of the selected TTI, the selection may be denied (in step 305 or 305'). For example, because the number of UEs using the 2 ms TTI length is larger than the number of UEs using the 10 ms TTI length while the number of resources available for allocation (the size of corresponding resource subsets) may be the same for the two TTI lengths, resources in the resource subset corresponding to the 2 ms TTI length may all be occupied, resulting in that a UE selecting the 2 ms TTI is denied. In this case, in the embodiment of the present invention, the number of denials to the UE can be recorded and the sizes of the resource subsets can be dynamically adjusted.

[0057] FIG. 4 is a schematic flowchart of a process of dynamic adjustment of resource subsets according to an embodiment of the present invention.

[0058] As shown in FIG. 4, in step 401, a Node B records the number of denials to a UE. For example, the Node B records the number of denials to the UE selecting a 2 ms TTI and the number of denials to the UE selecting a 10 ms TTI.

[0059] In step 402, the Node B reports the recorded number to an RNC (radio network controller, Radio Network Controller). For example, the Node B reports the number to the RNC over an Iub interface. According to an embodiment of the present invention, the Node B may report the number to the RNC through a Denied E-DCH RACH Resources message under E-DCH RACH Report.

[0060] In step 403, the RNC adjusts the numbers of resources in the resource subsets (lists) of the 2 ms TTI and 10 ms TTI according to the number of denials reported by the Node B. For example, it is assumed that 0 to 15 are allocated to the 2 ms TTI and that 16 to 31 are allocated to the 10 ms TTI previously. After the Node B reports the numbers of the Denied E-DCH RACH Resources of the 2 ms TTI and 10 ms TTI, if the number of denials of the 2 ms TTI is larger, the RNC can increase common E-DCH resources corresponding to the 2 ms TTI, for example, allocate resources indexed 0-20 to the 2 ms TTI and resources indexed 21-31 to the 10 ms TTI. Thereby, common E-DCH resources in the resource subsets are adjusted dynamically.

[0061] In step 404, the RNC notifies the Node B of the adjustment result. The RNC may notify the Node B of the adjustment result through a dedicated message or other

Samsung Exhibit 1009, Page 93 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

proper messages.

[0062] In step 405, the Node B notifies the UE of the new resource subset (list) information through a broadcast message. Thereby, the UE obtains the adjusted resource subset information by reading the broadcast message.

[0063] Thereby, in the embodiment of the present invention, the allocation manner of resources corresponding to two TTI lengths can be adjusted dynamically according to the running status of the network. This further increases the utilization efficiency of resources.

[0064] FIG. 5 is a schematic block diagram of a base station device according to an embodiment of the present invention. As shown in FIG. 5, the base station device 50 according to the embodiment of the present invention includes a broadcasting unit 51, a receiving unit 52, and an allocating unit 53.

[0065] The broadcasting unit 51 is configured to send a cell broadcast message to a terminal device, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI.

[0066] The receiving unit 52 is configured to receive indication information sent from the terminal device, where the indication information indicates that the terminal device selects the first TTI or the second TTI as a TTI for use.

[0067] The allocating unit 53 is configured to allocate a common enhanced dedicated channel resource to the terminal device according to the indication information.

[0068] In the embodiment of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and a network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0069] FIG. 6 is a schematic block diagram of a base station device according to an embodiment of the present invention. In FIG. 5, parts that are the same as or similar to those in FIG. 5 are identified by same or similar marks and the details thereof are appropriately omitted.

[0070] The base station device 60 in FIG. 6 includes a broadcasting unit 51', a receiving unit 52, and an allocating unit 53'. A cell broadcast message sent from the broadcasting unit 51' includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, which are grouped into a first resource subset specific to a first TTI and a second resource subset specific to a second TTI.

[0071] In addition, the allocating unit 53' allocates a common enhanced dedicated channel resource in the first resource subset to the terminal device when the indication information received by the receiving unit 52 indicates that the selected TTI is the first TTI; and allocates a common enhanced dedicated channel resource in the second resource subset to the terminal device when the indication information received by the receiving unit 52 indicates that the selected TTI is the second TTI.

[0072] As shown in FIG. 6, the base station device 60 further includes a notifying unit 61 and/or a recording unit 62.

[0073] The notifying unit 61 notifies the terminal device of the allocated common enhanced dedicated channel resource, so that the terminal device selects the first parameter configuration or the second parameter configuration according to the selected TTI.

[0074] The recording unit 62 is configured to record the number of denials to the terminal device and send the recorded number to a radio network controller, so that the radio network controller adjusts the common enhanced dedicated channel resources in the first resource subset and the second resource subset according to the number.

[0075] The base station device in FIG. 5 and FIG. 6 can execute all steps relating to the Node B in the foregoing method for allocating common enhanced dedicated channel resources, and to avoid repetition, the details will not be described herein again.

[0076] FIG. 7 is a schematic block diagram of a terminal device according to an embodiment of the present invention. The terminal device 70 shown in FIG. 7 includes a receiving unit 71, a selecting unit 72, and a sending unit 73.

[0077] The receiving unit 71 is configured to receive a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI.

[0078] The selecting unit 72 is configured to select the first TTI or the second TTI as a TTI for use and generate indication information of the selected TTI.

[0079] The sending unit 73 is configured to send the indication information to the network side, so that the network side allocates a common enhanced dedicated channel resource according to the indication information.

[0080] In the embodiment of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and the network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocat-

Samsung Exhibit 1009, Page 94 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

ing and utilizing system resources.

[0081] The terminal device 70 in FIG. 7 can execute all steps relating to the UE in the foregoing method for allocating common enhanced dedicated channel resources, and to avoid repetition, the details will not be described herein again.

[0082] For example, the receiving unit 71 is further configured to receive a notification of the allocated common enhanced dedicated channel resource. The selecting unit 72 is further configured to select the first parameter configuration or the second parameter configuration according to the selected TTI.

[0083] According to another embodiment of the present invention, the receiving unit 71 receives a cell broadcast message, where, in the cell broadcast message, common enhanced dedicated channel resources are grouped into a first resource subset specific to the first TTI and a second resource subset specific to the second TTI.

[0084] The foregoing describes embodiments where a UE selects a TTI but the present invention is not limited thereto. The selection of a TTI may also be determined by the network side.

[0085] FIG. 8 is a schematic flowchart of a method for allocating channel resource according to an embodiment of the present invention. The method 10 shown in FIG. 8 is executed mainly on the network side, for example, by a base station (such as a Node B).

[0086] As shown in FIG. 8, step 801 of the method 80 is similar to step 101 of the method 10. A cell broadcast message is sent to a terminal device, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI.

[0087] In step 802, the Node B selects the first TTI or the second TTI as a TTI for use. According to information in the cell, the Node B may select the TTI to be used by the UE. For example, the Node B may determine the selected TTI length according to preamble (preamble) power of uplink access of the UE.

[0088] In step 803, the Node B notifies the terminal device of the selected TTI, and in step 804, the Node B allocates a common enhanced dedicated channel resource to the terminal device according to the selected TTI.

[0089] In the embodiment of the present invention, multiple TTIs are configured for a cell and the network side broadcasts the parameter configuration information of the multiple TTIs to the terminal device and then selects a proper TTI from the multiple TTIs and allocates a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0090] Corresponding operations are executed on the terminal side. FIG. 9 illustrates a method for allocating channel resource according to an embodiment of the present invention. The method 90 shown in FIG. 9 is executed by a terminal device (such as a UE).

[0091] 901. Receive a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI.

[0092] 902. Receive indication information from the network side, where the indication information indicates that the network side device selects the first TTI or the second TTI as a TTI for use.

[0093] 903. Receive a common enhanced dedicated channel resource that is allocated by the network side according to the selected TTI.

[0094] Thereby, in the embodiment of the present invention, multiple TTIs are configured for a cell and the network side broadcasts the parameter configuration information of the multiple TTIs to the terminal device and then selects a proper TTI from the multiple TTIs and allocates a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0095] FIG. 10 is a schematic block diagram of a base station device according to an embodiment of the present invention. The base station device 100 shown in FIG. 10 includes:

a broadcasting unit 1010, configured to send a cell broadcast message to a terminal device, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI;

a selecting unit 1020, configured to select the first TTI or the second TTI as a TTI for use;

a notifying unit 1030, configured to notify the terminal device of the selected TTI; and

an allocating unit 1040, configured to allocate a common enhanced dedicated channel resource to the terminal device according to the selected TTI.

[0096] Thereby, in the embodiment of the present invention, multiple TTIs are configured for a cell and the network side broadcasts the parameter configuration information of the multiple TTIs to the terminal device and then selects a proper TTI from the multiple TTIs and al-

Samsung Exhibit 1009, Page 95 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

locates a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0097] FIG. 11 is a schematic block diagram of a terminal device according to an embodiment of the present invention. The terminal device 110 shown in FIG. 11 includes a receiving unit 115. The receiving unit 115 is configured to receive a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI.

[0098] The receiving unit 115 is further configured to receive indication information from the network side, where the indication information indicates that the network side device selects the first TTI or the second TTI as a TTI for use.

[0099] The receiving unit 115 is further configured to receive a common enhanced dedicated channel resource that is allocated by the network side according to the selected TTI.

[0100] Thereby, in the embodiment of the present invention, multiple TTIs are configured for a cell and the network side broadcasts the parameter configuration information of the multiple TTIs to the terminal device and then selects a proper TTI from the multiple TTIs and allocates a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0101] FIG. 12 is a schematic block diagram of a communication system according to an embodiment of the present invention. The communication system 120 shown in FIG. 12 includes a base station device 121 and a terminal device 122.

[0102] The base station device 121 may be the foregoing base station device 50, 60, or 100. The terminal device 122 may be the foregoing terminal device 70 or 110. Therefore, detailed descriptions thereof are omitted.

[0103] FIG. 13 is a schematic block diagram of a communication system according to another embodiment of the present invention. In the communication system 130 shown in FIG. 13, parts that are the same as or similar to those in FIG. 12 are identified with the same or similar marks.

[0104] As shown in FIG. 13, in addition to the base station device 121 and the terminal device 122, the communication system 130 further includes a radio network controller (RNC) 131. In a scenario where different resource subsets (such as a first resource subset and a second resource subset) are adopted for different TTIs, the radio network controller 131 is configured to receive the number of denials to the terminal device 122 recorded by the base station device 121 and adjust common enhanced dedicated channel resources in the first resource subset and the second resource subset according to the number.

[0105] A person of ordinary skill in the art may be aware that, in combination with the examples described in the embodiments disclosed in this specification, units and algorithm steps may be implemented by electronic hardware, computer software, or a combination thereof. In order to clearly describe the interchangeability between the hardware and the software, the foregoing has generally described compositions and steps of each embodiment according to functions. Whether the functions are performed by hardware or software depends on particular applications and design constraint conditions of the technical solutions. A person skilled in the art may implement the described functions by using different methods for each particular application, but it should not be considered that the implementation goes beyond the scope of the present invention.

[0106] It may be clearly understood by a person skilled in the art that, for the purpose of convenient and brief description, for a detailed working process of the foregoing system, apparatus, and unit, reference may be made to the corresponding process in the foregoing method embodiments, and details will not be described herein again.

[0107] In the several embodiments provided in the present application, it should be understood that the disclosed system, apparatus, and method may be implemented in other manners. For example, the described apparatus embodiment is merely exemplary. For example, the unit division is merely logical function division and may be other divisions in actual implementation. For example, a plurality of units or components may be combined or integrated into another system, or some features may be ignored or not performed. In addition, the displayed or discussed mutual couplings or direct couplings or communication connections may be implemented through some interfaces. The indirect couplings or communication connections between the apparatuses or units may be implemented in electronic, mechanical or other forms.

[0108] The units described as separate parts may or may not be physically separate, and parts displayed as units may or may not be physical units, that is, may be located in one position, or may be distributed on a plurality of network elements. A part or all of the units may be selected according to actual needs to achieve the objectives of the solutions of the embodiments.

[0109] In addition, functional units in the embodiments of the present invention may be integrated into one processing unit, or each of the units may exist alone physically, or two or more units are integrated into one unit. The integrated unit may be implemented in the form of hardware, or may be implemented in the form of a software functional unit.

[0110] When the integrated unit are implemented in the form of a software functional unit and sold or used as an independent product, the integrated unit may be

Samsung Exhibit 1009, Page 96 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

stored in a computer-readable storage medium. Based on such an understanding, the technical solutions of the present invention essentially, or the part contributing to the prior art, or all or a part of the technical solutions may be implemented in the form of a software product. The computer software product is stored in a storage medium, and includes several instructions for instructing a computer device (which may be a personal computer, a server, or a network device or the like) to perform all or a part of the steps of the methods described in the embodiments of the present invention. The foregoing storage medium includes: any medium that can store a program code, such as a USB flash disk, a removable hard disk, a read-only memory (ROM, Read-Only Memory), a random access memory (RAM, Random Access Memory), a magnetic disk, or an optical disk.

[0111] The foregoing descriptions are merely specific embodiments of the present invention, but are not intended to limit the protection scope of the present invention. Any variation or replacement readily figured out by a person skilled in the art within the technical scope disclosed in the present invention shall fall within the protection scope of the present invention. Therefore, the protection scope of the present invention shall be subject to the protection scope of the claims.

Claims

1. A method for allocating channel resource, **characterized in** comprising:

   sending a cell broadcast message to a terminal device, wherein the cell broadcast message comprises description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second transmission time interval (TTI) which is different from the first TTI;
   receiving indication information sent from the terminal device, wherein the indication information indicates that the terminal device selects the first TTI or the second TTI as a TTI for use; and
   allocating a common enhanced dedicated channel resource to the terminal device according to the indication information.

2. The method according to claim 1, **characterized in that** the sending the cell broadcast message to the terminal device comprises:

   sending the cell broadcast message to the terminal device, wherein, in the cell broadcast message, the common enhanced dedicated channel resources are grouped into a first resource subset specific to the first TTI and a second resource subset specific to the second TTI.

3. The method according to claim 2, **characterized in that** the allocating the common enhanced dedicated channel resource to the terminal device according to the indication information comprises:

   allocating a common enhanced dedicated channel resource in the first resource subset to the terminal device when the indication information indicates that the selected TTI is the first TTI; and
   allocating a common enhanced dedicated channel resource in the second resource subset to the terminal device when the indication information indicates that the selected TTI is the second TTI.

4. The method according to claim 2, **characterized in** further comprising:

   recording the number of denials to the terminal device; and
   sending the recorded number to a radio network controller, so that the radio network controller adjusts the common enhanced dedicated channel resources in the first resource subset and the second resource subset according to the number.

5. A method for allocating channel resource, **characterized in** comprising:

   receiving a cell broadcast message from a network side, wherein the cell broadcast message comprises description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI;
   selecting the first TTI or the second TTI as a TTI for use and generating indication information of the selected TTI; and
   sending the indication information to the network side, so that the network side allocates a common enhanced dedicated channel resource according to the indication information.

6. The method according to claim 5, **characterized in that** the receiving the cell broadcast message from the network side comprises:

Samsung Exhibit 1009, Page 97 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

receiving the cell broadcast message, wherein, in the cell broadcast message, the common enhanced dedicated channel resources are grouped into a first resource subset specific to the first TTI and a second resource subset specific to the second TTI.

7. A method for allocating channel resource, **characterized in** comprising:

sending a cell broadcast message to a terminal device, wherein the cell broadcast message comprises description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI;
selecting the first TTI or the second TTI as a TTI for use;
notifying the terminal device of the selected TTI; and
allocating a common enhanced dedicated channel resource to the terminal device according to the selected TTI.

8. A method for allocating channel resource, **characterized in** comprising:

receiving a cell broadcast message from a network side, wherein the cell broadcast message comprises description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI;
receiving indication information from the network side, wherein the indication information indicates that the network side device selects the first TTI or the second TTI as a TTI for use; and
receiving a common enhanced dedicated channel resource that is allocated by the network side according to the selected TTI.

9. A base station device, **characterized in** comprising:

a broadcasting unit, configured to send a cell broadcast message to a terminal device, wherein
the cell broadcast message comprises description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI;
a receiving unit, configured to receive indication information sent from the terminal device, wherein the indication information indicates that the terminal device selects the first TTI or the second TTI as a TTI for use; and
an allocating unit, configured to allocate a common enhanced dedicated channel resource to the terminal device according to the indication information.

10. The base station device according to claim 9, **characterized in that** the broadcasting unit sends the cell broadcast message to the terminal device, wherein, in the cell broadcast message, the common enhanced dedicated channel resources are grouped into a first resource subset specific to the first TTI and a second resource subset specific to the second TTI.

11. The base station device according to claim 10, **characterized in that**, the allocating unit allocates a common enhanced dedicated channel resource in the first resource subset to the terminal device when the indication information indicates that the selected TTI is the first TTI; and allocates a common enhanced dedicated channel resource in the second resource subset to the terminal device when the indication information indicates that the selected TTI is the second TTI.

12. The base station device according to claim 10, **characterized in** further comprising:

a recording unit, configured to record the number of denials to the terminal device and send the recorded number to a radio network controller, so that the radio network controller adjusts the common enhanced dedicated channel resources in the first resource subset and the second resource subset according to the number.

13. A base station device, **characterized in** comprising:

a broadcasting unit, configured to send a cell broadcast message to a terminal device, wherein
the cell broadcast message comprises description information of a first parameter configuration and description information of a second pa-

Samsung Exhibit 1009, Page 98 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

rameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI;
a selecting unit, configured to select the first TTI or the second TTI as a TTI for use;
a notifying unit, configured to notify the terminal device of the selected TTI; and
an allocating unit, configured to allocate a common enhanced dedicated channel resource to the terminal device according to the selected TTI.

14. A terminal device, **characterized in** comprising:

a receiving unit, configured to receive a cell broadcast message from a network side, wherein
the cell broadcast message comprises description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI;
a selecting unit, configured to select the first TTI or the second TTI as a TTI for use and generate indication information of the selected TTI; and
a sending unit, configured to send the indication information to the network side, so that the network side allocates a common enhanced dedicated channel resource according to the indication information.

15. The terminal device according to claim 14, **characterized in that**:

the receiving unit is further configured to receive a notification of the allocated common enhanced dedicated channel resource; and
the selecting unit is further configured to select the first parameter configuration or the second parameter configuration according to the selected TTI.

16. The terminal device according to claim 14, **characterized in that** the receiving unit receives the cell broadcast message, wherein, in the cell broadcast message, the common enhanced dedicated channel resources are grouped into a first resource subset specific to the first TTI and a second resource subset specific to the second TTI.

17. A terminal device, **characterized in** comprising:

a receiving unit, configured to receive a cell broadcast message from a network side, wherein the cell broadcast message comprises description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; wherein
the receiving unit is further configured to receive indication information from the network side, wherein the indication information indicates that the network side device selects the first TTI or the second TTI as a TTI for use; and
the receiving unit is further configured to receive a common enhanced dedicated channel resource that is allocated by the network side according to the selected TTI.

18. A communication system, **characterized in** comprising:

the base station device according to any one of claims 9-13; and
the terminal device according to any one of claims 14-17.

19. The communication system according to claim 18, **characterized in** further comprising:

a radio network controller, configured to receive the number of denials to the terminal device recorded by the base station device and adjust the common enhanced dedicated channel resources in the first resource subset and the second resource subset according to the number.

Samsung Exhibit 1009, Page 99 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

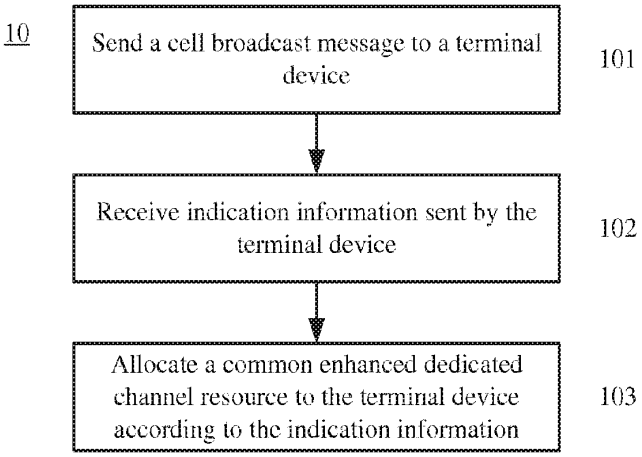


FIG. 1

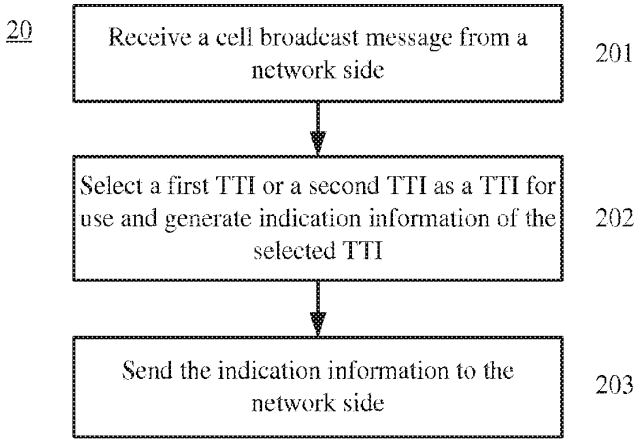


FIG. 2

Samsung Exhibit 1009, Page 100 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

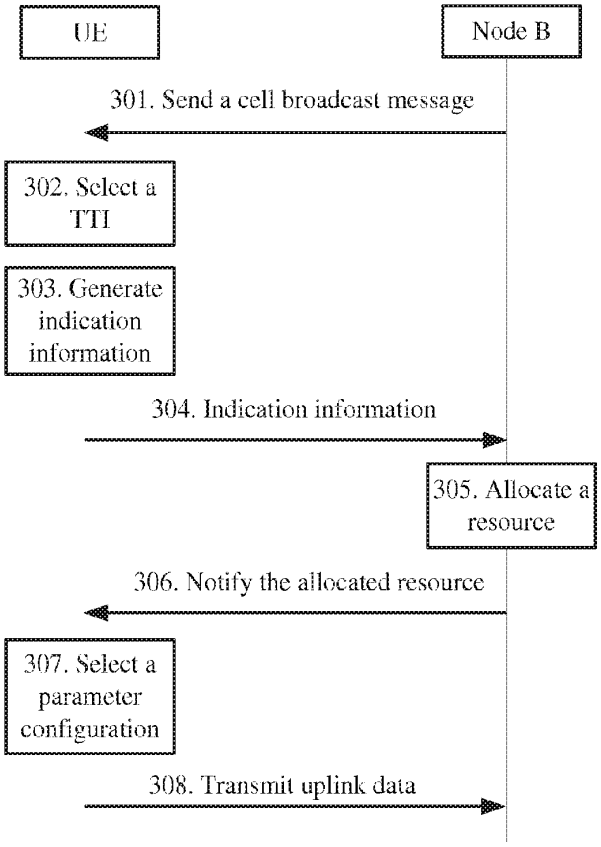


FIG. 3A

Samsung Exhibit 1009, Page 101 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

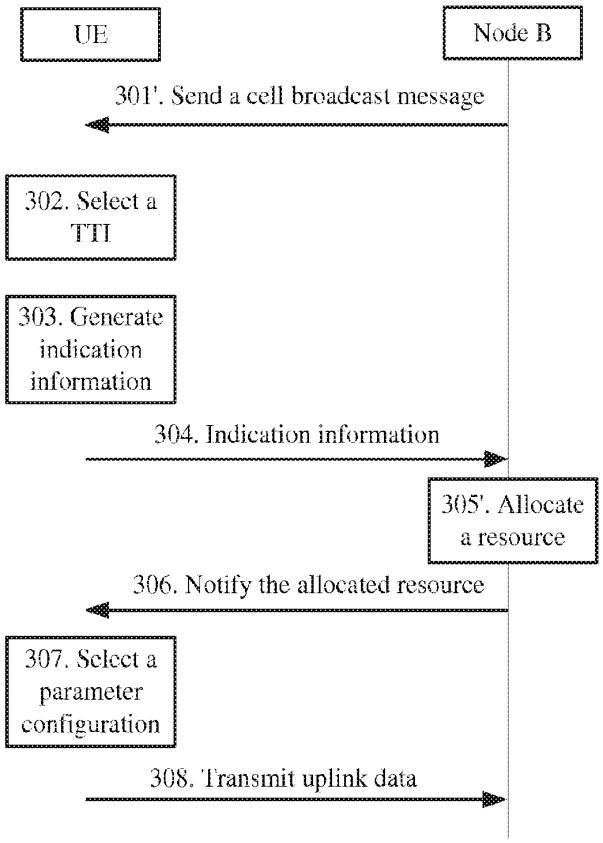


FIG. 3B

Samsung Exhibit 1009, Page 102 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

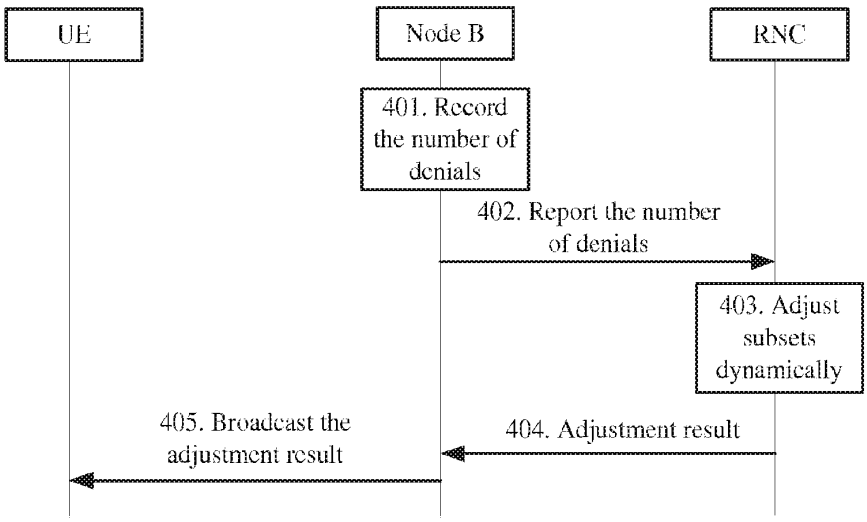


FIG. 4

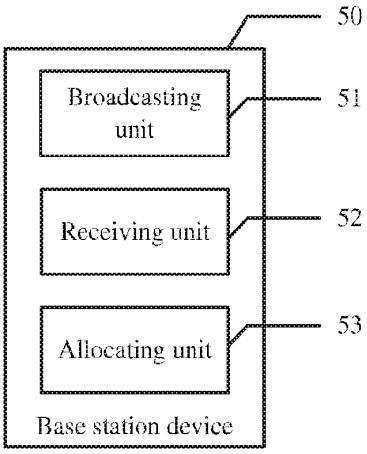


FIG. 5

Samsung Exhibit 1009, Page 103 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

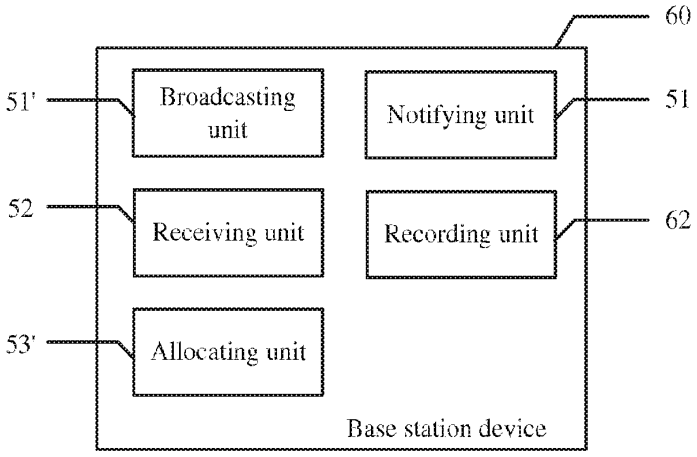


FIG. 6

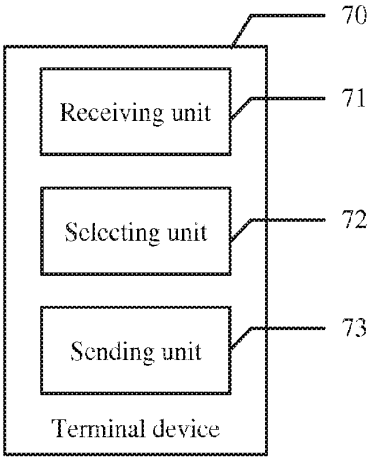


FIG. 7

Samsung Exhibit 1009, Page 104 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

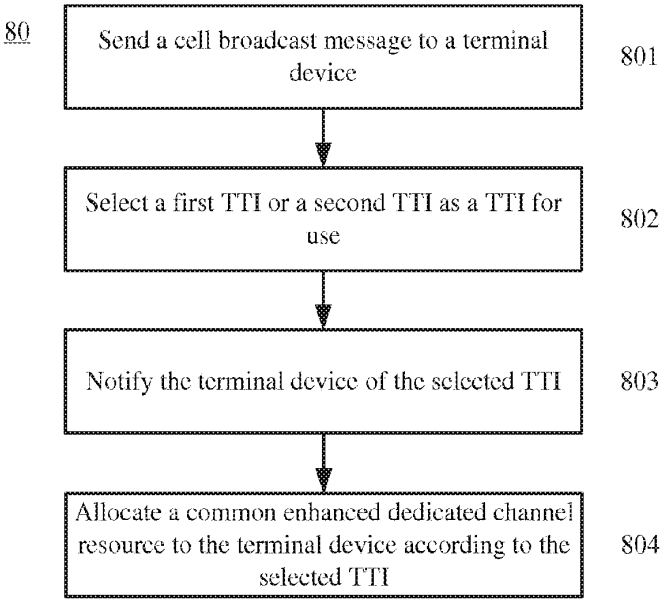


FIG. 8

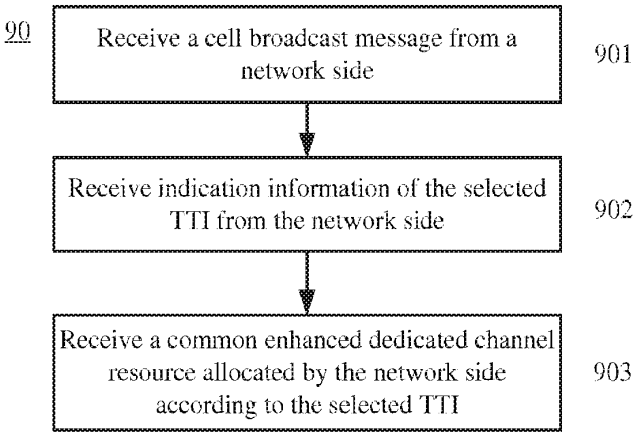


FIG. 9

Samsung Exhibit 1009, Page 105 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

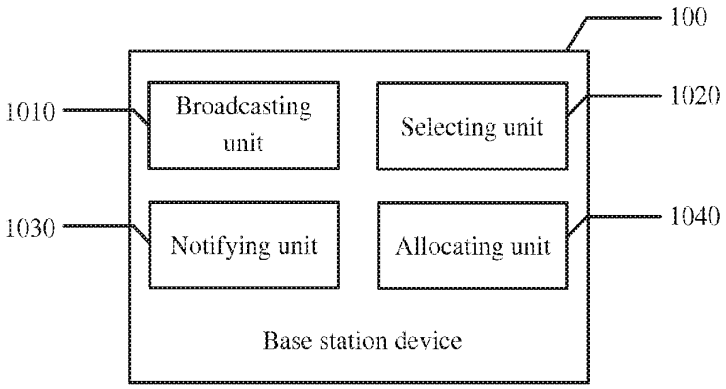


FIG. 10

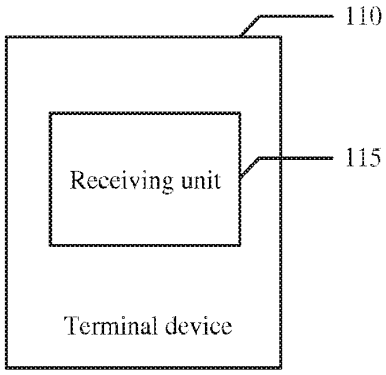


FIG. 11

Samsung Exhibit 1009, Page 106 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

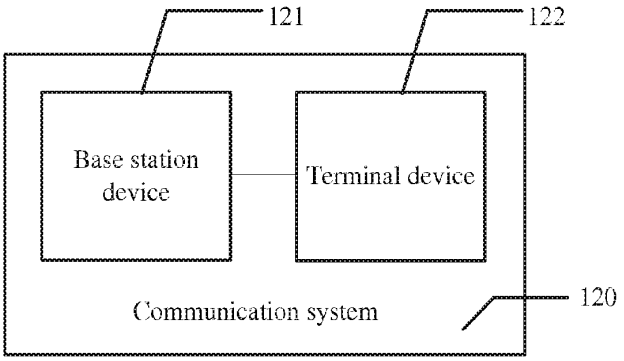


FIG. 12

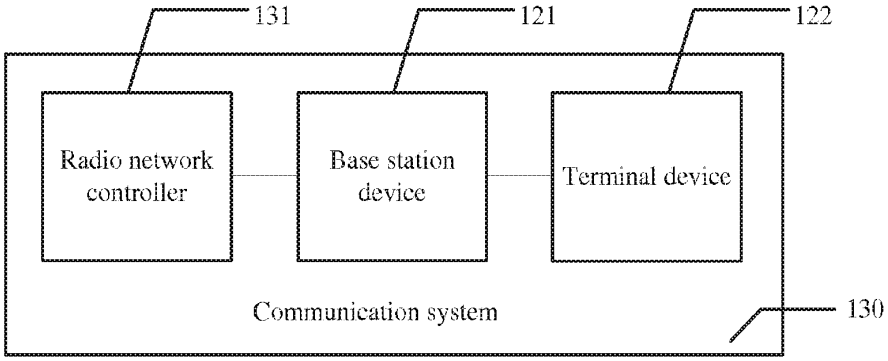


FIG. 13

Samsung Exhibit 1009, Page 107 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2012/073476

A. CLASSIFICATION OF SUBJECT MATTER

H04W 72/04(2009.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: H04W; H04L; H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CPRSABS, CNTXT, CNKI, VEN: broadcast, first, second, different, transmission time interval, TTI, select, indicate, enhanced dedicated channel, EDCH

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN101400072A (DATANG MOBILE COMMUNICATION APPARATUS) 01 Apr. 2009 (01.04.2009), the description page 4 line 12- page 6 line 22, claims 1, 8-11	7-8, 13, 17-19
Y	CN1852605A (HUAWEI TECHNOLOGIES CO., LTD.), 25 Oct. 2006 (25.10.2006) claims 1, 9	7-8, 13, 17-19
A	CN101902779A(HUAWEI TECHNOLOGIES CO., LTD.), 01 Dec. 2010 (01.12.2010) the whole document	1-19

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 Jun. 2012(15.06.2012)	12 Jul. 2012(12.07.2012)

Name and mailing address of the ISA/CN	Authorized officer
State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No. (86-10)62019451	LI, Qian Telephone No. (86-10) 62411283

Form PCT/ISA /210 (second sheet) (July 2009)

Samsung Exhibit 1009, Page 108 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2012/073476

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN101400072A	01.04.2009	NONE	
CN1852605A	25.10.2006	CN100421528C	24.09.2008
CN101902779A	01.12.2010	WO2010135985A1	02.12.2010

Form PCT/ISA /210 (patent family annex) (July 2009)

Samsung Exhibit 1009, Page 109 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 201110083708 **[0001]**

Samsung Exhibit 1009, Page 110 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

Electronic Acknowledgement Receipt

EFS ID:	31229065
Application Number:	15663674
International Application Number:	
Confirmation Number:	8966
Title of Invention:	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM
First Named Inventor/Applicant Name:	Wei-Yu Chen
Customer Number:	106622
Filer:	Sang N. Dang/Sandy Kim
Filer Authorized By:	Sang N. Dang
Attorney Docket Number:	1426-136.101
Receipt Date:	14-DEC-2017
Filing Date:	28-JUL-2017
Time Stamp:	14:30:37
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)	1426-136-101--IDSasFiled12142017.pdf	57948 1a9af3f6723be342e13837338ea483d91eda063d	no	2
Warnings:					

Information:					
This is not an USPTO supplied IDS fillable form					
2	Non Patent Literature	NPL--EP2680651f.pdf	2874715 bf3f4b3ca1c9511d19a6d953b8561c9b0458199c	no	23
Warnings:					
Information:					
3	Non Patent Literature	NPL-R2-163445.pdf	899814 e6986514509368a79636c1258c0faa82a78e0164	no	4
Warnings:					
Information:					
4	Non Patent Literature	NPL-R2-162662.pdf	1482535 492f90df2c63f00a87dc86e3fa2afaf9a9907bb2	no	7
Warnings:					
Information:					
5	Non Patent Literature	NPL-R2-154172.pdf	411408 9555d6d707479db685770051fab0b2e363058494	no	3
Warnings:					
Information:					
6	Non Patent Literature	NPL-R1-163175.pdf	1123092 b3ca6b1922e55a5c0c7ca0337fea8b34b3f3a023	no	6
Warnings:					
Information:					
7	Non Patent Literature	NPL-EPSearchReport.pdf	2503296 3dfe920cc5a7e366036d0a1e936aa39b9bdd93ea	no	13
Warnings:					
Information:					
		Total Files Size (in bytes):	9352808		

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.

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	15663674
Filing Date	2017-07-28
First Named Inventor	Wei-Yu Chen
Art Unit	2642
Examiner Name	Pakee Fang
Attorney Docket Number	1426-136.101

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					

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							☐

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]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15663674
	Filing Date	2017-07-28
	First Named Inventor	Wei-Yu Chen
	Art Unit	2642
	Examiner Name	Pakee Fang
	Attorney Docket Number	1426-136.101

	1	3GPP TS 36.300 V13.4.0 (2016-06),Technical Specification, 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 13)	☐
	2	Klaus I. Pedersen et al., A Flexible 5G Frame Structure Design for Frequency-Division Duplex Cases, IEEE Communications Magazine, March 2016 (March 31, 2016)	☐
	3	Notice of Non-Final Office Action from Korean Intellectual Property Office from corresponding Korean Application No. 10-2017-0096475, dated January 10, 2018.	☒

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.

Electronic Acknowledgement Receipt

EFS ID:	31566889
Application Number:	15663674
International Application Number:	
Confirmation Number:	8966
Title of Invention:	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM
First Named Inventor/Applicant Name:	Wei-Yu Chen
Customer Number:	106622
Filer:	Sang N. Dang/Sandy Kim
Filer Authorized By:	Sang N. Dang
Attorney Docket Number:	1426-136.101
Receipt Date:	22-JAN-2018
Filing Date:	28-JUL-2017
Time Stamp:	14:58:09
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)	1426-136-101--IDSasFiled01222018.pdf	54134 035dfb062c2c2a91f4123f1eb943b39bee0e28a4	no	2
Warnings:					

Information:					
This is not an USPTO supplied IDS fillable form					
2	Non Patent Literature	NPL--3GPP.pdf	4006694 dcd6dcd87c6012e7e56e557551bb5f16ed8eba26	no	310
Warnings:					
Information:					
3	Non Patent Literature	NPL-Flexible5G.pdf	192414 64c6964193ad8023a9871a56e8adc13f0fcddc08	no	7
Warnings:					
Information:					
4	Non Patent Literature	NPL-OfficeActionfromKIPO.pdf	1502733 0a69be4de6e711190f6e81c64947606b6be54178	no	6
Warnings:					
Information:					
5	Non Patent Literature	NPL-KROfficeActioninEnglish.pdf	55168 5df42cfd19bc5dee72be158f426b180f24ba91d6	no	5
Warnings:					
Information:					
		Total Files Size (in bytes):	5811143		

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.

<u>New Applications Under 35 U.S.C. 111</u>
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.
<u>National Stage of an International Application under 35 U.S.C. 371</u>
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.
<u>New International Application Filed with the USPTO as a Receiving Office</u>
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.
15/663,674	07/28/2017	Wei-Yu Chen	1426-136.101	8966

106622 7590 02/01/2018

Blue Capital Law Firm, P.C.
650 Town Center Drive, Suite 1530
Costa Mesa, CA 92626

EXAMINER	
FANG, PAKEE	

ART UNIT	PAPER NUMBER
2642	

NOTIFICATION DATE	DELIVERY MODE
02/01/2018	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

Office Action Summary	Application No. 15/663,674	Applicant(s) CHEN ET AL.	
	Examiner KEITH FANG	Art Unit 2642	AIA (First Inventor to File) Status Yes

-- 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 *07/28/2017*.

☐ 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) *1-24* 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) *1-24* 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: _____.

DETAILED ACTION

Election/Restrictions

1. Claims 1-24 are directed to the following patentably distinct species:

1st Specie, Fig. 12;

2nd Specie Fig. 13;

3rd Specie Fig. 14;

4th Specie Fig. 15;

5th Specie Fig. 16;

6th Specie Fig. 17;

7th Specie Fig. 18;

8th Specie Fig. 19;

The species are independent or distinct because FIGS. 12-19 contains different methods which using different steps to perform different functions.

Applicant must determine which of the pending claim falls into which of the cited specie, and make an election of the cited specie along with affiliated pending claims in the response to this restriction.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species, or a single grouping of patentably indistinct species, for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, there is no generic claim for the species restriction.

There is a search and/or examination burden for the patentably distinct species as set forth above because at least the following reason(s) apply: Each of the species is located in a different classification and/or sub-classification.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species to be examined even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected species or grouping of patentably indistinct species**, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

The election may be made with or without traverse. To preserve 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 election of species 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 on the elected species or grouping of patentably indistinct species.

Should applicant traverse on the ground that the species, or groupings of patentably indistinct species from which election is required, are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing them 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 species 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 species. Furthermore, if the

Applicant improperly selected unrelated claims for the elected species, further action maybe required that would result in an unintentional delay for prosecuting the current Application. **Please, also cancel all other unrelated claims** of the elected species.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations of an allowable generic claim as provided by 37 CFR 1.141.

Inquiries

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to PAKEE FANG whose telephone number is (571)270-3633. The Examiner can normally be reached on Mon-Fri 9AM - 5PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, PÉREZ-GUTIÉRREZ RAFAEL can be reached on 571-272-7915. 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.

/PAKEE FANG/
Primary Examiner, Art Unit 2642

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15663674	CHEN ET AL.
	Examiner	**Art Unit**
	KEITH FANG	2642

✓	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	01/29/2018								
	1	÷								
	2	÷								
	3	÷								
	4	÷								
	5	÷								
	6	÷								
	7	÷								
	8	÷								
	9	÷								
	10	÷								
	11	÷								
	12	÷								
	13	÷								
	14	÷								
	15	÷								
	16	÷								
	17	÷								
	18	÷								
	19	÷								
	20	÷								
	21	÷								
	22	÷								
	23	÷								
	24	÷								

Samsung Exhibit 1009, Page 124 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

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 NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/663,674	07/28/2017	Wei-Yu Chen	1426-136.101

CONFIRMATION NO. 8966

106622
Blue Capital Law Firm, P.C.
650 Town Center Drive, Suite 1530
Costa Mesa, CA 92626

PUBLICATION NOTICE

OC000000097115354

Title:METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM

Publication No.US-2018-0035470-A1
Publication Date:02/01/2018

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently https://portal.uspto.gov/pair/PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	: 15/663,674
Confirmation No.	: 8966
Applicant	: Wei-Yu Chen
Filed	: July 28, 2017
Title	: METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM
TC/A.U.	: 2642
Examiner	: Pakee Fang
Docket No.	: 1426-136.101 (1050153-US)
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 February 1, 2018, the Examiner has indicated that the species are independent or distinct because FIGS. 12-19 contain different methods which using different steps to perform different functions.

In particular, the Examiner has categorized the different species as follows:

1st Specie, Fig. 12;
2nd Specie Fig. 13;
3rd Specie Fig. 14;
4th Specie Fig. 15;
5th Specie Fig. 16;
6th Specie Fig. 17;
7th Specie Fig. 18;
8th Specie Fig. 19.

See Office Action, Page 2.

Samsung Exhibit 1009, Page 126 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

Furthermore, the Examiner has required an election in the present application among the species that the Examiner has categorized.

As a preliminary matter, Applicant respectfully disagrees with the species that the Examiner has categorized above. Applicant respectfully submits that claims 1-24 should be categorized as follows:

1. *Specie I* – Claims 1-7 and 16-20; FIGS. 12, 13, 16, 17, and 19 (and the text describing the figures); and
2. *Specie II* – Claims 8-25 and 21-24; FIGS. 14 and 18 (and the text describing the figures).

For the purpose of examination of the present application, Applicant elects claims 1-7 and 16-20 (which is *Specie I*).

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: March 19, 2018

/Sang N. Dang/
Reg. No. 51,186
Tel.: (714) 839-3800

Samsung Exhibit 1009, Page 127 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Wei-Yu Chen and Li-Chih Tseng	
Title:	METHOD AND APPARATUS FOR IMPROVING Msg3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM	
Serial No.:	15/663,674	Filed: July 28, 2017
Examiner:	Pakee Fang	Group Art Unit: 8966
Attorney Docket No.:	1426-136.101 (1050153-US)	

CERTIFICATE OF EFS-WEB TRANSMISSION UNDER 37 CFR § 1.8

I hereby certify that the enclosed 2 Page Amendment Transmittal Sheet; and 2 Page Response to Restriction Requirement are being transmitted to the United States Patent and Trademark Office via EFS-Web on March 19, 2018.

Date: March 19, 2018 /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:	32090617
Application Number:	15663674
International Application Number:	
Confirmation Number:	8966
Title of Invention:	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM
First Named Inventor/Applicant Name:	Wei-Yu Chen
Customer Number:	106622
Filer:	Sang N. Dang/Sandy Kim
Filer Authorized By:	Sang N. Dang
Attorney Docket Number:	1426-136.101
Receipt Date:	19-MAR-2018
Filing Date:	28-JUL-2017
Time Stamp:	14:38:00
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		1426-136-101--ResponsetoResReq03192018.pdf	129550 55407cddb3edad8d48e07e368398b7122e0aca95	yes	5

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	2
	Response to Election / Restriction Filed	3	3
	Applicant Arguments/Remarks Made in an Amendment	4	4
	Miscellaneous Incoming Letter	5	5
Warnings:			
Information:			
	Total Files Size (in bytes):	129550	

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
1426-136.101

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

Title of Invention

METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM

First Named Inventor	Wei-Yu Chen
Application No.	15/663,674
Filing Date	July 28, 2017
Examiner	Pakee Fang
Art Unit	2642

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	24	- 24 =		x =	
Total Indep. Claims	4	- 4 =		x =	
Multiple Dependent Claims (check if applicable) ☐					
				TOTAL	

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 _____

Samsung Exhibit 1009, Page 131 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

Amendment Transmittal Letter

Docket Number
1426-136.101

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	03-19-2018

Samsung Exhibit 1009, Page 132 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

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.
15/663,674	07/28/2017	Wei-Yu Chen	1426-136.101	8966

106622 7590 05/30/2018

Blue Capital Law Firm, P.C.
650 Town Center Drive, Suite 1530
Costa Mesa, CA 92626

EXAMINER	
FANG, PAKEE	

ART UNIT	PAPER NUMBER
2642	

NOTIFICATION DATE	DELIVERY MODE
05/30/2018	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

Office Action Summary	Application No. 15/663,674	Applicant(s) CHEN ET AL.	
	Examiner KEITH FANG	Art Unit 2642	AIA (First Inventor to File) Status Yes

-- 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 *07/28/2017*.

☐ 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) *1-24* is/are pending in the application.

5a) Of the above claim(s) *8-15 and 21-24* is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-7 and 16-20* 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 *07/28/2017* 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: _____.

DETAILED ACTION

1. **Claims 1-24 are presented for examination. Claims 8-15 and 21-24 are withdrawn.**

Election/Restrictions

2. Applicant elected to prosecute claims **1-7 and 16-20** is acknowledged by the Primary Examiner.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a)(2) the claimed invention was described in a patent issued under section 151, or in an application for patent published or deemed published under section 122(b), in which the patent or application, as the case may be, names another inventor and was effectively filed before the effective filing date of the claimed invention.

4. **Claims 1-7 and 16-20** are rejected under 35 U.S.C. 102(a)(2) as being anticipated by Mujtaba et al. (US Pub. 20160366705 A1).

For claim 1, Mujtaba disclose (Figs. 1-7) a method of a UE (User Equipment) for performing random access procedure, comprising:

the UE receives a message from a network, wherein the message includes a TTI (Transmission Time Interval) information of Msg3 [0076, 0080, 0063-65];

the UE transmits a preamble to the network (Step 502/602) [0060-61, 0070-73];

the UE receives a Msg2 from the network for responding the preamble (Step 504/604) [0062, 0074-79]; and

the UE performs a Msg3 transmission to the network according to the TTI information of Msg3 [0076, 0080, 0063-65].

For claim 16, Mujtaba disclose (Figs. 1-7) A User Equipment (UE), comprising: a control circuit; a processor installed in the control circuit; and a memory installed in the control circuit and operatively coupled to the processor [0029, 0032, 0043, 0046-49]; wherein the processor is configured to execute a program code stored in the memory to:

receive a message from a network, wherein the message includes a TTI (Transmission Time Interval) information of Msg3 [0076, 0080, 0063-65];

transmit a preamble to the network (Step 502/602) [0060-61, 0070-73];

receive a Msg2 from the network for responding the preamble (Step 504/604) [0062, 0074-79]; and

perform a Msg3 transmission to the network according to the TTI information of Msg3 [0076, 0080, 0063-65].

For claims 2 and 17, Mujtaba disclose (Figs. 1-7) the UE selects the TTI information of Msg3 based on a PRACH (Physical Random Access Channel) resource set of the preamble or preamble set of the preamble, if there are multiple TTI information of Msg3 in the message [0076, 0080, 0063-65].

For claims 3 and 18, Mujtaba disclose (Figs. 1-7) the UE selects the TTI information of Msg3 based on random access purpose, if there are multiple TTI information in the message [0076, 0080, 0063-65].

For claims 4 and 19, Mujtaba disclose (Figs. 1-7) the UE selects the TTI information of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple TTI information of Msg3 in the message [0084-85].

For claim 5, Mujtaba disclose (Figs. 1-7) the message is a downlink control signal [0075, 0058, 0095].

For claim 6, Mujtaba disclose (Figs. 1-7) the message is a RRC (Radio Resource Control) message [0075, 0058, 0095].

For claims 7 and 20, the UE selects the TTI information of Msg3 based on a random access configuration of the preamble transmission, if there are multiple TTI information of Msg3 in the message [0076, 0080, 0061-65, 0058].

Inquiries

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to PAKEE FANG whose telephone number is (571)270-3633. The Examiner can normally be reached on Mon-Fri 9AM - 5PM. If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, PÉREZ-GUTIÉRREZ RAFAEL can be reached on 571-272-7915. 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.

/PAKEE FANG/
Primary Examiner, Art Unit 2642

Notice of References Cited	Application/Control No. 15/663,674	Applicant(s)/Patent Under Reexamination CHEN ET AL.	
	Examiner KEITH FANG	Art Unit 2642	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-2016/0366705 A1	12-2016	Mujtaba; Syed Aon	H04W72/0413	1/1
	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.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15663674	CHEN ET AL.
	Examiner	Art Unit
	KEITH FANG	2642

CPC- SEARCHED		
Symbol	Date	Examiner
H04W74/0833, H04W48/16, H04W72/1284, H04W74/006, H04L1/1607	5/23/2018	PF

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
455	combined text	5/23/2018	PF

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

SEARCH NOTES		
Search Notes	Date	Examiner
East search, Google, inventors	5/23/2018	PF

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15663674	CHEN ET AL.
	Examiner	**Art Unit**
	KEITH FANG	2642

✓	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	01/29/2018	05/23/2018							
	1	÷	✓							
	2	÷	✓							
	3	÷	✓							
	4	÷	✓							
	5	÷	✓							
	6	÷	✓							
	7	÷	✓							
	8	÷	N							
	9	÷	N							
	10	÷	N							
	11	÷	N							
	12	÷	N							
	13	÷	N							
	14	÷	N							
	15	÷	N							
	16	÷	✓							
	17	÷	✓							
	18	÷	✓							
	19	÷	✓							
	20	÷	✓							
	21	÷	N							
	22	÷	N							
	23	÷	N							
	24	÷	N							

Samsung Exhibit 1009, Page 141 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

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	15663674
	Filing Date	2017-07-28
	First Named Inventor	Chen, Wei-Yu
	Art Unit	2642
	Examiner Name	Pakee Fang
	Attorney Docket Number	1426-136.101

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					

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	2680651	EP		2014-01-01	Huawei Technologies Co., Ltd.		☐

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]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.F/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	15663674
Filing Date	2017-07-28
First Named Inventor	Chen, Wei-Yu
Art Unit	2642
Examiner Name	Pakee Fang
Attorney Docket Number	1426-136.101

	1	NOKIA ET AL: "Scheduling Framework and Requirements", 3GPP DRAFT; R2-163445 SCHEDULING FRAMEWORK, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-Q6921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE vol. RAN WG2, no. Nanjing, China; 20160523 -20160527 13 May 2016 (2016-05-13), XP051089702, Retrieved from the Internet: URL: http: //www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_94/Docs/	☐
	2	HUAWEI ET AL: "Low latency and low overhead transmission for NR", 3GPP DRAFT; R2-162662 LOW LATENCY AND LOW OVERHEAD TRANSMISSION FOR NR, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX vol. RAN WG2, no. Dubrovnik, Croatia; 20160411 - 20160415 1 April 2016 (2016-04-01), XP051082246, Retrieved from the Internet:	☐
	3	ZTE: "Utilization of short TTI in higher layer", 3GPP DRAFT; R2-154172 UTILIZATION OF SHORT TTI IN HIGHER LAYER, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ;FRANCE vol. RAN WG2, no. Mai mo, Sweden; 20151005 -20151009 25 September 2015 (2015-09-25), XP051023493, Retrieved from the Internet:	☐
	4	NTT DOCOMO ET AL: "Discussions on TTI shortening", 3GPP DRAFT; R1-163175, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ;FRANCE vol. RAN WG1, no. Busan, Korea; 20160411 - 2Q160415 1 April 2016 (2016-04-01), XP051Q7988Q, Retrieved from the Internet:	☐
	5	European Search Report from corresponding EP Application No. 17183827.9, dated December 12, 2017.	☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/PAKEE FANG/	Date Considered	05/21/2018

*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. /P.F/

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	2	"20180035470".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:17
S2	2	S1 and (frame msg$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:26
S3	82131	(H04W74/0833, H04W48/16, H04W72/1284, H04W74/006, H04L1/1607).CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:29
S4	5501	S3 and (preamble heading) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:33
S5	1227	S4 and ((Transmission adj2 Time adj2 Interval) TTI)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:35
S6	78	S5 and ((Transmission adj2 Time adj2 Interval) TTI) with (first second new third fourth) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:37
S7	66	@ay<"2017" and S6	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 17:41

5/23/2018 8:15:30 PM
C:\Users\pfang\Documents\EAST\Workspaces\15663674.wsp

Samsung Exhibit 1009, Page 144 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

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	15663674
Filing Date	2017-07-28
First Named Inventor	Wei-Yu Chen
Art Unit	2642
Examiner Name	Pakee Fang
Attorney Docket Number	1426-136.101

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					

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							☐

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]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.F/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15663674
	Filing Date	2017-07-28
	First Named Inventor	Wei-Yu Chen
	Art Unit	2642
	Examiner Name	Pakee Fang
	Attorney Docket Number	1426-136.101

	1	3GPP TS 36.300 V13.4.0 (2016-06),Technical Specification, 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 13)	☐
	2	Klaus I. Pedersen et al., A Flexible 5G Frame Structure Design for Frequency-Division Duplex Cases, IEEE Communications Magazine, March 2016 (March 31, 2016)	☐
	3	Notice of Non-Final Office Action from Korean Intellectual Property Office from corresponding Korean Application No. 10-2017-0096475, dated January 10, 2018.	☒

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/PAKEE FANG/	Date Considered	05/21/2018

*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. /P.F/

Bibliographic Data

Application No: 15/663,674

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /PAKEE FANG/ (Examiner's Signature) | (Initials)

Title: METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
07/28/2017	455	2642	1426-136.101
RULE			

APPLICANTS

ASUSTek Computer Inc., Taipei City, TAIWAN

INVENTORS

Wei-Yu Chen Taipei City, TAIWAN

Li-Chih Tseng Taipei City, TAIWAN

CONTINUING DATA

This application has PRO of 62367875 07/28/2016

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

08/23/2017

STATE OR COUNTRY

TAIWAN

ADDRESS

Blue Capital Law Firm, P.C.
650 Town Center Drive, Suite 1530
Costa Mesa, CA 92626
UNITED STATES

FILING FEE RECEIVED

$2,340

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	15/663,674
Confirmation No.	:	8966
Applicant	:	Wei-Yu Chen and Li-Chi Tseng
Filed	:	July 28, 2017
Title	:	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM
TC/A.U.	:	2642
Examiner	:	Pakee Fang
Docket No.	:	1426-136.101 (1050153-US)
Customer No.	:	106622

RESPONSE TO OFFICE ACTION

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

In response to the non-final Office Action mailed on May 30, 2018, having a three-month period for filing a response to **August 30, 2018**, please amend the above-identified application as follows:

Amendments to Claims begin on page 2.
Remarks begin on page 6.

Samsung Exhibit 1009, Page 148 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

Amendment Transmittal Letter

Docket Number
1426-136.101

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

Title of Invention

METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM

First Named Inventor	Wei-Yu Chen
Application No.	15/663,674
Filing Date	July 28, 2017
Examiner	Pakee Fang
Art Unit	2642

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	24	- 24 =		x ☐ =	
Total Indep. Claims	4	- 4 =		x =	
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

Samsung Exhibit 1009, Page 149 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

Amendment Transmittal Letter

Docket Number
1426-136.101

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	08-03-2018

Samsung Exhibit 1009, Page 150 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

Electronic Acknowledgement Receipt

EFS ID:	33374651
Application Number:	15663674
International Application Number:	
Confirmation Number:	8966
Title of Invention:	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM
First Named Inventor/Applicant Name:	Wei-Yu Chen
Customer Number:	106622
Filer:	Sang N. Dang/Sandy Kim
Filer Authorized By:	Sang N. Dang
Attorney Docket Number:	1426-136.101
Receipt Date:	03-AUG-2018
Filing Date:	28-JUL-2017
Time Stamp:	19:43:39
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		1426-136-101--ROAof05302018asFiled08032018.pdf	138443 9d3b85696d4f6c0a18ba0e95c4875c61d3b3edb4	yes	10

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Miscellaneous Incoming Letter	10	10
	Applicant Arguments/Remarks Made in an Amendment	8	9
	Claims	4	7
	Amendment/Req. Reconsideration-After Non-Final Reject	3	3
	Transmittal Letter	1	2
Warnings:			
Information:			
	Total Files Size (in bytes):	138443	

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Wei-Yu Chen and Li-Chih Tseng	
Title:	METHOD AND APPARATUS FOR IMPROVING Msg3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM	
Serial No.:	15/663,674	Filed: July 28, 2017
Examiner:	Pakee Fang	Group Art Unit: 8966
Attorney Docket No.:	1426-136.101 (1050153-US)	

CERTIFICATE OF EFS-WEB TRANSMISSION
UNDER 37 CFR § 1.8

I hereby certify that the enclosed 2 Page Amendment Transmittal Sheet; and 7 Page Amendment are being transmitted to the United States Patent and Trademark Office via EFS-Web on August 3, 2018.

Date: August 3, 2018 /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

REMARKS

Claims 8-15 and 21-24 were previously withdrawn from the consideration. *See* Response to Response to Restriction Requirement dated March 19, 2018. Claims 1-7 and 16-20 are pending in the application. In the Office Action, claims 1-7 and 16-20 stand rejected under 35 U.S.C. 102(a)(2) as being anticipated by Mujtaba (U.S. Patent Publication No. 2016/0366705). *See* Office Action, ¶ 4. Applicants respectfully traverse the rejection and respectfully request reconsideration of the claims.

Paragraphs [0052] and [0053] of the present application disclose that to achieve dynamic TTI concept, a UE needs to derive TTI information (e.g., TTI length, numerology) for transmitting Msg3 on air interface for improving resource efficiency. Consistent with paragraphs [0052] and [0053] of the present application, claims 1 and 16 recite "receives [or receive] a message from a network, wherein the message includes a TTI (Transmission Time Interval) information of Msg3" and "performs [or perform] a Msg3 transmission to the network according to the TTI information of Msg3". Applicants respectfully submit that Mujtaba fails to disclose the noted limitations.

The motivation of Mujtaba is to solve a link budget constrained wireless devices performing random access procedures performs random access procedures by Transmission Time Interval Bundling (TTI-B). Paragraph [0004] of Mujtaba states "Devices which exhibit relatively limited reception and/or transmission capabilities (due to device design, current transmission medium conditions, and/or other factors) may be referred to in some instances as 'link budget limited' or 'link budget constrained" devices." *See* Mujtaba, Paragraph [0004]. Furthermore, paragraph [0076] of Mujtaba teaches a base station designates TC-RNTI values for use with link budget limited devices, such that use of those TC-RNTI values is understood to use TTI-B (e.g., at least for the Msg3). The base station provide such a TC-RNTI in its Msg2/RAR to a wireless device that has been determined to be link budget constrained, based on which the wireless device may subsequently use TTI-B (Transmission Time Interval Bundling). Transmission Time Interval Bundling is typically used to improved uplink/downlink transmission at cell edge or in poor radio conditions by using to transmit a transport block (TB) multiple times in consecutive subframes without waiting for HARQ ACK/NACK messages.

In contrast, the present application is to adjust a TTI of one transmission through dynamic TTI concept to improve resource efficiency for the transmission. Accordingly, claims 1 and 16

Samsung Exhibit 1009, Page 154 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

recite "receives [or receive] a message from a network, wherein the message includes a TTI (Transmission Time Interval) information of Msg3" and "performs [or perform] a Msg3 transmission to the network according to the TTI information of Msg3". As Mujtaba and the present application are concerned with different technical problems and issues, Mujtaba fails to disclose that the UE receives a message from a network, wherein the message includes a TTI (Transmission Time Interval) information of Msg3 as recited in the claims.

For the reasons stated above, Applicant respectfully submits that claims 1-7 and 16-20 are patentable over Mujtaba.

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: August 3, 2018

/Sang N. Dang/
Reg. No. 51,186
Tel.: (714) 839-3800

Samsung Exhibit 1009, Page 155 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

IN THE CLAIMS:

1. (Original) A method of a UE (User Equipment) for performing random access procedure, comprising:

the UE receives a message from a network, wherein the message includes a TTI (Transmission Time Interval) information of Msg3;

the UE transmits a preamble to the network;

the UE receives a Msg2 from the network for responding the preamble; and

the UE performs a Msg3 transmission to the network according to the TTI information of Msg3.

2. (Original) The method of claim 1, further comprising:

the UE selects the TTI information of Msg3 based on a PRACH (Physical Random Access Channel) resource set of the preamble or preamble set of the preamble, if there are multiple TTI information of Msg3 in the message.

3. (Original) The method of claim 1, further comprising:

the UE selects the TTI information of Msg3 based on random access purpose, if there are multiple TTI information in the message.

4. (Original) The method of claim 1, further comprising:

the UE selects the TTI information of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple TTI information of Msg3 in the message.

5. (Original) The method of claim 1, wherein the message is a downlink control signal.

6. (Original) The method of claim 1, wherein the message is a RRC (Radio Resource Control) message.

Samsung Exhibit 1009, Page 156 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

7. (Original) The method of claim 1, further comprising:

the UE selects the TTI information of Msg3 based on a random access configuration of the preamble transmission, if there are multiple TTI information of Msg3 in the message.

8. (Withdrawn) A method of a UE (User Equipment) for performing random access procedure, comprising:

the UE transmits a preamble to a network;

the UE receives a Msg2 from the network in response to the preamble, wherein the Msg2 contains a TTI (Transmission Time Interval) information of Msg3; and

the UE performs a Msg3 transmission to the network according to the TTI information.

9. (Withdrawn) The method of claim 8, further comprising:

the UE selects the TTI information of Msg3 based on random access purpose, if there are multiple TTI information of Msg3 in the Msg2.

10. (Withdrawn) The method of claim 8, further comprising:

the UE selects the TTI information of Msg3 based on a PRACH (Physical Random Access Channel) resource set of the preamble transmission or a preamble set of the preamble transmission, if there are multiple TTI information of Msg3 in the Msg2.

11. (Withdrawn) The method of claim 8, further comprising:

the UE selects the TTI information of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple TTI information of Msg3 in the Msg2.

12. (Withdrawn) The method of claim 8, wherein the TTI information of Msg3 is included in a RAR (Random Access Response) for responding the preamble.

13. (Withdrawn) The method of claim 8, wherein the TTI information of Msg3 is included in a common field for multiple RARs in the Msg2.

14. (Withdrawn) The method of claim 8, wherein the TTI information of Msg3 includes a TTI duration of Msg3.

Samsung Exhibit 1009, Page 157 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

15. (Withdrawn) The method of claim 8, wherein the TTI information of Msg3 includes a start timing offset of Msg3.

16. (Original) A User Equipment (UE), comprising:

a control circuit;

a processor installed in the control circuit; and

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:

receive a message from a network, wherein the message includes a TTI (Transmission Time Interval) information of Msg3;

transmit a preamble to the network;

receive a Msg2 from the network for responding the preamble; and

perform a Msg3 transmission to the network according to the TTI information of Msg3.

17. (Original) The UE of claim 16, wherein the processor is further configured to execute the program code stored in the memory to:

select the TTI information of Msg3 based on a PRACH (Physical Random Access Channel) resource set of the preamble transmission or a preamble set of the preamble transmission, if there are multiple TTI information of Msg3 in the message.

18. (Original) The UE of claim 16, wherein the processor is further configured to execute the program code stored in the memory to:

select the TTI information of Msg3 based on random access purpose, if there are multiple TTI information of Msg3 in the message.

19. (Original) The UE of claim 16, wherein the processor is further configured to execute the program code stored in the memory to:

select the TTI information of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple TTI information of Msg3 in the message.

20. (Original) The UE of claim 16, wherein the processor is further configured to execute the program code stored in the memory to:

select the TTI information of Msg3 based on a random access configuration of the preamble transmission, if there are multiple TTI information of Msg3 in the message.

21. (Withdrawn) A User Equipment (UE), comprising:

a control circuit;

a processor installed in the control circuit; and

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:

transmit a preamble to a network;

receive a Msg2 from the network in response to the preamble, wherein the Msg2 contains a TTI (Transmission Time Interval) information of Msg3; and

perform a Msg3 transmission to the network according to the TTI information of Msg3.

22. (Withdrawn) The UE of claim 21, wherein the processor is further configured to execute the program code stored in the memory to:

the UE selects the TTI information of Msg3 based on random access purpose, if there are multiple TTI information of Msg3 in the Msg2.

23. (Withdrawn) The UE of claim 21, wherein the processor is further configured to execute the program code stored in the memory to:

the UE selects the TTI information of Msg3 based on a PRACH (Physical Random Access Channel) resource set of the preamble or a preamble set of the preamble transmission, if there are multiple TTI information of Msg3 in the Msg2.

24. (Withdrawn) The UE of claim 21, wherein the processor is further configured to execute the program code stored in the memory to:

the UE selects the TTI information of Msg3 based on highest priority of logical channel having available data, if there are multiple TTI information of Msg3 in the Msg2.

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 Substitute for Form PTO-875	Application or Docket Number 15/663,674	Filing Date 07/28/2017	☐ 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 08/03/2018	(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	** 24	= 0	X $100 =	0
Independent (37 CFR 1.16(h))	* 4	Minus	***4	= 0	X $460 =	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
DELEACHES YOUNG

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)
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	15663674
Filing Date	2017-07-28
First Named Inventor	Wei-Yu Chen
Art Unit	2642
Examiner Name	Pakee Fang
Attorney Docket Number	1426-136.101

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					

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	2680651	EP		2014-01-01	Kun Yan et al.		☐

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]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15663674
	Filing Date	2017-07-28
	First Named Inventor	Wei-Yu Chen
	Art Unit	2642
	Examiner Name	Pakee Fang
	Attorney Docket Number	1426-136.101

	1	NOKIA et al., "Scheduling Framework and Requirements", vol. RAN WG2, no. Nanjing, China; R2-163445 (May 23, 2016).	☐
	2	Office Action from Korean Intellectual Property Office in the corresponding KR Application No. 10-2017-0096475, dated July 24, 2018.	☒

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.

Information Disclosure Statement Transmittal

Docket Number
1426-136.101

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

In Re Application Of:

Wei-Yu Chen

Application No.	15/663,674
Filing Date	July 28, 2017
Examiner	Pakee Fang
Art Unit	2642

Title of Invention

METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM

BASIS FOR FILING (Select 1, 2 or 3 below.)

37 CFR 1.97(b)

1) ☐ The Information Disclosure Statement submitted herewith is being filed within three months of the filing of a national application other than a continued prosecution application under 37 CFR 1.53 (d); within three months of the date of entry of the national stage as set forth in 37 CFR 1.491 in an international application; before the mailing of a first Office Action on the merits, or before the mailing of a first Office Action after the filing of a request for continued examination under 37 CFR 1.114.

37 CFR 1.97(c)

2) ☒ The Information Disclosure Statement submitted herewith is being filed after the period specified in 37 CFR 1.97(b), but before the mailing date of a Final Action under 37 CFR 1.113, a Notice of Allowance under 37 CFR 1.311, or an Action that otherwise closes prosecution in the application, and is accompanied by one of:

a) ☒ the statement specified in 37 CFR 1.97(e);

OR

b) ☐ the fee set forth in 37 CFR 1.17(p).

37 CFR 1.97(d)

3) ☐ The Information Disclosure Statement submitted herewith is being filed after the period specified in 37 CFR 1.97(c), and on or before payment of the issue fee, and is accompanied by the Statement as specified in 37 CFR 1.97(e) and the fee set forth in 37 CFR 1.17(p).

Samsung Exhibit 1009, Page 163 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

Information Disclosure Statement Transmittal

Docket Number
1426-136.101

STATEMENT UNDER 37 CFR 1.97(e) ACCOMPANYING INFORMATION DISCLOSURE STATEMENT

The Information Disclosure Statement submitted herewith is submitted under one of the following conditions, which satisfies the requirement under 37 CFR 1.97(e). (Select 4 or 5 below if applicable.)

4) ☒ That each item of information contained in the Information Disclosure Statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the Information Disclosure Statement; or

5) ☐ That no item of information contained in the Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the Information Disclosure Statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the Information Disclosure Statement.

Remarks (Enter Remarks Below or Attach Document Containing Remarks)

Fee set forth in 37 CFR 1.17(p):

☒ No additional fee is required.

☐ A check in the amount of _____ is attached.

☐ The Director is hereby authorized to charge and credit Deposit Account No. _____ as described below.

- ☐ Charge the amount of _____
- ☐ Credit any overpayment.
- ☐ Charge any additional fee required.

☐ Payment by credit card. Form PTO-2038 is attached.

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.

Samsung Exhibit 1009, Page 164 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

Information Disclosure Statement Transmittal

Docket Number
1426-136.101

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 Transmittal Letter, 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 Transmittal Letter, 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 Transmittal Letter, accompanying documents and fee authorization (if appropriate) is 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 Trasmittal Letter 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	08/13/2018

Samsung Exhibit 1009, Page 165 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

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

(11) EP 2 680 651 A1

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
01.01.2014 Bulletin 2014/01

(21) Application number: **12767268.1**

(22) Date of filing: **01.04.2012**

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

(86) International application number:
PCT/CN2012/073476

(87) International publication number:
WO 2012/136130 (11.10.2012 Gazette 2012/41)

(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

(30) Priority: **02.04.2011 CN 201110083708**

(71) Applicant: **Huawei Technologies Co., Ltd.**
Shenzhen, Guangdong 518129 (CN)

(72) Inventors:
- **YAN, Kun**
  Shenzhen
  Guangdong 518129 (CN)
- **GAO, Yongqiang**
  Shenzhen
  Guangdong 518129 (CN)

(74) Representative: **Pfenning, Meinig & Partner GbR**
Theresienhöhe 13
80339 München (DE)

(54) METHOD, BASE STATION DEVICE, TERMINAL DEVICE, AND COMMUNICATION SYSTEM FOR CHANNEL RESOURCE ALLOCATION

(57) Embodiments of the present invention provide a method for allocating channel resource, a base station device, a terminal device, and a communication system. The method includes: sending a cell broadcast message to a terminal device, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; receiving indication information sent from the terminal device, where the indication information indicates that the terminal device selects the first TTI or the second TTI as a TTI for use; and allocating a common enhanced dedicated channel resource to the terminal device according to the indication information. In the embodiments of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and a network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

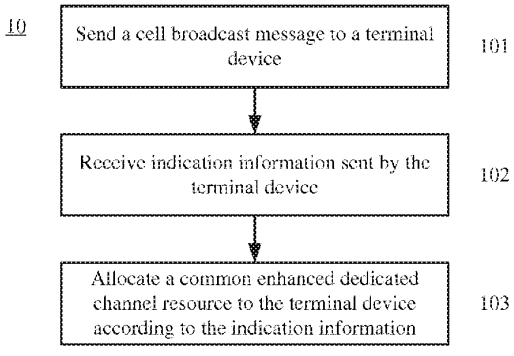


FIG. 1

Printed by Jouve, 75001 PARIS (FR)

EP 2 680 651 A1

Description

[0001] This application claims priority to Chinese Patent Application No. 201110083708.4, filed with the Chinese Patent Office on April 2, 2011 and entitled "METHOD FOR ALLOCATING CHANNEL RESOURCE, BASE STATION DEVICE, TERMINAL DEVICE, AND COMMUNICATION SYSTEM", which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] Embodiments of the present invention relate to the field of wireless communications, and in particular, to a method for allocating channel resource, a base station device, a terminal device, and a communication system.

BACKGROUND

[0003] In 3GPP (The 3rd Generation Partnership Project, The 3rd Generation Partnership Project) UMTS (Universal Mobile Telecommunications System, Universal Mobile Telecommunications System) R8 version, for a UE (User Equipment, user equipment) in idle (idle) mode or a CELL_FACH (CELL Forward Access Channel, cell forward access channel) state, in order to reduce an uplink transmission delay and increase an uplink transmission rate, a new feature known as an enhanced RACH (random access channel, Random Access Channel) is adopted. The enhanced RACH enhances random access in R99 version. The enhanced random access adopts an E-DCH (Enhanced Dedicated Channel, enhanced dedicated channel) to substitute for an RACH to implement uplink transmission. An enhanced CELL_FACH procedure roughly includes a preamble access and resource allocation stage, a collision resolution stage, an E-DCH data transmission stage, and a resource release stage.

[0004] Resources allocated at the resource allocation stage refer to Common-EDCH (Common Enhanced-Dedicated Channel, common enhanced-dedicated channel) resources, which are broadcast in system information of a cell. A UE may obtain Common-EDCH resource information by reading the system information broadcast by the cell. According to the existing protocol, there are altogether 32 sets of Common-EDCH resources, including code information such as an F-DPCH (Fractional Dedicated Physical Channel, fractional dedicated physical channel), an E-RGCH (E-DCH absolute grant channel, E-DCH absolute grant channel), an E-HICH (E-DCH HARQ Acknowledgement Indicator Channel, E-DCH hybrid automatic repeat request acknowledgement indicator channel), and an uplink DPCH (Dedicated Physical Channel, dedicated physical channel). A Node B notifies, through an AICH (Acquisition Indicator Channel, acquisition indicator channel) at the resource allocation stage, the UE of using a resource index. After receiving the resource index, the UE uses the corresponding set of resources to transmit uplink data.

[0005] As for the enhanced RACH feature, only one uplink TTI (Transmission Time Interval, transmission time interval) length can be configured for each cell and the UE uses only one TTI length, which may be a 2 ms TTI or 10 ms TTI, in uplink data transmission. Therefore, the aforesaid 32 sets of resources are all configured specifically for the occasion where the UE uses one TTI length.

[0006] However, the configuration is not flexible enough. If the TTI of a cell does not match the TTI required by the UE, the utilization efficiency of system resources will be reduced.

SUMMARY

[0007] Embodiments of the present invention provide a method for allocating channel resource, a base station device, a terminal device, and a communication system, which can increase the utilization efficiency of system resources.

[0008] In one aspect, a method for allocating channel resource is provided, including: sending a cell broadcast message to a terminal device, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; receiving indication information sent from the terminal device, where the indication information indicates that the terminal device selects the first TTI or the second TTI as a TTI for use; and allocating a common enhanced dedicated channel resource to the terminal device according to the indication information.

[0009] In another aspect, a method for allocating channel resource is provided, including: receiving a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; selecting the first TTI or the second TTI as a TTI for use and generating indication information of the selected TTI; and sending the indication information to the network side, so that the network side allocates a common enhanced dedicated channel resource according to the indication information.

[0010] In another aspect, a base station device is provided, including: a broadcasting unit, configured to send a cell broadcast message to a terminal device, where the cell broadcast message includes description information

Samsung Exhibit 1009, Page 167 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; a receiving unit, configured to receive indication information sent from the terminal device, where the indication information indicates that the terminal device selects the first TTI or the second TTI as a TTI for use; and an allocating unit, configured to allocate a common enhanced dedicated channel resource to the terminal device according to the indication information.

[0011] In another aspect, a terminal device is provided, including: a receiving unit, configured to receive a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; a selecting unit, configured to select the first TTI or the second TTI as a TTI for use and generate indication information of the selected TTI; and a sending unit, configured to send the indication information to the network side, so that the network side allocates a common enhanced dedicated channel resource according to the indication information.

[0012] In another aspect, a method for allocating channel resource is provided, including: sending a cell broadcast message to a terminal device, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; selecting the first TTI or the second TTI as a TTI for use; notifying the terminal device of the selected TTI; and allocating a common enhanced dedicated channel resource to the terminal device according to the selected TTI.

[0013] In another aspect, a method for allocating channel resource is provided, including: receiving a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; receiving indication information from the network side, where the indication information indicates that the network side device selects the first TTI or the second TTI as a TTI for use; and receiving a common enhanced dedicated channel resource that is allocated by the network side according to the selected TTI.

[0014] In another aspect, a base station device is provided, including: a broadcasting unit, configured to send a cell broadcast message to a terminal device, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; a selecting unit, configured to select the first TTI or the second TTI as a TTI for use; a notifying unit, configured to notify the terminal device of the selected TTI; and an allocating unit, configured to allocate a common enhanced dedicated channel resource to the terminal device according to the selected TTI.

[0015] In another aspect, a terminal device is provided, including: a receiving unit, configured to receive a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; where, the receiving unit is further configured to receive indication information from the network side, where the indication information indicates that the network side device selects the first TTI or the second TTI as a TTI for use; and the receiving unit is further configured to receive a common enhanced dedicated channel resource that is allocated by the network side according to the selected TTI.

[0016] In another aspect, a communication system is provided, including the above base station device or the above terminal device.

[0017] In the embodiments of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and the network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

BRIEF DESCRIPTION OF DRAWINGS

[0018] To illustrate the technical solutions in the embodiments of the present invention more clearly, the following briefly introduces the accompanying drawings required for describing the embodiments or the prior art. Apparently, the accompanying drawings in the following

Samsung Exhibit 1009, Page 168 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

description show merely some embodiments of the present invention, and a person of ordinary skill in the art may still derive other drawings from these accompanying drawings without creative efforts.

FIG. 1 is a schematic flowchart of a method for allocating channel resource according to an embodiment of the present invention;

FIG. 2 is a schematic flowchart of a method for allocating channel resource according to an embodiment of the present invention;

FIG. 3A and FIG. 3B are schematic flowcharts of processes of channel resource allocation according to an embodiment of the present invention;

FIG. 4 is a schematic flowchart of a process of channel resource allocation according to an embodiment of the present invention;

FIG. 5 is a schematic block diagram of a base station device according to an embodiment of the present invention;

FIG. 6 is a schematic block diagram of a base station device according to an embodiment of the present invention;

FIG. 7 is a schematic block diagram of a terminal device according to an embodiment of the present invention;

FIG. 8 is a schematic flowchart of a method for allocating channel resource according to an embodiment of the present invention;

FIG. 9 illustrates a method for allocating channel resource according to an embodiment of the present invention;

FIG. 10 is a schematic block diagram of a base station device according to an embodiment of the present invention;

FIG. 11 is a schematic block diagram of a terminal device according to an embodiment of the present invention;

FIG. 12 is a schematic block diagram of a communication system according to an embodiment of the present invention; and

FIG. 13 is a schematic block diagram of a communication system according to another embodiment of the present invention.

DESCRIPTION OF EMBODIMENTS

[0019] The following clearly and completely describes the technical solutions in the embodiments of the present invention with reference to the accompanying drawings in the embodiments of the present invention. Apparently, the described embodiments are merely a part rather than all of the embodiments of the present invention. All other embodiments obtained by a person of ordinary skill in the art based on the embodiments of the present invention without creative efforts shall fall within the protection scope of the present invention.

[0020] The technical solutions of the present invention may be applied to various communication systems, such as GSM, code division multiple access (CDMA, Code Division Multiple Access), wideband code division multiple access (WCDMA, Wideband Code Division Multiple Access Wireless), general packet radio service (GPRS, General Packet Radio Service), and long term evolution (LTE, Long Term Evolution).

[0021] A mobile terminal (Mobile Terminal), or referred to as a mobile user (UE, User Equipment) or a mobile user equipment or the like, may communicate with one or more core networks via a radio access network (RAN, Radio Access Network). The mobile terminal may be a mobile terminal such as a mobile phone (or referred as cellular phone) or a computer equipped with a mobile terminal, such as a portable, pocket-sized, handheld, computer-embedded, or vehicle-mounted mobile apparatus. The mobile terminals exchange speeches and/or data with the radio access network.

[0022] A base station may be a base station in GSM or CDMA (BTS, Base Transceiver Station), or a base station in WCDMA (NodeB), or an evolved base station in LTE (eNB or e-NodeB, evolutional Node B), which is not limited by the present invention. For ease of description, the following embodiments take the Node B as an example for description.

[0023] The UE or the network side cannot adjust the length of the TTI dynamically according to the requirement of the UE. The UE can use only the TTI configured by the network side. For example, a cell supports only a 2 ms TTI length but the UE is located at the cell edge, where switching to a 10 ms TTI length can achieve better coverage and transmission reliability. Or, the cell supports only a 10 ms TTI length but the UE is located in the cell center, where more power is available and switching to a 2 ms TTI length will effectively increase the uplink transmission rate. In this case, the TTI of the cell does not match the TTI required by the UE, which reduces the utilization efficiency of system resources.

[0024] The embodiments of the present invention take into account the possibility of configuring two TTI lengths in each cell. That is, in one cell, a UE supporting an enhanced RACH can select one of the two TTI lengths dynamically to transmit uplink data.

[0025] Although the UE is used to represent a terminal device and the Node B is used to represent a base station device hereinafter, the embodiments of the present invention are not limited to the specific systems represented by these terms. The embodiments of the present invention are applicable to any system that can use multiple TTI lengths in one cell.

[0026] FIG. 1 is a schematic flowchart of a method for allocating channel resource according to an embodiment of the present invention. The method 10 shown in FIG. 1 is executed mainly on the network side, for example, by a base station (such as a Node B).

[0027] In step 101 of the method 10, a cell broadcast message is sent to a terminal device (such as a UE), where the cell broadcast message includes description

Samsung Exhibit 1009, Page 169 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel Common-EDCH resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI.

[0028] 102. Receive indication information sent from the terminal device, where the indication information indicates that the terminal device selects the first TTI or the second TTI as a TTI for use.

[0029] 103. Allocate a common enhanced dedicated channel resource to the terminal device according to the indication information.

[0030] In the embodiment of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and the network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0031] Corresponding operations are executed on the terminal side. FIG. 2 is a schematic flowchart of a method for allocating channel resource according to an embodiment of the present invention. The method 20 shown in FIG. 2 is executed by a terminal device (such as a UE) and includes the following:

[0032] 201. Receive a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI.

[0033] 202. Select the first TTI or the second TTI as a TTI for use and generate indication information of the selected TTI.

[0034] 203. Send the indication information to the network side, so that the network side allocates a common enhanced dedicated channel resource according to the indication information.

[0035] In the embodiment of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and the network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0036] A process of channel resource allocation in a communication system in an embodiment of present invention will be described in detail in the following. FIG. 3A is a schematic flowchart of a process of channel resource allocation according to an embodiment of the present invention.

[0037] In step S31 shown in FIG. 3A, a Node B sends a cell broadcast message to a UE. The cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to Common-EDCH resources, where the first parameter configuration is specific to a first TTI (such as 2 ms or 10 ms) and the second parameter configuration is specific to a second TTI (such as 10 ms or 2 ms) which is different from the first TTI. In other words, in addition to an existing TTI, the broadcast message in the embodiment of the present invention may include a description of an additional parameter configuration specific to another TTI length.

[0038] In step 302, after receiving the broadcast message, the UE obtains information of the two TTIs that can be supported by the cell. Therefore, the UE selects the first TTI or the second TTI as a TTI for use according to its own requirement.

[0039] In step 303, the UE generates indication information of the selected TTI and sends the indication information to the Node B in step 304. The indication information may be sent through a dedicated indication message or carried by other messages. For example, the UE notifies the Node B of the selected TTI length by selecting different signatures (signature) at the random access stage, or the UE notifies the Node B of the selected TTI length by using different preamble scramble codes (preamble scramble code) at the random access stage.

[0040] In step 305, after receiving the indication information of the TTI selected by the UE, the Node B is triggered to allocate a Common-EDCH resource. In a scenario where a 2 ms TTI and a 10 ms TTI share 32 sets of common E-DCH resources, the Node B may allocate a common E-DCH resource according to a resource allocation manner similar to that defined in the existing protocol.

[0041] In step 306, the Node B notifies the UE of the allocated Common-EDCH resource.

[0042] In step 307, after receiving the notification of the Node B, the UE selects the corresponding parameter configuration (the first parameter configuration or the second parameter configuration) according to the selected TTI.

[0043] In step 308, the UE transmits uplink data by using the selected parameter configuration.

[0044] In the embodiment of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and a network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0045] In the example shown in FIG. 3A, in a scenario where a 2 ms TTI and a 10 ms TTI share 32 sets of common E-DCH resources, the Node B may not consider

Samsung Exhibit 1009, Page 170 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

the TTI length selected by the UE when allocating a common E-DCH resource. In an embodiment of the present invention, the TTI selected by the UE may be considered when a common E-DCH resource is allocated.

[0046] FIG. 3B is a schematic flowchart of a process of channel resource allocation according to an embodiment of the present invention. In FIG. 3B, processes that are the same as or similar to those in FIG. 3A are identified by same or similar marks and the details thereof are appropriately omitted.

[0047] Step 301' is similar to step 301 in FIG. 3A, where a Node B sends a cell broadcast message to a UE. The difference is that the cell broadcast message sent in step 301' includes not only the description information of parameter configurations of two TTIs (such as a 2 ms TTI length and a 10 ms TTI length) but also indexes of common E-DCH resources respectively used by the 2 ms TTI and 10 ms TTI, that is, the existing 32 sets of common E-DCH resources are grouped in two lists (resource subsets) of the 2 ms TTI and 10 ms TTI.

[0048] Steps 302-304 are the same as steps 302-304 in FIG. 3A. In step 302, the UE obtains information of the two TTIs that can be supported by the cell after receiving the broadcast message. The UE selects the first TTI or the second TTI as a TTI for use according to its own need.

[0049] In step 303, the UE generates indication information of the selected TTI and sends the indication information to the Node B in step 304. The indication information may be sent through a dedicated indication message or carried by other messages. For example, the UE notifies the Node B of the selected TTI length by selecting different signatures (signature) at the random access stage, or the UE notifies the Node B of the selected TTI length by using different preamble scramble codes (preamble scramble code) at the random access stage.

[0050] In step 305', after receiving the indication information of the TTI selected by the UE, the Node B is triggered to allocate a Common-EDCH resource. In this case, when allocating a resource, the Node B considers the TTI selected by the UE.

[0051] For example, the indexes of the 32 sets of common E-DCH resources are 0 to 31, and in the broadcast message, 0 to 15 are allocated to the 2 ms TTI and 16 to 31 are allocated to the 10 ms TTI. In this case, if the indication message of the UE indicates that the 2 ms TTI length is selected, the Node B selects a common E-DCH resource to be allocated to the UE from the resource subset with indexes of 0-15. If the indication message of the UE indicates that the 10 ms TTI length is selected, the Node B selects a common E-DCH resource to be allocated to the UE from the resource subset with indexes of 16-31.

[0052] Steps 306-308 are the same as steps 306-308 in FIG. 3A. In step 306, the Node B notifies the UE of the allocated Common-EDCH resource.

[0053] In step 307, after receiving the notification of the Node B, the UE selects the corresponding parameter configuration (the first parameter configuration or the second parameter configuration) according to the selected TTI.

[0054] In step 308, the UE transmits uplink data by using the selected parameter configuration.

[0055] In the embodiment of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and a network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0056] When the UE notifies the Node B of the selected TTI, the selection may be denied (in step 305 or 305'). For example, because the number of UEs using the 2 ms TTI length is larger than the number of UEs using the 10 ms TTI length while the number of resources available for allocation (the size of corresponding resource subsets) may be the same for the two TTI lengths, resources in the resource subset corresponding to the 2 ms TTI length may all be occupied, resulting in that a UE selecting the 2 ms TTI is denied. In this case, in the embodiment of the present invention, the number of denials to the UE can be recorded and the sizes of the resource subsets can be dynamically adjusted.

[0057] FIG. 4 is a schematic flowchart of a process of dynamic adjustment of resource subsets according to an embodiment of the present invention.

[0058] As shown in FIG. 4, in step 401, a Node B records the number of denials to a UE. For example, the Node B records the number of denials to the UE selecting a 2 ms TTI and the number of denials to the UE selecting a 10 ms TTI.

[0059] In step 402, the Node B reports the recorded number to an RNC (radio network controller, Radio Network Controller). For example, the Node B reports the number to the RNC over an Iub interface. According to an embodiment of the present invention, the Node B may report the number to the RNC through a Denied E-DCH RACH Resources message under E-DCH RACH Report.

[0060] In step 403, the RNC adjusts the numbers of resources in the resource subsets (lists) of the 2 ms TTI and 10 ms TTI according to the number of denials reported by the Node B. For example, it is assumed that 0 to 15 are allocated to the 2 ms TTI and that 16 to 31 are allocated to the 10 ms TTI previously. After the Node B reports the numbers of the Denied E-DCH RACH Resources of the 2 ms TTI and 10 ms TTI, if the number of denials of the 2 ms TTI is larger, the RNC can increase common E-DCH resources corresponding to the 2 ms TTI, for example, allocate resources indexed 0-20 to the 2 ms TTI and resources indexed 21-31 to the 10 ms TTI. Thereby, common E-DCH resources in the resource subsets are adjusted dynamically.

[0061] In step 404, the RNC notifies the Node B of the adjustment result. The RNC may notify the Node B of the adjustment result through a dedicated message or other

Samsung Exhibit 1009, Page 171 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

proper messages.

[0062] In step 405, the Node B notifies the UE of the new resource subset (list) information through a broadcast message. Thereby, the UE obtains the adjusted resource subset information by reading the broadcast message.

[0063] Thereby, in the embodiment of the present invention, the allocation manner of resources corresponding to two TTI lengths can be adjusted dynamically according to the running status of the network. This further increases the utilization efficiency of resources.

[0064] FIG. 5 is a schematic block diagram of a base station device according to an embodiment of the present invention. As shown in FIG. 5, the base station device 50 according to the embodiment of the present invention includes a broadcasting unit 51, a receiving unit 52, and an allocating unit 53.

[0065] The broadcasting unit 51 is configured to send a cell broadcast message to a terminal device, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI.

[0066] The receiving unit 52 is configured to receive indication information sent from the terminal device, where the indication information indicates that the terminal device selects the first TTI or the second TTI as a TTI for use.

[0067] The allocating unit 53 is configured to allocate a common enhanced dedicated channel resource to the terminal device according to the indication information.

[0068] In the embodiment of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and a network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0069] FIG. 6 is a schematic block diagram of a base station device according to an embodiment of the present invention. In FIG. 5, parts that are the same as or similar to those in FIG. 5 are identified by same or similar marks and the details thereof are appropriately omitted.

[0070] The base station device 60 in FIG. 6 includes a broadcasting unit 51', a receiving unit 52, and an allocating unit 53'. A cell broadcast message sent from the broadcasting unit 51' includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, which are grouped into a first resource subset specific to a first TTI and a second resource subset specific to a second TTI.

[0071] In addition, the allocating unit 53' allocates a common enhanced dedicated channel resource in the first resource subset to the terminal device when the indication information received by the receiving unit 52 indicates that the selected TTI is the first TTI; and allocates a common enhanced dedicated channel resource in the second resource subset to the terminal device when the indication information received by the receiving unit 52 indicates that the selected TTI is the second TTI.

[0072] As shown in FIG. 6, the base station device 60 further includes a notifying unit 61 and/or a recording unit 62.

[0073] The notifying unit 61 notifies the terminal device of the allocated common enhanced dedicated channel resource, so that the terminal device selects the first parameter configuration or the second parameter configuration according to the selected TTI.

[0074] The recording unit 62 is configured to record the number of denials to the terminal device and send the recorded number to a radio network controller, so that the radio network controller adjusts the common enhanced dedicated channel resources in the first resource subset and the second resource subset according to the number.

[0075] The base station device in FIG. 5 and FIG. 6 can execute all steps relating to the Node B in the foregoing method for allocating common enhanced dedicated channel resources, and to avoid repetition, the details will not be described herein again.

[0076] FIG. 7 is a schematic block diagram of a terminal device according to an embodiment of the present invention. The terminal device 70 shown in FIG. 7 includes a receiving unit 71, a selecting unit 72, and a sending unit 73.

[0077] The receiving unit 71 is configured to receive a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI.

[0078] The selecting unit 72 is configured to select the first TTI or the second TTI as a TTI for use and generate indication information of the selected TTI.

[0079] The sending unit 73 is configured to send the indication information to the network side, so that the network side allocates a common enhanced dedicated channel resource according to the indication information.

[0080] In the embodiment of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and the network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocat-

Samsung Exhibit 1009, Page 172 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

ing and utilizing system resources.

[0081] The terminal device 70 in FIG. 7 can execute all steps relating to the UE in the foregoing method for allocating common enhanced dedicated channel resources, and to avoid repetition, the details will not be described herein again.

[0082] For example, the receiving unit 71 is further configured to receive a notification of the allocated common enhanced dedicated channel resource. The selecting unit 72 is further configured to select the first parameter configuration or the second parameter configuration according to the selected TTI.

[0083] According to another embodiment of the present invention, the receiving unit 71 receives a cell broadcast message, where, in the cell broadcast message, common enhanced dedicated channel resources are grouped into a first resource subset specific to the first TTI and a second resource subset specific to the second TTI.

[0084] The foregoing describes embodiments where a UE selects a TTI but the present invention is not limited thereto. The selection of a TTI may also be determined by the network side.

[0085] FIG. 8 is a schematic flowchart of a method for allocating channel resource according to an embodiment of the present invention. The method 10 shown in FIG. 8 is executed mainly on the network side, for example, by a base station (such as a Node B).

[0086] As shown in FIG. 8, step 801 of the method 80 is similar to step 101 of the method 10. A cell broadcast message is sent to a terminal device, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI.

[0087] In step 802, the Node B selects the first TTI or the second TTI as a TTI for use. According to information in the cell, the Node B may select the TTI to be used by the UE. For example, the Node B may determine the selected TTI length according to preamble (preamble) power of uplink access of the UE.

[0088] In step 803, the Node B notifies the terminal device of the selected TTI, and in step 804, the Node B allocates a common enhanced dedicated channel resource to the terminal device according to the selected TTI.

[0089] In the embodiment of the present invention, multiple TTIs are configured for a cell and the network side broadcasts the parameter configuration information of the multiple TTIs to the terminal device and then selects a proper TTI from the multiple TTIs and allocates a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0090] Corresponding operations are executed on the terminal side. FIG. 9 illustrates a method for allocating channel resource according to an embodiment of the present invention. The method 90 shown in FIG. 9 is executed by a terminal device (such as a UE).

[0091] 901. Receive a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI.

[0092] 902. Receive indication information from the network side, where the indication information indicates that the network side device selects the first TTI or the second TTI as a TTI for use.

[0093] 903. Receive a common enhanced dedicated channel resource that is allocated by the network side according to the selected TTI.

[0094] Thereby, in the embodiment of the present invention, multiple TTIs are configured for a cell and the network side broadcasts the parameter configuration information of the multiple TTIs to the terminal device and then selects a proper TTI from the multiple TTIs and allocates a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0095] FIG. 10 is a schematic block diagram of a base station device according to an embodiment of the present invention. The base station device 100 shown in FIG. 10 includes:

a broadcasting unit 1010, configured to send a cell broadcast message to a terminal device, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI;

a selecting unit 1020, configured to select the first TTI or the second TTI as a TTI for use;

a notifying unit 1030, configured to notify the terminal device of the selected TTI; and

an allocating unit 1040, configured to allocate a common enhanced dedicated channel resource to the terminal device according to the selected TTI.

[0096] Thereby, in the embodiment of the present invention, multiple TTIs are configured for a cell and the network side broadcasts the parameter configuration information of the multiple TTIs to the terminal device and then selects a proper TTI from the multiple TTIs and al-

Samsung Exhibit 1009, Page 173 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

locates a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0097] FIG. 11 is a schematic block diagram of a terminal device according to an embodiment of the present invention. The terminal device 110 shown in FIG. 11 includes a receiving unit 115. The receiving unit 115 is configured to receive a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI.

[0098] The receiving unit 115 is further configured to receive indication information from the network side, where the indication information indicates that the network side device selects the first TTI or the second TTI as a TTI for use.

[0099] The receiving unit 115 is further configured to receive a common enhanced dedicated channel resource that is allocated by the network side according to the selected TTI.

[0100] Thereby, in the embodiment of the present invention, multiple TTIs are configured for a cell and the network side broadcasts the parameter configuration information of the multiple TTIs to the terminal device and then selects a proper TTI from the multiple TTIs and allocates a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0101] FIG. 12 is a schematic block diagram of a communication system according to an embodiment of the present invention. The communication system 120 shown in FIG. 12 includes a base station device 121 and a terminal device 122.

[0102] The base station device 121 may be the foregoing base station device 50, 60, or 100. The terminal device 122 may be the foregoing terminal device 70 or 110. Therefore, detailed descriptions thereof are omitted.

[0103] FIG. 13 is a schematic block diagram of a communication system according to another embodiment of the present invention. In the communication system 130 shown in FIG. 13, parts that are the same as or similar to those in FIG. 12 are identified with the same or similar marks.

[0104] As shown in FIG. 13, in addition to the base station device 121 and the terminal device 122, the communication system 130 further includes a radio network controller (RNC) 131. In a scenario where different resource subsets (such as a first resource subset and a second resource subset) are adopted for different TTIs, the radio network controller 131 is configured to receive the number of denials to the terminal device 122 recorded by the base station device 121 and adjust common enhanced dedicated channel resources in the first resource subset and the second resource subset according to the number.

[0105] A person of ordinary skill in the art may be aware that, in combination with the examples described in the embodiments disclosed in this specification, units and algorithm steps may be implemented by electronic hardware, computer software, or a combination thereof. In order to clearly describe the interchangeability between the hardware and the software, the foregoing has generally described compositions and steps of each embodiment according to functions. Whether the functions are performed by hardware or software depends on particular applications and design constraint conditions of the technical solutions. A person skilled in the art may implement the described functions by using different methods for each particular application, but it should not be considered that the implementation goes beyond the scope of the present invention.

[0106] It may be clearly understood by a person skilled in the art that, for the purpose of convenient and brief description, for a detailed working process of the foregoing system, apparatus, and unit, reference may be made to the corresponding process in the foregoing method embodiments, and details will not be described herein again.

[0107] In the several embodiments provided in the present application, it should be understood that the disclosed system, apparatus, and method may be implemented in other manners. For example, the described apparatus embodiment is merely exemplary. For example, the unit division is merely logical function division and may be other divisions in actual implementation. For example, a plurality of units or components may be combined or integrated into another system, or some features may be ignored or not performed. In addition, the displayed or discussed mutual couplings or direct couplings or communication connections may be implemented through some interfaces. The indirect couplings or communication connections between the apparatuses or units may be implemented in electronic, mechanical or other forms.

[0108] The units described as separate parts may or may not be physically separate, and parts displayed as units may or may not be physical units, that is, may be located in one position, or may be distributed on a plurality of network elements. A part or all of the units may be selected according to actual needs to achieve the objectives of the solutions of the embodiments.

[0109] In addition, functional units in the embodiments of the present invention may be integrated into one processing unit, or each of the units may exist alone physically, or two or more units are integrated into one unit. The integrated unit may be implemented in the form of hardware, or may be implemented in the form of a software functional unit.

[0110] When the integrated unit are implemented in the form of a software functional unit and sold or used as an independent product, the integrated unit may be

Samsung Exhibit 1009, Page 174 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

stored in a computer-readable storage medium. Based on such an understanding, the technical solutions of the present invention essentially, or the part contributing to the prior art, or all or a part of the technical solutions may be implemented in the form of a software product. The computer software product is stored in a storage medium, and includes several instructions for instructing a computer device (which may be a personal computer, a server, or a network device or the like) to perform all or a part of the steps of the methods described in the embodiments of the present invention. The foregoing storage medium includes: any medium that can store a program code, such as a USB flash disk, a removable hard disk, a read-only memory (ROM, Read-Only Memory), a random access memory (RAM, Random Access Memory), a magnetic disk, or an optical disk.

[0111] The foregoing descriptions are merely specific embodiments of the present invention, but are not intended to limit the protection scope of the present invention. Any variation or replacement readily figured out by a person skilled in the art within the technical scope disclosed in the present invention shall fall within the protection scope of the present invention. Therefore, the protection scope of the present invention shall be subject to the protection scope of the claims.

Claims

1. A method for allocating channel resource, **characterized in** comprising:

   sending a cell broadcast message to a terminal device, wherein the cell broadcast message comprises description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second transmission time interval (TTI) which is different from the first TTI;
   receiving indication information sent from the terminal device, wherein the indication information indicates that the terminal device selects the first TTI or the second TTI as a TTI for use; and
   allocating a common enhanced dedicated channel resource to the terminal device according to the indication information.

2. The method according to claim 1, **characterized in that** the sending the cell broadcast message to the terminal device comprises:

   sending the cell broadcast message to the terminal device, wherein, in the cell broadcast message, the common enhanced dedicated channel resources are grouped into a first resource subset specific to the first TTI and a second resource subset specific to the second TTI.

3. The method according to claim 2, **characterized in that** the allocating the common enhanced dedicated channel resource to the terminal device according to the indication information comprises:

   allocating a common enhanced dedicated channel resource in the first resource subset to the terminal device when the indication information indicates that the selected TTI is the first TTI; and
   allocating a common enhanced dedicated channel resource in the second resource subset to the terminal device when the indication information indicates that the selected TTI is the second TTI.

4. The method according to claim 2, **characterized in** further comprising:

   recording the number of denials to the terminal device; and
   sending the recorded number to a radio network controller, so that the radio network controller adjusts the common enhanced dedicated channel resources in the first resource subset and the second resource subset according to the number.

5. A method for allocating channel resource, **characterized in** comprising:

   receiving a cell broadcast message from a network side, wherein the cell broadcast message comprises description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI;
   selecting the first TTI or the second TTI as a TTI for use and generating indication information of the selected TTI; and
   sending the indication information to the network side, so that the network side allocates a common enhanced dedicated channel resource according to the indication information.

6. The method according to claim 5, **characterized in that** the receiving the cell broadcast message from the network side comprises:

Samsung Exhibit 1009, Page 175 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

receiving the cell broadcast message, wherein, in the cell broadcast message, the common enhanced dedicated channel resources are grouped into a first resource subset specific to the first TTI and a second resource subset specific to the second TTI.

7. A method for allocating channel resource, **characterized in** comprising:

sending a cell broadcast message to a terminal device, wherein the cell broadcast message comprises description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI;
selecting the first TTI or the second TTI as a TTI for use;
notifying the terminal device of the selected TTI; and
allocating a common enhanced dedicated channel resource to the terminal device according to the selected TTI.

8. A method for allocating channel resource, **characterized in** comprising:

receiving a cell broadcast message from a network side, wherein the cell broadcast message comprises description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI;
receiving indication information from the network side, wherein the indication information indicates that the network side device selects the first TTI or the second TTI as a TTI for use; and
receiving a common enhanced dedicated channel resource that is allocated by the network side according to the selected TTI.

9. A base station device, **characterized in** comprising:

a broadcasting unit, configured to send a cell broadcast message to a terminal device, wherein
the cell broadcast message comprises description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI;
a receiving unit, configured to receive indication information sent from the terminal device, wherein the indication information indicates that the terminal device selects the first TTI or the second TTI as a TTI for use; and
an allocating unit, configured to allocate a common enhanced dedicated channel resource to the terminal device according to the indication information.

10. The base station device according to claim 9, **characterized in that** the broadcasting unit sends the cell broadcast message to the terminal device, wherein, in the cell broadcast message, the common enhanced dedicated channel resources are grouped into a first resource subset specific to the first TTI and a second resource subset specific to the second TTI.

11. The base station device according to claim 10, **characterized in that**, the allocating unit allocates a common enhanced dedicated channel resource in the first resource subset to the terminal device when the indication information indicates that the selected TTI is the first TTI; and allocates a common enhanced dedicated channel resource in the second resource subset to the terminal device when the indication information indicates that the selected TTI is the second TTI.

12. The base station device according to claim 10, **characterized in** further comprising:

a recording unit, configured to record the number of denials to the terminal device and send the recorded number to a radio network controller, so that the radio network controller adjusts the common enhanced dedicated channel resources in the first resource subset and the second resource subset according to the number.

13. A base station device, **characterized in** comprising:

a broadcasting unit, configured to send a cell broadcast message to a terminal device, wherein
the cell broadcast message comprises description information of a first parameter configuration and description information of a second pa-

Samsung Exhibit 1009, Page 176 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

rameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI;
a selecting unit, configured to select the first TTI or the second TTI as a TTI for use;
a notifying unit, configured to notify the terminal device of the selected TTI; and
an allocating unit, configured to allocate a common enhanced dedicated channel resource to the terminal device according to the selected TTI.

14. A terminal device, **characterized in** comprising:

a receiving unit, configured to receive a cell broadcast message from a network side, wherein
the cell broadcast message comprises description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI;
a selecting unit, configured to select the first TTI or the second TTI as a TTI for use and generate indication information of the selected TTI; and
a sending unit, configured to send the indication information to the network side, so that the network side allocates a common enhanced dedicated channel resource according to the indication information.

15. The terminal device according to claim 14, **characterized in that**:

the receiving unit is further configured to receive a notification of the allocated common enhanced dedicated channel resource; and
the selecting unit is further configured to select the first parameter configuration or the second parameter configuration according to the selected TTI.

16. The terminal device according to claim 14, **characterized in that** the receiving unit receives the cell broadcast message, wherein, in the cell broadcast message, the common enhanced dedicated channel resources are grouped into a first resource subset specific to the first TTI and a second resource subset specific to the second TTI.

17. A terminal device, **characterized in** comprising:

a receiving unit, configured to receive a cell broadcast message from a network side, wherein the cell broadcast message comprises description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; wherein
the receiving unit is further configured to receive indication information from the network side, wherein the indication information indicates that the network side device selects the first TTI or the second TTI as a TTI for use; and
the receiving unit is further configured to receive a common enhanced dedicated channel resource that is allocated by the network side according to the selected TTI.

18. A communication system, **characterized in** comprising:

the base station device according to any one of claims 9-13; and
the terminal device according to any one of claims 14-17.

19. The communication system according to claim 18, **characterized in** further comprising:

a radio network controller, configured to receive the number of denials to the terminal device recorded by the base station device and adjust the common enhanced dedicated channel resources in the first resource subset and the second resource subset according to the number.

Samsung Exhibit 1009, Page 177 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

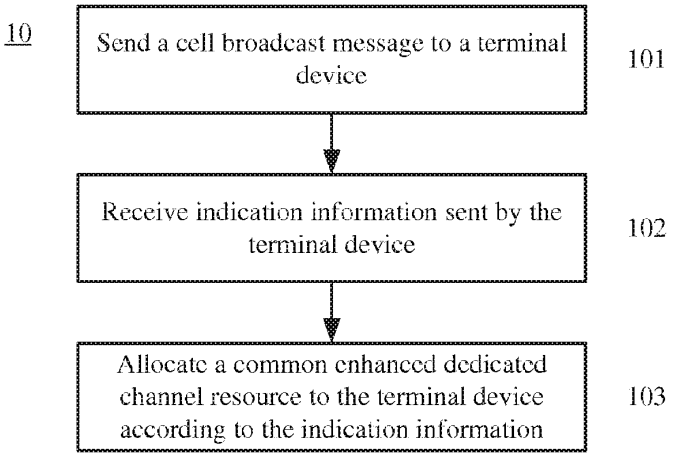


FIG. 1

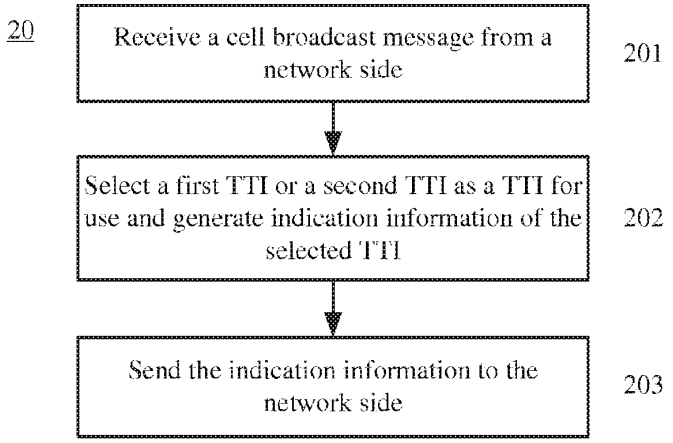


FIG. 2

Samsung Exhibit 1009, Page 178 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

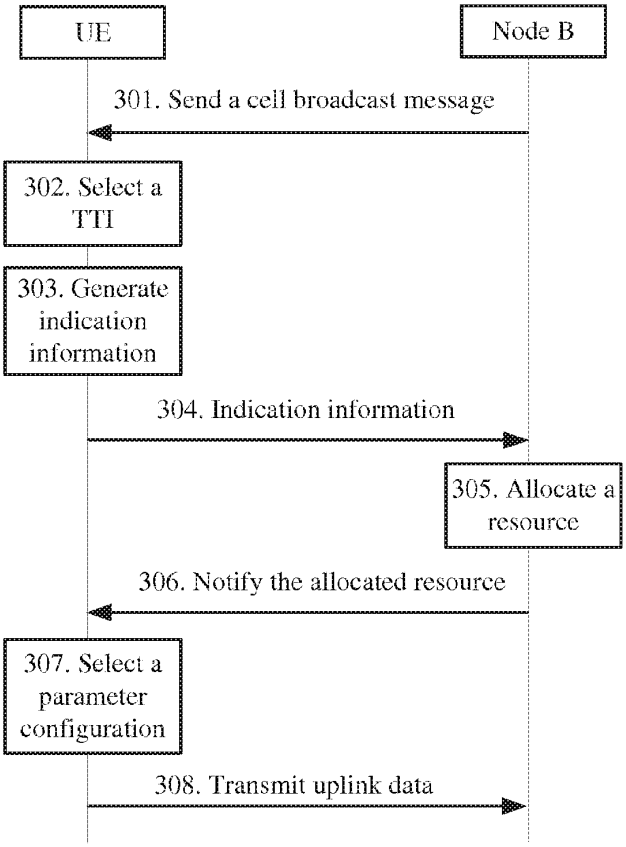


FIG. 3A

Samsung Exhibit 1009, Page 179 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

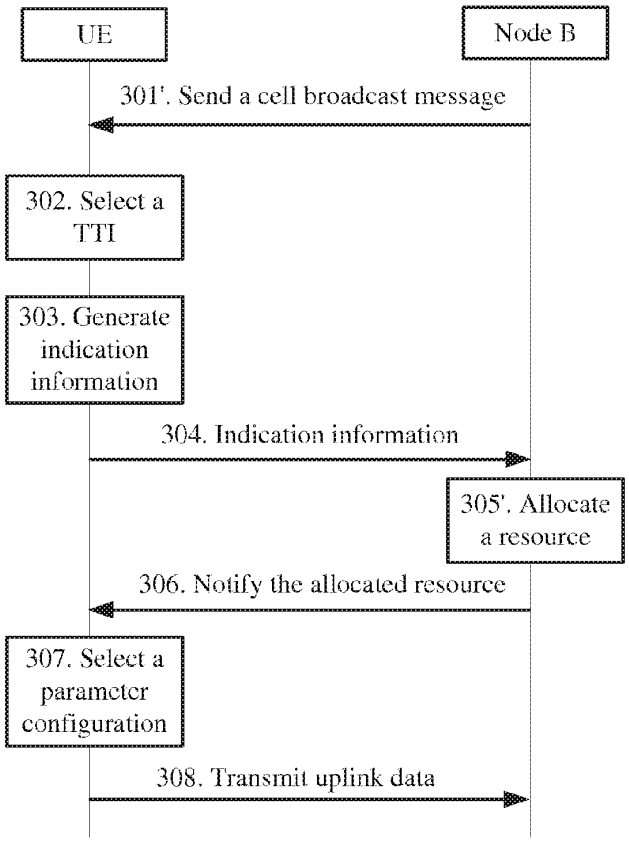


FIG. 3B

Samsung Exhibit 1009, Page 180 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

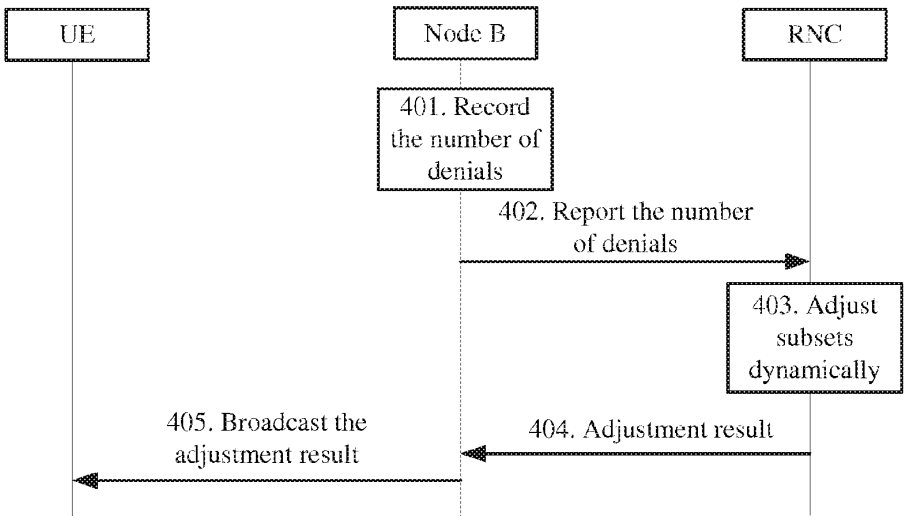


FIG. 4

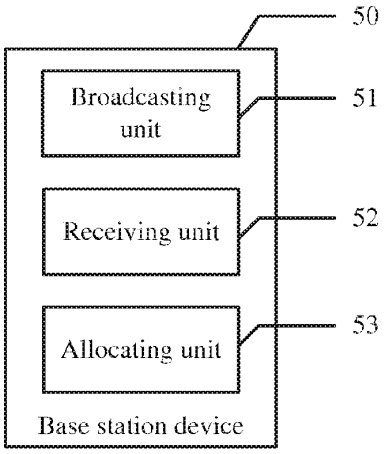


FIG. 5

Samsung Exhibit 1009, Page 181 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

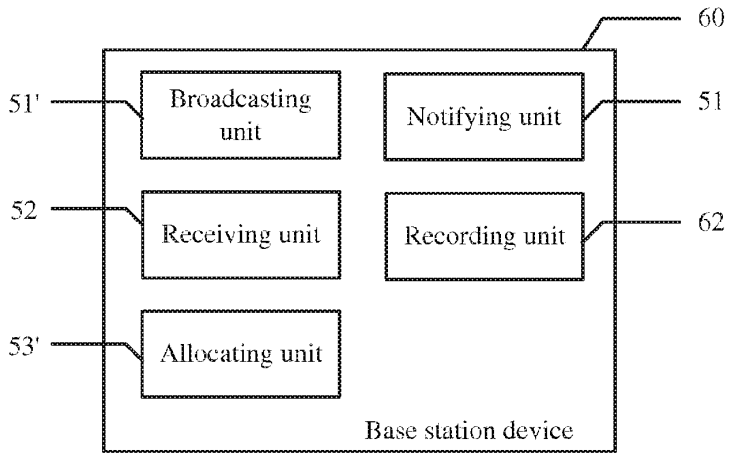


FIG. 6

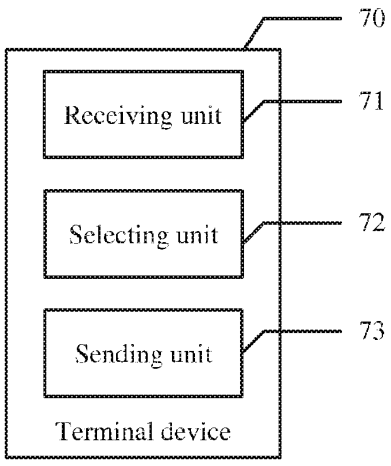


FIG. 7

Samsung Exhibit 1009, Page 182 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

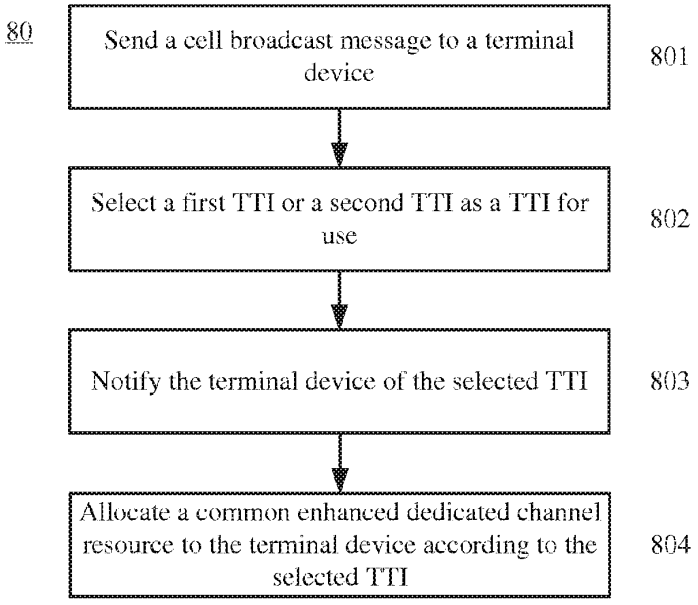


FIG. 8

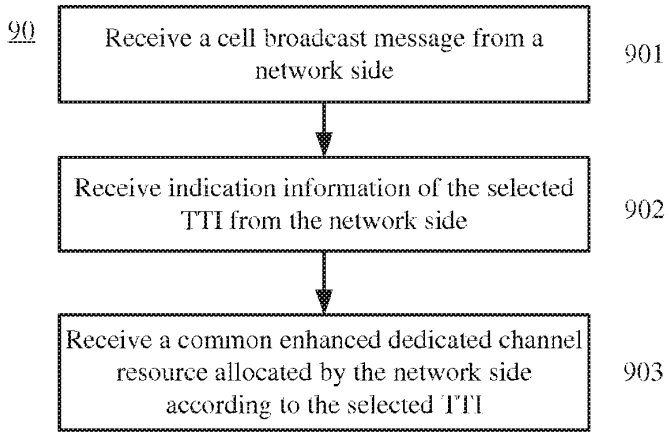


FIG. 9

Samsung Exhibit 1009, Page 183 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

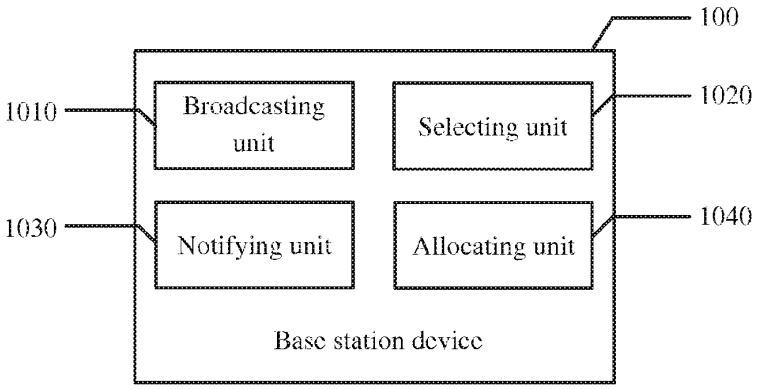


FIG. 10

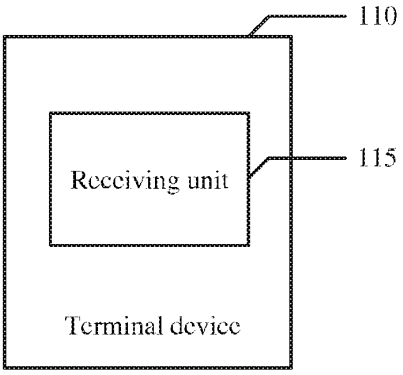


FIG. 11

Samsung Exhibit 1009, Page 184 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

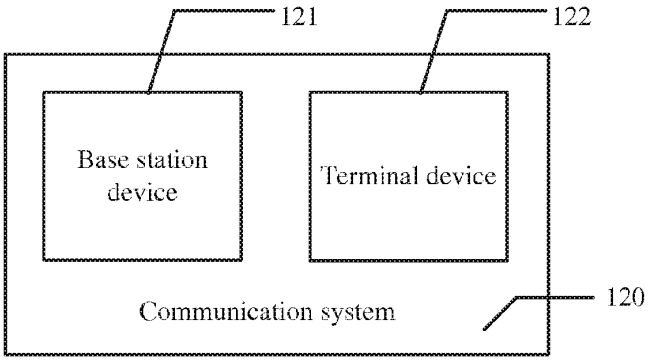


FIG. 12

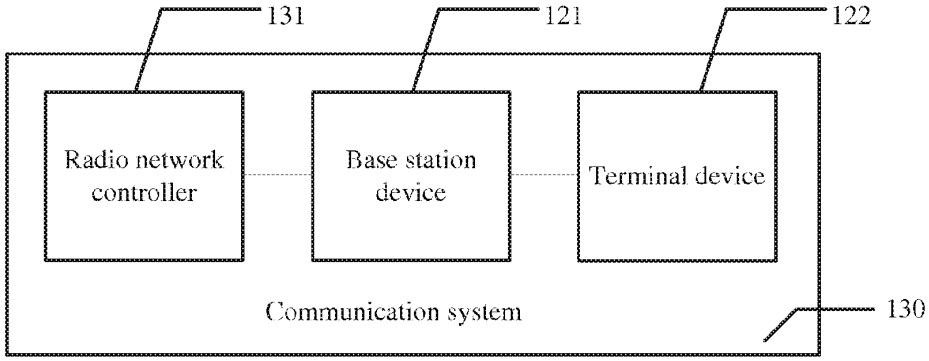


FIG. 13

Samsung Exhibit 1009, Page 185 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2012/073476

A. CLASSIFICATION OF SUBJECT MATTER

H04W 72/04(2009.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: H04W; H04L; H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CPRSABS, CNTXT, CNKI, VEN: broadcast, first, second, different, transmission time interval, TTI, select, indicate, enhanced dedicated channel, EDCH

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN101400072A (DATANG MOBILE COMMUNICATION APPARATUS) 01 Apr. 2009 (01.04.2009), the description page 4 line 12- page 6 line 22, claims 1, 8-11	7-8, 13, 17-19
Y	CN1852605A (HUAWEI TECHNOLOGIES CO., LTD.), 25 Oct. 2006 (25.10.2006) claims 1, 9	7-8, 13, 17-19
A	CN101902779A(HUAWEI TECHNOLOGIES CO., LTD.), 01 Dec. 2010 (01.12.2010) the whole document	1-19

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 Jun. 2012(15.06.2012)	12 Jul. 2012(12.07.2012)

Name and mailing address of the ISA/CN	Authorized officer
State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No. (86-10)62019451	LI, Qian Telephone No. (86-10) 62411283

Form PCT/ISA /210 (second sheet) (July 2009)

Samsung Exhibit 1009, Page 186 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2012/073476

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN101400072A	01.04.2009	NONE	
CN1852605A	25.10.2006	CN100421528C	24.09.2008
CN101902779A	01.12.2010	WO2010135985A1	02.12.2010

Form PCT/ISA/210 (patent family annex) (July 2009)

Samsung Exhibit 1009, Page 187 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 201110083708 **[0001]**

Samsung Exhibit 1009, Page 188 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

Electronic Acknowledgement Receipt

EFS ID:	33448642
Application Number:	15663674
International Application Number:	
Confirmation Number:	8966
Title of Invention:	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM
First Named Inventor/Applicant Name:	Wei-Yu Chen
Customer Number:	106622
Filer:	Sang N. Dang/Sandy Kim
Filer Authorized By:	Sang N. Dang
Attorney Docket Number:	1426-136.101
Receipt Date:	13-AUG-2018
Filing Date:	28-JUL-2017
Time Stamp:	14:30:14
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		1426-136-101--IDSasFiled08132018.pdf	149650 b0560439038ea586cf7abd71a7bec080793dc72a	yes	6

	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Miscellaneous Incoming Letter		6	6	
	Information Disclosure Statement (IDS) Form (SB08)		4	5	
	Transmittal Letter		1	3	
Warnings:					
Information:					
2	Foreign Reference	EP2680651.pdf	520414 aa3aba26cf41b385e67475d30921dce7b2929c6e	no	23
Warnings:					
Information:					
3	Non Patent Literature	NPL--R2163445.pdf	212253 ff0c98be7bbb5539e70d9f33549d9bf2a7c2a7ba	no	4
Warnings:					
Information:					
4	Non Patent Literature	NPL--KROfficeAction.pdf	1544287 bdcb49f1e2435617ce7651232637892c817d5174	no	4
Warnings:					
Information:					
5	Non Patent Literature	NPL--KROfficeActioninEnglish.pdf	45233 164fafdf39b450b9ece7756182df2f9339cf356b	no	4
Warnings:					
Information:					
		Total Files Size (in bytes):	2471837		

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Wei-Yu Chen and Li-Chih Tseng	
Title:	METHOD AND APPARATUS FOR IMPROVING Msg3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM	
Serial No.:	15/663,674	Filed: July 28, 2017
Examiner:	Pakee Fang	Group Art Unit: 8966
Attorney Docket No.:	1426-136.101 (1050153-US)	

CERTIFICATE OF EFS-WEB TRANSMISSION
UNDER 37 CFR § 1.8

I hereby certify that the enclosed 3 Page Information Disclosure Statement Transmittal; 2 Page Information Disclosure Statement by Applicant with 4 references are being transmitted to the United States Patent and Trademark Office via EFS-Web on August 13, 2018.

Date: August 13, 2018 /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

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.
15/663,674	07/28/2017	Wei-Yu Chen	1426-136.101	8966

106622 7590 09/27/2018

Blue Capital Law Firm, P.C.
650 Town Center Drive, Suite 1530
Costa Mesa, CA 92626

EXAMINER	
FANG, PAKEE	

ART UNIT	PAPER NUMBER
2642	

NOTIFICATION DATE	DELIVERY MODE
09/27/2018	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

Office Action Summary	**Application No.** 15/663,674	**Applicant(s)** Chen et al.	
	Examiner PAKEE FANG	**Art Unit** 2642	**AIA Status** Yes

-- 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 08/03/2018.

☐ 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) 1-24 is/are pending in the application.

5a) Of the above claim(s) 8-15 and 21-24 is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-7 and 16-20 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 _____ 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: _____.

DETAILED ACTION

Response to Amendment

1. The amendment filed on 08/03/2018 has been entered and considered by Examiner.

Claims 1-24 are presented for examination. Claims 8-15 and 21-24 are withdrawn. This Action is made FINAL.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the Examiner.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a)(2) the claimed invention was described in a patent issued under section 151, or in an application for patent published or deemed published under section 122(b), in which the patent or application, as the case may be, names another inventor and was effectively filed before the effective filing date of the claimed invention.

4. **Claims 1-7 and 16-20** are rejected under 35 U.S.C. 102(a)(2) as being anticipated by Mujtaba et al. (US Pub. 20160366705 A1).

For claim 1, Mujtaba disclose (Figs. 1-7) a method of a UE (User Equipment) for performing random access procedure, comprising:

the UE receives a message from a network, wherein the message includes a TTI (Transmission Time Interval) information of Msg3 [0076, 0080, 0063-65];

the UE transmits a preamble to the network (Step 502/602) [0060-61, 0070-73];

the UE receives a Msg2 from the network for responding the preamble (Step 504/604) [0062, 0074-79]; and

the UE performs a Msg3 transmission to the network according to the TTI information of Msg3 [0076, 0080, 0063-65].

For claim 16, Mujtaba disclose (Figs. 1-7) A User Equipment (UE), comprising: a control circuit; a processor installed in the control circuit; and a memory installed in the control circuit and operatively coupled to the processor [0029, 0032, 0043, 0046-49]; wherein the processor is configured to execute a program code stored in the memory to:

receive a message from a network, wherein the message includes a TTI (Transmission Time Interval) information of Msg3 [0076, 0080, 0063-65];

transmit a preamble to the network (Step 502/602) [0060-61, 0070-73];

receive a Msg2 from the network for responding the preamble (Step 504/604) [0062, 0074-79]; and

perform a Msg3 transmission to the network according to the TTI information of Msg3 [0076, 0080, 0063-65].

For claims 2 and 17, Mujtaba disclose (Figs. 1-7) the UE selects the TTI information of Msg3 based on a PRACH (Physical Random Access Channel) resource set of the preamble or preamble set of the preamble, if there are multiple TTI information of Msg3 in the message [0076, 0080, 0063-65].

For claims 3 and 18, Mujtaba disclose (Figs. 1-7) the UE selects the TTI information of Msg3 based on random access purpose, if there are multiple TTI information in the message [0076, 0080, 0063-65].

For claims 4 and 19, Mujtaba disclose (Figs. 1-7) the UE selects the TTI information of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple TTI information of Msg3 in the message [0084-85].

For claim 5, Mujtaba disclose (Figs. 1-7) the message is a downlink control signal [0075, 0058, 0095].

For claim 6, Mujtaba disclose (Figs. 1-7) the message is a RRC (Radio Resource Control) message [0075, 0058, 0095].

For claims 7 and 20, Mujtaba disclose (Figs. 1-7) the UE selects the TTI information of Msg3 based on a random access configuration of the preamble transmission, if there are multiple TTI information of Msg3 in the message [0076, 0080, 0061-65, 0058].

Response to Arguments

5. Applicant's arguments filed 08/03/2018 have been fully considered but they are not persuasive.

6. With regard to the references failing to teach every element recited in the independent claims; the Examiner respectfully disagrees with the arguments by the Applicant. Even though, the Examiner acknowledges Applicant's invention may possess some novel features, the claims are written too broad that can be read on the current cited prior art(s). Further actions must be taken to explicitly claim those novel features of the current application.

With regards to the argument for the limitation "… *receive a message from a network, wherein the message includes a TTI information of Msg3* …", the Examiner asserts that Mujtaba disclose, on Figs. 1-7, "…*the base station may determine that the link budget constrained wireless device should implement transmission time interval bundling (TTI-B) for the Msg3… base station as part of the Msg2* ***transmitted by the base station****, using any of a variety of possible signaling techniques. As one possibility, certain TC-RNTI values may be designated (e.g., specified in standard documents, and/or agreed upon by infrastructure and device vendors) for use with link budget limited devices, such that use of those TC-RNTI values is understood to specify the use of certain techniques such* ***as TTI-B (e.g., at least for the Msg3)****. …*" [0076, 0080, 0063-65]

ARGUMENT DOES NOT REPLACE EVIDENCE WHERE EVIDENCE IS NECESSARY

The arguments made by the counsel cannot take the place of evidence in the record. The Applicant representative's arguments for the obvious reason to combine the implicit and explicit teaching of the cited reference(s) failed to provide factual support to sustain the ground of arguments. The mere statement of disagreement of the prior art made by the Applicant's representative cannot be served as evidence for support. Please see the following case law for detail:

In re Schulze, 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965); In re Geisler, 116 F.3d 1465,43 USPQ2d 1362 (Fed. Cir. 1997) ("An assertion of what seems to follow from common experience is just attorney argument and not the kind of **factual evidence that is required to rebut a prima facie case of obviousness**."). See MPEP § 716.01(c) for examples of

attorney statements which are not evidence and which must be supported by an appropriate affidavit or declaration.

All limitations, elements, and arguments cited by the Applicant had indeed been disclosed by the reference prior art(s) or addressed by the Examiner. The concurrent Office Action furthermore elaborates the explicit and implicit teaching of the disclosed reference(s). Any rationale and citation applied in the previous Office Action not challenge by the Applicant will be treated as the Applicant's admittance in the subject matter.

Conclusion

7. **THIS ACTION IS MADE FINAL.** 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.

Inquiries

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to PAKEE FANG whose telephone number is (571)270-3633. The

Examiner can normally be reached on Mon-Fri 9:00AM-5:00PM. If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, PÉREZ-GUTIÉRREZ RAFAEL can be reached on 571-272-7915. 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.

/PAKEE FANG/
Primary Examiner, Art Unit 2642

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/663,674	Chen et al.
	Examiner	**Art Unit**
	PAKEE FANG	2642

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/29/2018	05/23/2018	09/24/2018						
	1	÷	✓	✓						
	2	÷	✓	✓						
	3	÷	✓	✓						
	4	÷	✓	✓						
	5	÷	✓	✓						
	6	÷	✓	✓						
	7	÷	✓	✓						
	8	÷	N	N						
	9	÷	N	N						
	10	÷	N	N						
	11	÷	N	N						
	12	÷	N	N						
	13	÷	N	N						
	14	÷	N	N						
	15	÷	N	N						
	16	÷	✓	✓						
	17	÷	✓	✓						
	18	÷	✓	✓						
	19	÷	✓	✓						
	20	÷	✓	✓						
	21	÷	N	N						
	22	÷	N	N						
	23	÷	N	N						
	24	÷	N	N						

Samsung Exhibit 1009, Page 201 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/663,674	Chen et al.
	Examiner	Art Unit
	PAKEE FANG	2642

CPC - Searched*		
Symbol	Date	Examiner
H04W74/0833, H04W48/16, H04W72/1284, H04W74/006, H04L1/1607	5/23/2018	PF

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
455	combined text	5/23/2018	PF

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
East search, Google, inventors	5/23/2018	PF
updated search	09/24/2018	PF

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

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	15663674
Filing Date	2017-07-28
First Named Inventor	Wei-Yu Chen
Art Unit	2642
Examiner Name	Pakee Fang
Attorney Docket Number	1426-136.101

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					

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	2680651	EP		2014-01-01	Kun Yan et al.		☐

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]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.F/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15663674
	Filing Date	2017-07-28
	First Named Inventor	Wei-Yu Chen
	Art Unit	2642
	Examiner Name	Pakee Fang
	Attorney Docket Number	1426-136.101

	1	NOKIA et al., "Scheduling Framework and Requirements", vol. RAN WG2, no. Nanjing, China; R2-163445 (May 23, 2016).	☐
	2	Office Action from Korean Intellectual Property Office in the corresponding KR Application No. 10-2017-0096475, dated July 24, 2018.	☒

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/PAKEE FANG/	Date Considered	09/24/2018

*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. /P.F/

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	90849	(H04W74/0833, H04W48/16, H04W72/1284, H04W74/006, H04L1/1607).CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/09/24 12:08
L2	6069	L1 and (preamble heading) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/09/24 12:08
L3	1413	L2 and ((Transmission adj2 Time adj2 Interval) TTI)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/09/24 12:08
L4	101	L3 and ((Transmission adj2 Time adj2 Interval) TTI) with (first second new third fourth) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/09/24 12:08
L5	75	@ay<"2017" and L4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/09/24 12:08
S1	2	"20180035470".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:17
S2	2	S1 and (frame msg$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:26
S3	82131	(H04W74/0833, H04W48/16, H04W72/1284, H04W74/006, H04L1/1607).CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:29
S4	5501	S3 and (preamble heading) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:33
S5	1227	S4 and ((Transmission adj2 Time adj2 Interval) TTI)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:35

Samsung Exhibit 1009, Page 205 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

S6	78	S5 and ((Transmission adj2 Time adj2 Interval) TTI) with (first second new third fourth) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:37
S7	66	@ay<"2017" and S6	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 17:41

9/24/2018 12:14:13 PM
C:\Users\pfang\Documents\EAST\Workspaces\15663674.wsp

Samsung Exhibit 1009, Page 206 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

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	15663674
	Filing Date	2017-07-28
	First Named Inventor	Wei-Yu Chen
	Art Unit	2642
	Examiner Name	Pakee Fang
	Attorney Docket Number	1426-136.101

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	20160073431		2016-03-10	Sungjun PARK et al.	

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	2680651	EP		2014-01-01	Yan Kun et al.		☐

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]

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15663674
	Filing Date	2017-07-28
	First Named Inventor	Wei-Yu Chen
	Art Unit	2642
	Examiner Name	Pakee Fang
	Attorney Docket Number	1426-136.101

	1	NOKIA et al., "Scheduling Framework and Requirements", vol. RAN WG2, no. Nanjing, China; R2-163445 (May 23, 2016)	☐
	2	Office Action from Taiwan Intellectual Property Office in corresponding TW Application No. 106125537, dated September 25, 2018.	☒

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Wei-Yu Chen and Li-Chih Tseng	
Title:	METHOD AND APPARATUS FOR IMPROVING Msg3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM	
Serial No.:	15/663,674	Filed: July 28, 2017
Examiner:	Pakee Fang	Group Art Unit: 8966
Attorney Docket No.:	1426-136.101 (1050153-US)	

CERTIFICATE OF EFS-WEB TRANSMISSION
UNDER 37 CFR § 1.8

I hereby certify that the enclosed 3 Page Information Disclosure Statement Transmittal; 2 Page Information Disclosure Statement by Applicant with 3 references are being transmitted to the United States Patent and Trademark Office via EFS-Web on October 4, 2018.

Date: October 4, 2018 /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

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

(11) EP 2 680 651 A1

(12) EUROPEAN PATENT APPLICATION
published in accordance with Art. 153(4) EPC

(43) Date of publication:
01.01.2014 Bulletin 2014/01

(21) Application number: **12767268.1**

(22) Date of filing: **01.04.2012**

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

(86) International application number:
PCT/CN2012/073476

(87) International publication number:
WO 2012/136130 (11.10.2012 Gazette 2012/41)

(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

(30) Priority: **02.04.2011 CN 201110083708**

(71) Applicant: **Huawei Technologies Co., Ltd.**
Shenzhen, Guangdong 518129 (CN)

(72) Inventors:
- **YAN, Kun**
  Shenzhen
  Guangdong 518129 (CN)
- **GAO, Yongqiang**
  Shenzhen
  Guangdong 518129 (CN)

(74) Representative: **Pfenning, Meinig & Partner GbR**
Theresienhöhe 13
80339 München (DE)

(54) METHOD, BASE STATION DEVICE, TERMINAL DEVICE, AND COMMUNICATION SYSTEM FOR CHANNEL RESOURCE ALLOCATION

(57) Embodiments of the present invention provide a method for allocating channel resource, a base station device, a terminal device, and a communication system. The method includes: sending a cell broadcast message to a terminal device, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; receiving indication information sent from the terminal device, where the indication information indicates that the terminal device selects the first TTI or the second TTI as a TTI for use; and allocating a common enhanced dedicated channel resource to the terminal device according to the indication information. In the embodiments of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and a network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

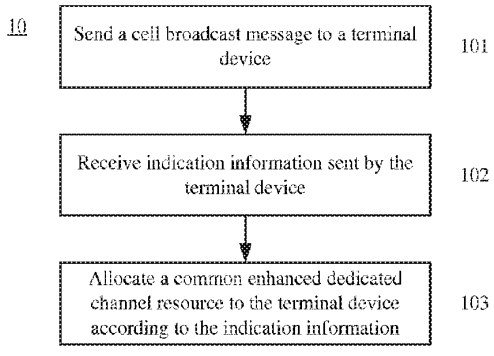


FIG. 1

Printed by Jouve, 75001 PARIS (FR)

EP 2 680 651 A1

Description

[0001] This application claims priority to Chinese Patent Application No. 201110083708.4, filed with the Chinese Patent Office on April 2, 2011 and entitled "METHOD FOR ALLOCATING CHANNEL RESOURCE, BASE STATION DEVICE, TERMINAL DEVICE, AND COMMUNICATION SYSTEM", which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] Embodiments of the present invention relate to the field of wireless communications, and in particular, to a method for allocating channel resource, a base station device, a terminal device, and a communication system.

BACKGROUND

[0003] In 3GPP (The 3rd Generation Partnership Project, The 3rd Generation Partnership Project) UMTS (Universal Mobile Telecommunications System, Universal Mobile Telecommunications System) R8 version, for a UE (User Equipment, user equipment) in idle (idle) mode or a CELL_FACH (CELL Forward Access Channel, cell forward access channel) state, in order to reduce an uplink transmission delay and increase an uplink transmission rate, a new feature known as an enhanced RACH (random access channel, Random Access Channel) is adopted. The enhanced RACH enhances random access in R99 version. The enhanced random access adopts an E-DCH (Enhanced Dedicated Channel, enhanced dedicated channel) to substitute for an RACH to implement uplink transmission. An enhanced CELL_FACH procedure roughly includes a preamble access and resource allocation stage, a collision resolution stage, an E-DCH data transmission stage, and a resource release stage.

[0004] Resources allocated at the resource allocation stage refer to Common-EDCH (Common Enhanced-Dedicated Channel, common enhanced-dedicated channel) resources, which are broadcast in system information of a cell. A UE may obtain Common-EDCH resource information by reading the system information broadcast by the cell. According to the existing protocol, there are altogether 32 sets of Common-EDCH resources, including code information such as an F-DPCH (Fractional Dedicated Physical Channel, fractional dedicated physical channel), an E-RGCH (E-DCH absolute grant channel, E-DCH absolute grant channel), an E-HICH (E-DCH HARQ Acknowledgement Indicator Channel, E-DCH hybrid automatic repeat request acknowledgement indicator channel), and an uplink DPCH (Dedicated Physical Channel, dedicated physical channel). A Node B notifies, through an AICH (Acquisition Indicator Channel, acquisition indicator channel) at the resource allocation stage, the UE of using a resource index. After receiving the resource index, the UE uses the corresponding set of resources to transmit uplink data.

[0005] As for the enhanced RACH feature, only one uplink TTI (Transmission Time Interval, transmission time interval) length can be configured for each cell and the UE uses only one TTI length, which may be a 2 ms TTI or 10 ms TTI, in uplink data transmission. Therefore, the aforesaid 32 sets of resources are all configured specifically for the occasion where the UE uses one TTI length.

[0006] However, the configuration is not flexible enough. If the TTI of a cell does not match the TTI required by the UE, the utilization efficiency of system resources will be reduced.

SUMMARY

[0007] Embodiments of the present invention provide a method for allocating channel resource, a base station device, a terminal device, and a communication system, which can increase the utilization efficiency of system resources.

[0008] In one aspect, a method for allocating channel resource is provided, including: sending a cell broadcast message to a terminal device, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; receiving indication information sent from the terminal device, where the indication information indicates that the terminal device selects the first TTI or the second TTI as a TTI for use; and allocating a common enhanced dedicated channel resource to the terminal device according to the indication information.

[0009] In another aspect, a method for allocating channel resource is provided, including: receiving a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; selecting the first TTI or the second TTI as a TTI for use and generating indication information of the selected TTI; and sending the indication information to the network side, so that the network side allocates a common enhanced dedicated channel resource according to the indication information.

[0010] In another aspect, a base station device is provided, including: a broadcasting unit, configured to send a cell broadcast message to a terminal device, where the cell broadcast message includes description information

Samsung Exhibit 1009, Page 211 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; a receiving unit, configured to receive indication information sent from the terminal device, where the indication information indicates that the terminal device selects the first TTI or the second TTI as a TTI for use; and an allocating unit, configured to allocate a common enhanced dedicated channel resource to the terminal device according to the indication information.

[0011] In another aspect, a terminal device is provided, including: a receiving unit, configured to receive a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; a selecting unit, configured to select the first TTI or the second TTI as a TTI for use and generate indication information of the selected TTI; and a sending unit, configured to send the indication information to the network side, so that the network side allocates a common enhanced dedicated channel resource according to the indication information.

[0012] In another aspect, a method for allocating channel resource is provided, including: sending a cell broadcast message to a terminal device, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; selecting the first TTI or the second TTI as a TTI for use; notifying the terminal device of the selected TTI; and allocating a common enhanced dedicated channel resource to the terminal device according to the selected TTI.

[0013] In another aspect, a method for allocating channel resource is provided, including: receiving a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; receiving indication information from the network side, where the indication information indicates that the network side device selects the first TTI or the second TTI as a TTI for use; and receiving a common enhanced dedicated channel resource that is allocated by the network side according to the selected TTI.

[0014] In another aspect, a base station device is provided, including: a broadcasting unit, configured to send a cell broadcast message to a terminal device, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; a selecting unit, configured to select the first TTI or the second TTI as a TTI for use; a notifying unit, configured to notify the terminal device of the selected TTI; and an allocating unit, configured to allocate a common enhanced dedicated channel resource to the terminal device according to the selected TTI.

[0015] In another aspect, a terminal device is provided, including: a receiving unit, configured to receive a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; where, the receiving unit is further configured to receive indication information from the network side, where the indication information indicates that the network side device selects the first TTI or the second TTI as a TTI for use; and the receiving unit is further configured to receive a common enhanced dedicated channel resource that is allocated by the network side according to the selected TTI.

[0016] In another aspect, a communication system is provided, including the above base station device or the above terminal device.

[0017] In the embodiments of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and the network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

BRIEF DESCRIPTION OF DRAWINGS

[0018] To illustrate the technical solutions in the embodiments of the present invention more clearly, the following briefly introduces the accompanying drawings required for describing the embodiments or the prior art. Apparently, the accompanying drawings in the following

Samsung Exhibit 1009, Page 212 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

description show merely some embodiments of the present invention, and a person of ordinary skill in the art may still derive other drawings from these accompanying drawings without creative efforts.

FIG. 1 is a schematic flowchart of a method for allocating channel resource according to an embodiment of the present invention;

FIG. 2 is a schematic flowchart of a method for allocating channel resource according to an embodiment of the present invention;

FIG. 3A and FIG. 3B are schematic flowcharts of processes of channel resource allocation according to an embodiment of the present invention;

FIG. 4 is a schematic flowchart of a process of channel resource allocation according to an embodiment of the present invention;

FIG. 5 is a schematic block diagram of a base station device according to an embodiment of the present invention;

FIG. 6 is a schematic block diagram of a base station device according to an embodiment of the present invention;

FIG. 7 is a schematic block diagram of a terminal device according to an embodiment of the present invention;

FIG. 8 is a schematic flowchart of a method for allocating channel resource according to an embodiment of the present invention;

FIG. 9 illustrates a method for allocating channel resource according to an embodiment of the present invention;

FIG. 10 is a schematic block diagram of a base station device according to an embodiment of the present invention;

FIG. 11 is a schematic block diagram of a terminal device according to an embodiment of the present invention;

FIG. 12 is a schematic block diagram of a communication system according to an embodiment of the present invention; and

FIG. 13 is a schematic block diagram of a communication system according to another embodiment of the present invention.

DESCRIPTION OF EMBODIMENTS

[0019] The following clearly and completely describes the technical solutions in the embodiments of the present invention with reference to the accompanying drawings in the embodiments of the present invention. Apparently, the described embodiments are merely a part rather than all of the embodiments of the present invention. All other embodiments obtained by a person of ordinary skill in the art based on the embodiments of the present invention without creative efforts shall fall within the protection scope of the present invention.

[0020] The technical solutions of the present invention may be applied to various communication systems, such as GSM, code division multiple access (CDMA, Code Division Multiple Access), wideband code division multiple access (WCDMA, Wideband Code Division Multiple Access Wireless), general packet radio service (GPRS, General Packet Radio Service), and long term evolution (LTE, Long Term Evolution).

[0021] A mobile terminal (Mobile Terminal), or referred to as a mobile user (UE, User Equipment) or a mobile user equipment or the like, may communicate with one or more core networks via a radio access network (RAN, Radio Access Network). The mobile terminal may be a mobile terminal such as a mobile phone (or referred as cellular phone) or a computer equipped with a mobile terminal, such as a portable, pocket-sized, handheld, computer-embedded, or vehicle-mounted mobile apparatus. The mobile terminals exchange speeches and/or data with the radio access network.

[0022] A base station may be a base station in GSM or CDMA (BTS, Base Transceiver Station), or a base station in WCDMA (NodeB), or an evolved base station in LTE (eNB or e-NodeB, evolutional Node B), which is not limited by the present invention. For ease of description, the following embodiments take the Node B as an example for description.

[0023] The UE or the network side cannot adjust the length of the TTI dynamically according to the requirement of the UE. The UE can use only the TTI configured by the network side. For example, a cell supports only a 2 ms TTI length but the UE is located at the cell edge, where switching to a 10 ms TTI length can achieve better coverage and transmission reliability. Or, the cell supports only a 10 ms TTI length but the UE is located in the cell center, where more power is available and switching to a 2 ms TTI length will effectively increase the uplink transmission rate. In this case, the TTI of the cell does not match the TTI required by the UE, which reduces the utilization efficiency of system resources.

[0024] The embodiments of the present invention take into account the possibility of configuring two TTI lengths in each cell. That is, in one cell, a UE supporting an enhanced RACH can select one of the two TTI lengths dynamically to transmit uplink data.

[0025] Although the UE is used to represent a terminal device and the Node B is used to represent a base station device hereinafter, the embodiments of the present invention are not limited to the specific systems represented by these terms. The embodiments of the present invention are applicable to any system that can use multiple TTI lengths in one cell.

[0026] FIG. 1 is a schematic flowchart of a method for allocating channel resource according to an embodiment of the present invention. The method 10 shown in FIG. 1 is executed mainly on the network side, for example, by a base station (such as a Node B).

[0027] In step 101 of the method 10, a cell broadcast message is sent to a terminal device (such as a UE), where the cell broadcast message includes description

Samsung Exhibit 1009, Page 213 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel Common-EDCH resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI.

[0028] 102. Receive indication information sent from the terminal device, where the indication information indicates that the terminal device selects the first TTI or the second TTI as a TTI for use.

[0029] 103. Allocate a common enhanced dedicated channel resource to the terminal device according to the indication information.

[0030] In the embodiment of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and the network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0031] Corresponding operations are executed on the terminal side. FIG. 2 is a schematic flowchart of a method for allocating channel resource according to an embodiment of the present invention. The method 20 shown in FIG. 2 is executed by a terminal device (such as a UE) and includes the following:

[0032] 201. Receive a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI.

[0033] 202. Select the first TTI or the second TTI as a TTI for use and generate indication information of the selected TTI.

[0034] 203. Send the indication information to the network side, so that the network side allocates a common enhanced dedicated channel resource according to the indication information.

[0035] In the embodiment of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and the network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0036] A process of channel resource allocation in a communication system in an embodiment of present invention will be described in detail in the following. FIG. 3A is a schematic flowchart of a process of channel resource allocation according to an embodiment of the present invention.

[0037] In step S31 shown in FIG. 3A, a Node B sends a cell broadcast message to a UE. The cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to Common-EDCH resources, where the first parameter configuration is specific to a first TTI (such as 2 ms or 10 ms) and the second parameter configuration is specific to a second TTI (such as 10 ms or 2 ms) which is different from the first TTI. In other words, in addition to an existing TTI, the broadcast message in the embodiment of the present invention may include a description of an additional parameter configuration specific to another TTI length.

[0038] In step 302, after receiving the broadcast message, the UE obtains information of the two TTIs that can be supported by the cell. Therefore, the UE selects the first TTI or the second TTI as a TTI for use according to its own requirement.

[0039] In step 303, the UE generates indication information of the selected TTI and sends the indication information to the Node B in step 304. The indication information may be sent through a dedicated indication message or carried by other messages. For example, the UE notifies the Node B of the selected TTI length by selecting different signatures (signature) at the random access stage, or the UE notifies the Node B of the selected TTI length by using different preamble scramble codes (preamble scramble code) at the random access stage.

[0040] In step 305, after receiving the indication information of the TTI selected by the UE, the Node B is triggered to allocate a Common-EDCH resource. In a scenario where a 2 ms TTI and a 10 ms TTI share 32 sets of common E-DCH resources, the Node B may allocate a common E-DCH resource according to a resource allocation manner similar to that defined in the existing protocol.

[0041] In step 306, the Node B notifies the UE of the allocated Common-EDCH resource.

[0042] In step 307, after receiving the notification of the Node B, the UE selects the corresponding parameter configuration (the first parameter configuration or the second parameter configuration) according to the selected TTI.

[0043] In step 308, the UE transmits uplink data by using the selected parameter configuration.

[0044] In the embodiment of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and a network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0045] In the example shown in FIG. 3A, in a scenario where a 2 ms TTI and a 10 ms TTI share 32 sets of common E-DCH resources, the Node B may not consider

Samsung Exhibit 1009, Page 214 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

the TTI length selected by the UE when allocating a common E-DCH resource. In an embodiment of the present invention, the TTI selected by the UE may be considered when a common E-DCH resource is allocated.

[0046] FIG. 3B is a schematic flowchart of a process of channel resource allocation according to an embodiment of the present invention. In FIG. 3B, processes that are the same as or similar to those in FIG. 3A are identified by same or similar marks and the details thereof are appropriately omitted.

[0047] Step 301' is similar to step 301 in FIG. 3A, where a Node B sends a cell broadcast message to a UE. The difference is that the cell broadcast message sent in step 301' includes not only the description information of parameter configurations of two TTIs (such as a 2 ms TTI length and a 10 ms TTI length) but also indexes of common E-DCH resources respectively used by the 2 ms TTI and 10 ms TTI, that is, the existing 32 sets of common E-DCH resources are grouped in two lists (resource subsets) of the 2 ms TTI and 10 ms TTI.

[0048] Steps 302-304 are the same as steps 302-304 in FIG. 3A. In step 302, the UE obtains information of the two TTIs that can be supported by the cell after receiving the broadcast message. The UE selects the first TTI or the second TTI as a TTI for use according to its own need.

[0049] In step 303, the UE generates indication information of the selected TTI and sends the indication information to the Node B in step 304. The indication information may be sent through a dedicated indication message or carried by other messages. For example, the UE notifies the Node B of the selected TTI length by selecting different signatures (signature) at the random access stage, or the UE notifies the Node B of the selected TTI length by using different preamble scramble codes (preamble scramble code) at the random access stage.

[0050] In step 305', after receiving the indication information of the TTI selected by the UE, the Node B is triggered to allocate a Common-EDCH resource. In this case, when allocating a resource, the Node B considers the TTI selected by the UE.

[0051] For example, the indexes of the 32 sets of common E-DCH resources are 0 to 31, and in the broadcast message, 0 to 15 are allocated to the 2 ms TTI and 16 to 31 are allocated to the 10 ms TTI. In this case, if the indication message of the UE indicates that the 2 ms TTI length is selected, the Node B selects a common E-DCH resource to be allocated to the UE from the resource subset with indexes of 0-15. If the indication message of the UE indicates that the 10 ms TTI length is selected, the Node B selects a common E-DCH resource to be allocated to the UE from the resource subset with indexes of 16-31.

[0052] Steps 306-308 are the same as steps 306-308 in FIG. 3A. In step 306, the Node B notifies the UE of the allocated Common-EDCH resource.

[0053] In step 307, after receiving the notification of the Node B, the UE selects the corresponding parameter configuration (the first parameter configuration or the second parameter configuration) according to the selected TTI.

[0054] In step 308, the UE transmits uplink data by using the selected parameter configuration.

[0055] In the embodiment of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and a network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0056] When the UE notifies the Node B of the selected TTI, the selection may be denied (in step 305 or 305'). For example, because the number of UEs using the 2 ms TTI length is larger than the number of UEs using the 10 ms TTI length while the number of resources available for allocation (the size of corresponding resource subsets) may be the same for the two TTI lengths, resources in the resource subset corresponding to the 2 ms TTI length may all be occupied, resulting in that a UE selecting the 2 ms TTI is denied. In this case, in the embodiment of the present invention, the number of denials to the UE can be recorded and the sizes of the resource subsets can be dynamically adjusted.

[0057] FIG. 4 is a schematic flowchart of a process of dynamic adjustment of resource subsets according to an embodiment of the present invention.

[0058] As shown in FIG. 4, in step 401, a Node B records the number of denials to a UE. For example, the Node B records the number of denials to the UE selecting a 2 ms TTI and the number of denials to the UE selecting a 10 ms TTI.

[0059] In step 402, the Node B reports the recorded number to an RNC (radio network controller, Radio Network Controller). For example, the Node B reports the number to the RNC over an Iub interface. According to an embodiment of the present invention, the Node B may report the number to the RNC through a Denied E-DCH RACH Resources message under E-DCH RACH Report.

[0060] In step 403, the RNC adjusts the numbers of resources in the resource subsets (lists) of the 2 ms TTI and 10 ms TTI according to the number of denials reported by the Node B. For example, it is assumed that 0 to 15 are allocated to the 2 ms TTI and that 16 to 31 are allocated to the 10 ms TTI previously. After the Node B reports the numbers of the Denied E-DCH RACH Resources of the 2 ms TTI and 10 ms TTI, if the number of denials of the 2 ms TTI is larger, the RNC can increase common E-DCH resources corresponding to the 2 ms TTI, for example, allocate resources indexed 0-20 to the 2 ms TTI and resources indexed 21-31 to the 10 ms TTI. Thereby, common E-DCH resources in the resource subsets are adjusted dynamically.

[0061] In step 404, the RNC notifies the Node B of the adjustment result. The RNC may notify the Node B of the adjustment result through a dedicated message or other

Samsung Exhibit 1009, Page 215 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

proper messages.

[0062] In step 405, the Node B notifies the UE of the new resource subset (list) information through a broadcast message. Thereby, the UE obtains the adjusted resource subset information by reading the broadcast message.

[0063] Thereby, in the embodiment of the present invention, the allocation manner of resources corresponding to two TTI lengths can be adjusted dynamically according to the running status of the network. This further increases the utilization efficiency of resources.

[0064] FIG. 5 is a schematic block diagram of a base station device according to an embodiment of the present invention. As shown in FIG. 5, the base station device 50 according to the embodiment of the present invention includes a broadcasting unit 51, a receiving unit 52, and an allocating unit 53.

[0065] The broadcasting unit 51 is configured to send a cell broadcast message to a terminal device, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI.

[0066] The receiving unit 52 is configured to receive indication information sent from the terminal device, where the indication information indicates that the terminal device selects the first TTI or the second TTI as a TTI for use.

[0067] The allocating unit 53 is configured to allocate a common enhanced dedicated channel resource to the terminal device according to the indication information.

[0068] In the embodiment of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and a network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0069] FIG. 6 is a schematic block diagram of a base station device according to an embodiment of the present invention. In FIG. 5, parts that are the same as or similar to those in FIG. 5 are identified by same or similar marks and the details thereof are appropriately omitted.

[0070] The base station device 60 in FIG. 6 includes a broadcasting unit 51', a receiving unit 52, and an allocating unit 53'. A cell broadcast message sent from the broadcasting unit 51' includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, which are grouped into a first resource subset specific to a first TTI and a second resource subset specific to a second TTI.

[0071] In addition, the allocating unit 53' allocates a common enhanced dedicated channel resource in the first resource subset to the terminal device when the indication information received by the receiving unit 52 indicates that the selected TTI is the first TTI; and allocates a common enhanced dedicated channel resource in the second resource subset to the terminal device when the indication information received by the receiving unit 52 indicates that the selected TTI is the second TTI.

[0072] As shown in FIG. 6, the base station device 60 further includes a notifying unit 61 and/or a recording unit 62.

[0073] The notifying unit 61 notifies the terminal device of the allocated common enhanced dedicated channel resource, so that the terminal device selects the first parameter configuration or the second parameter configuration according to the selected TTI.

[0074] The recording unit 62 is configured to record the number of denials to the terminal device and send the recorded number to a radio network controller, so that the radio network controller adjusts the common enhanced dedicated channel resources in the first resource subset and the second resource subset according to the number.

[0075] The base station device in FIG. 5 and FIG. 6 can execute all steps relating to the Node B in the foregoing method for allocating common enhanced dedicated channel resources, and to avoid repetition, the details will not be described herein again.

[0076] FIG. 7 is a schematic block diagram of a terminal device according to an embodiment of the present invention. The terminal device 70 shown in FIG. 7 includes a receiving unit 71, a selecting unit 72, and a sending unit 73.

[0077] The receiving unit 71 is configured to receive a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI.

[0078] The selecting unit 72 is configured to select the first TTI or the second TTI as a TTI for use and generate indication information of the selected TTI.

[0079] The sending unit 73 is configured to send the indication information to the network side, so that the network side allocates a common enhanced dedicated channel resource according to the indication information.

[0080] In the embodiment of the present invention, multiple TTIs are configured for a cell and the parameter configuration information of the multiple TTIs is broadcast to the terminal device, so that the terminal device can select a proper TTI from the multiple TTIs and the network side can allocate a channel resource according to the selected TTI, thereby increasing the efficiency in allocat-

Samsung Exhibit 1009, Page 216 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

ing and utilizing system resources.

[0081] The terminal device 70 in FIG. 7 can execute all steps relating to the UE in the foregoing method for allocating common enhanced dedicated channel resources, and to avoid repetition, the details will not be described herein again.

[0082] For example, the receiving unit 71 is further configured to receive a notification of the allocated common enhanced dedicated channel resource. The selecting unit 72 is further configured to select the first parameter configuration or the second parameter configuration according to the selected TTI.

[0083] According to another embodiment of the present invention, the receiving unit 71 receives a cell broadcast message, where, in the cell broadcast message, common enhanced dedicated channel resources are grouped into a first resource subset specific to the first TTI and a second resource subset specific to the second TTI.

[0084] The foregoing describes embodiments where a UE selects a TTI but the present invention is not limited thereto. The selection of a TTI may also be determined by the network side.

[0085] FIG. 8 is a schematic flowchart of a method for allocating channel resource according to an embodiment of the present invention. The method 10 shown in FIG. 8 is executed mainly on the network side, for example, by a base station (such as a Node B).

[0086] As shown in FIG. 8, step 801 of the method 80 is similar to step 101 of the method 10. A cell broadcast message is sent to a terminal device, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI.

[0087] In step 802, the Node B selects the first TTI or the second TTI as a TTI for use. According to information in the cell, the Node B may select the TTI to be used by the UE. For example, the Node B may determine the selected TTI length according to preamble (preamble) power of uplink access of the UE.

[0088] In step 803, the Node B notifies the terminal device of the selected TTI, and in step 804, the Node B allocates a common enhanced dedicated channel resource to the terminal device according to the selected TTI.

[0089] In the embodiment of the present invention, multiple TTIs are configured for a cell and the network side broadcasts the parameter configuration information of the multiple TTIs to the terminal device and then selects a proper TTI from the multiple TTIs and allocates a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0090] Corresponding operations are executed on the terminal side. FIG. 9 illustrates a method for allocating channel resource according to an embodiment of the present invention. The method 90 shown in FIG. 9 is executed by a terminal device (such as a UE).

[0091] 901. Receive a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI.

[0092] 902. Receive indication information from the network side, where the indication information indicates that the network side device selects the first TTI or the second TTI as a TTI for use.

[0093] 903. Receive a common enhanced dedicated channel resource that is allocated by the network side according to the selected TTI.

[0094] Thereby, in the embodiment of the present invention, multiple TTIs are configured for a cell and the network side broadcasts the parameter configuration information of the multiple TTIs to the terminal device and then selects a proper TTI from the multiple TTIs and allocates a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0095] FIG. 10 is a schematic block diagram of a base station device according to an embodiment of the present invention. The base station device 100 shown in FIG. 10 includes:

a broadcasting unit 1010, configured to send a cell broadcast message to a terminal device, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI;

a selecting unit 1020, configured to select the first TTI or the second TTI as a TTI for use;

a notifying unit 1030, configured to notify the terminal device of the selected TTI; and

an allocating unit 1040, configured to allocate a common enhanced dedicated channel resource to the terminal device according to the selected TTI.

[0096] Thereby, in the embodiment of the present invention, multiple TTIs are configured for a cell and the network side broadcasts the parameter configuration information of the multiple TTIs to the terminal device and then selects a proper TTI from the multiple TTIs and al-

Samsung Exhibit 1009, Page 217 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

locates a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0097] FIG. 11 is a schematic block diagram of a terminal device according to an embodiment of the present invention. The terminal device 110 shown in FIG. 11 includes a receiving unit 115. The receiving unit 115 is configured to receive a cell broadcast message from a network side, where the cell broadcast message includes description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, where the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI.

[0098] The receiving unit 115 is further configured to receive indication information from the network side, where the indication information indicates that the network side device selects the first TTI or the second TTI as a TTI for use.

[0099] The receiving unit 115 is further configured to receive a common enhanced dedicated channel resource that is allocated by the network side according to the selected TTI.

[0100] Thereby, in the embodiment of the present invention, multiple TTIs are configured for a cell and the network side broadcasts the parameter configuration information of the multiple TTIs to the terminal device and then selects a proper TTI from the multiple TTIs and allocates a channel resource according to the selected TTI, thereby increasing the efficiency in allocating and utilizing system resources.

[0101] FIG. 12 is a schematic block diagram of a communication system according to an embodiment of the present invention. The communication system 120 shown in FIG. 12 includes a base station device 121 and a terminal device 122.

[0102] The base station device 121 may be the foregoing base station device 50, 60, or 100. The terminal device 122 may be the foregoing terminal device 70 or 110. Therefore, detailed descriptions thereof are omitted.

[0103] FIG. 13 is a schematic block diagram of a communication system according to another embodiment of the present invention. In the communication system 130 shown in FIG. 13, parts that are the same as or similar to those in FIG. 12 are identified with the same or similar marks.

[0104] As shown in FIG. 13, in addition to the base station device 121 and the terminal device 122, the communication system 130 further includes a radio network controller (RNC) 131. In a scenario where different resource subsets (such as a first resource subset and a second resource subset) are adopted for different TTIs, the radio network controller 131 is configured to receive the number of denials to the terminal device 122 recorded by the base station device 121 and adjust common enhanced dedicated channel resources in the first resource subset and the second resource subset according to the number.

[0105] A person of ordinary skill in the art may be aware that, in combination with the examples described in the embodiments disclosed in this specification, units and algorithm steps may be implemented by electronic hardware, computer software, or a combination thereof. In order to clearly describe the interchangeability between the hardware and the software, the foregoing has generally described compositions and steps of each embodiment according to functions. Whether the functions are performed by hardware or software depends on particular applications and design constraint conditions of the technical solutions. A person skilled in the art may implement the described functions by using different methods for each particular application, but it should not be considered that the implementation goes beyond the scope of the present invention.

[0106] It may be clearly understood by a person skilled in the art that, for the purpose of convenient and brief description, for a detailed working process of the foregoing system, apparatus, and unit, reference may be made to the corresponding process in the foregoing method embodiments, and details will not be described herein again.

[0107] In the several embodiments provided in the present application, it should be understood that the disclosed system, apparatus, and method may be implemented in other manners. For example, the described apparatus embodiment is merely exemplary. For example, the unit division is merely logical function division and may be other divisions in actual implementation. For example, a plurality of units or components may be combined or integrated into another system, or some features may be ignored or not performed. In addition, the displayed or discussed mutual couplings or direct couplings or communication connections may be implemented through some interfaces. The indirect couplings or communication connections between the apparatuses or units may be implemented in electronic, mechanical or other forms.

[0108] The units described as separate parts may or may not be physically separate, and parts displayed as units may or may not be physical units, that is, may be located in one position, or may be distributed on a plurality of network elements. A part or all of the units may be selected according to actual needs to achieve the objectives of the solutions of the embodiments.

[0109] In addition, functional units in the embodiments of the present invention may be integrated into one processing unit, or each of the units may exist alone physically, or two or more units are integrated into one unit. The integrated unit may be implemented in the form of hardware, or may be implemented in the form of a software functional unit.

[0110] When the integrated unit are implemented in the form of a software functional unit and sold or used as an independent product, the integrated unit may be

Samsung Exhibit 1009, Page 218 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

stored in a computer-readable storage medium. Based on such an understanding, the technical solutions of the present invention essentially, or the part contributing to the prior art, or all or a part of the technical solutions may be implemented in the form of a software product. The computer software product is stored in a storage medium, and includes several instructions for instructing a computer device (which may be a personal computer, a server, or a network device or the like) to perform all or a part of the steps of the methods described in the embodiments of the present invention. The foregoing storage medium includes: any medium that can store a program code, such as a USB flash disk, a removable hard disk, a read-only memory (ROM, Read-Only Memory), a random access memory (RAM, Random Access Memory), a magnetic disk, or an optical disk.

[0111] The foregoing descriptions are merely specific embodiments of the present invention, but are not intended to limit the protection scope of the present invention. Any variation or replacement readily figured out by a person skilled in the art within the technical scope disclosed in the present invention shall fall within the protection scope of the present invention. Therefore, the protection scope of the present invention shall be subject to the protection scope of the claims.

Claims

1. A method for allocating channel resource, **characterized in** comprising:

   sending a cell broadcast message to a terminal device, wherein the cell broadcast message comprises description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second transmission time interval (TTI) which is different from the first TTI;
   receiving indication information sent from the terminal device, wherein the indication information indicates that the terminal device selects the first TTI or the second TTI as a TTI for use; and
   allocating a common enhanced dedicated channel resource to the terminal device according to the indication information.

2. The method according to claim 1, **characterized in that** the sending the cell broadcast message to the terminal device comprises:

   sending the cell broadcast message to the terminal device, wherein, in the cell broadcast message, the common enhanced dedicated channel resources are grouped into a first resource subset specific to the first TTI and a second resource subset specific to the second TTI.

3. The method according to claim 2, **characterized in that** the allocating the common enhanced dedicated channel resource to the terminal device according to the indication information comprises:

   allocating a common enhanced dedicated channel resource in the first resource subset to the terminal device when the indication information indicates that the selected TTI is the first TTI; and
   allocating a common enhanced dedicated channel resource in the second resource subset to the terminal device when the indication information indicates that the selected TTI is the second TTI.

4. The method according to claim 2, **characterized in** further comprising:

   recording the number of denials to the terminal device; and
   sending the recorded number to a radio network controller, so that the radio network controller adjusts the common enhanced dedicated channel resources in the first resource subset and the second resource subset according to the number.

5. A method for allocating channel resource, **characterized in** comprising:

   receiving a cell broadcast message from a network side, wherein the cell broadcast message comprises description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI;
   selecting the first TTI or the second TTI as a TTI for use and generating indication information of the selected TTI; and
   sending the indication information to the network side, so that the network side allocates a common enhanced dedicated channel resource according to the indication information.

6. The method according to claim 5, **characterized in that** the receiving the cell broadcast message from the network side comprises:

Samsung Exhibit 1009, Page 219 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

receiving the cell broadcast message, wherein, in the cell broadcast message, the common enhanced dedicated channel resources are grouped into a first resource subset specific to the first TTI and a second resource subset specific to the second TTI.

7. A method for allocating channel resource, **characterized in** comprising:

sending a cell broadcast message to a terminal device, wherein the cell broadcast message comprises description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI;
selecting the first TTI or the second TTI as a TTI for use;
notifying the terminal device of the selected TTI; and
allocating a common enhanced dedicated channel resource to the terminal device according to the selected TTI.

8. A method for allocating channel resource, **characterized in** comprising:

receiving a cell broadcast message from a network side, wherein the cell broadcast message comprises description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI;
receiving indication information from the network side, wherein the indication information indicates that the network side device selects the first TTI or the second TTI as a TTI for use; and
receiving a common enhanced dedicated channel resource that is allocated by the network side according to the selected TTI.

9. A base station device, **characterized in** comprising:

a broadcasting unit, configured to send a cell broadcast message to a terminal device, wherein
the cell broadcast message comprises description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI;
a receiving unit, configured to receive indication information sent from the terminal device, wherein the indication information indicates that the terminal device selects the first TTI or the second TTI as a TTI for use; and
an allocating unit, configured to allocate a common enhanced dedicated channel resource to the terminal device according to the indication information.

10. The base station device according to claim 9, **characterized in that** the broadcasting unit sends the cell broadcast message to the terminal device, wherein, in the cell broadcast message, the common enhanced dedicated channel resources are grouped into a first resource subset specific to the first TTI and a second resource subset specific to the second TTI.

11. The base station device according to claim 10, **characterized in that**, the allocating unit allocates a common enhanced dedicated channel resource in the first resource subset to the terminal device when the indication information indicates that the selected TTI is the first TTI; and allocates a common enhanced dedicated channel resource in the second resource subset to the terminal device when the indication information indicates that the selected TTI is the second TTI.

12. The base station device according to claim 10, **characterized in** further comprising:

a recording unit, configured to record the number of denials to the terminal device and send the recorded number to a radio network controller, so that the radio network controller adjusts the common enhanced dedicated channel resources in the first resource subset and the second resource subset according to the number.

13. A base station device, **characterized in** comprising:

a broadcasting unit, configured to send a cell broadcast message to a terminal device, wherein
the cell broadcast message comprises description information of a first parameter configuration and description information of a second pa-

Samsung Exhibit 1009, Page 220 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

rameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI;
a selecting unit, configured to select the first TTI or the second TTI as a TTI for use;
a notifying unit, configured to notify the terminal device of the selected TTI; and
an allocating unit, configured to allocate a common enhanced dedicated channel resource to the terminal device according to the selected TTI.

14. A terminal device, **characterized in** comprising:

a receiving unit, configured to receive a cell broadcast message from a network side, wherein
the cell broadcast message comprises description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI;
a selecting unit, configured to select the first TTI or the second TTI as a TTI for use and generate indication information of the selected TTI; and
a sending unit, configured to send the indication information to the network side, so that the network side allocates a common enhanced dedicated channel resource according to the indication information.

15. The terminal device according to claim 14, **characterized in that**:

the receiving unit is further configured to receive a notification of the allocated common enhanced dedicated channel resource; and
the selecting unit is further configured to select the first parameter configuration or the second parameter configuration according to the selected TTI.

16. The terminal device according to claim 14, **characterized in that** the receiving unit receives the cell broadcast message, wherein, in the cell broadcast message, the common enhanced dedicated channel resources are grouped into a first resource subset specific to the first TTI and a second resource subset specific to the second TTI.

17. A terminal device, **characterized in** comprising:

a receiving unit, configured to receive a cell broadcast message from a network side, wherein the cell broadcast message comprises description information of a first parameter configuration and description information of a second parameter configuration that correspond to common enhanced dedicated channel resources, wherein the first parameter configuration is specific to a first transmission time interval (TTI) and the second parameter configuration is specific to a second TTI which is different from the first TTI; wherein
the receiving unit is further configured to receive indication information from the network side, wherein the indication information indicates that the network side device selects the first TTI or the second TTI as a TTI for use; and
the receiving unit is further configured to receive a common enhanced dedicated channel resource that is allocated by the network side according to the selected TTI.

18. A communication system, **characterized in** comprising:

the base station device according to any one of claims 9-13; and
the terminal device according to any one of claims 14-17.

19. The communication system according to claim 18, **characterized in** further comprising:

a radio network controller, configured to receive the number of denials to the terminal device recorded by the base station device and adjust the common enhanced dedicated channel resources in the first resource subset and the second resource subset according to the number.

Samsung Exhibit 1009, Page 221 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

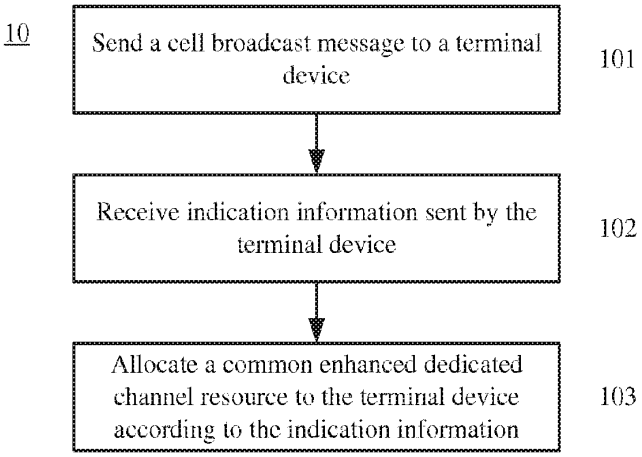


FIG. 1

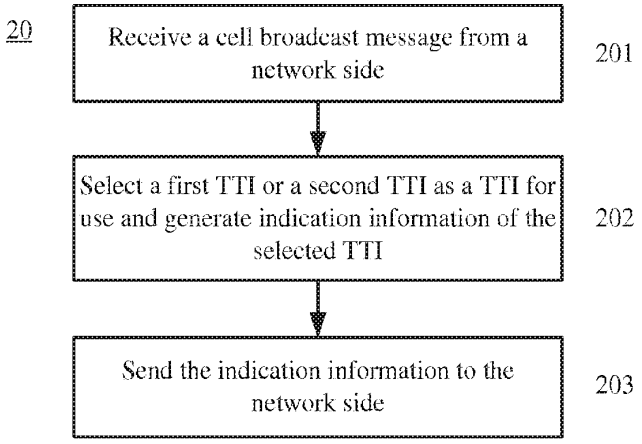


FIG. 2

Samsung Exhibit 1009, Page 222 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

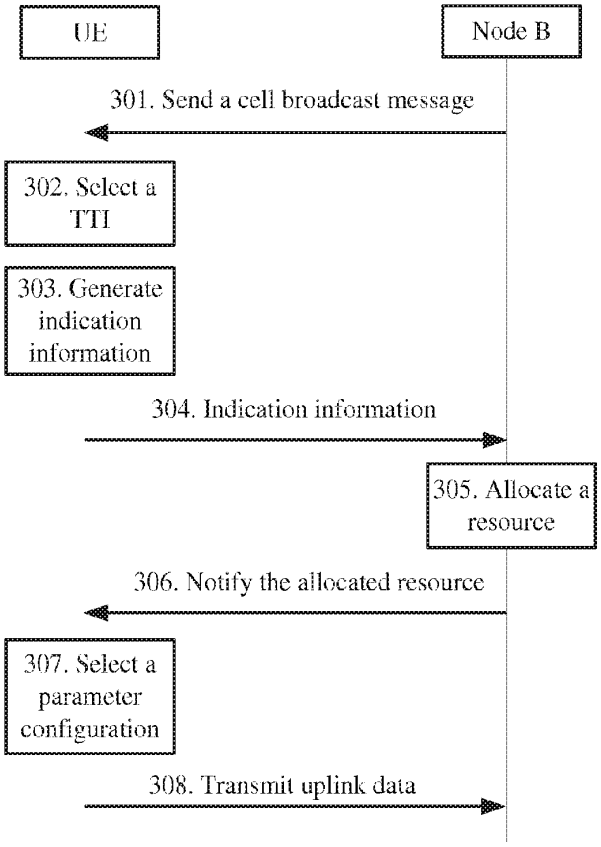


FIG. 3A

Samsung Exhibit 1009, Page 223 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

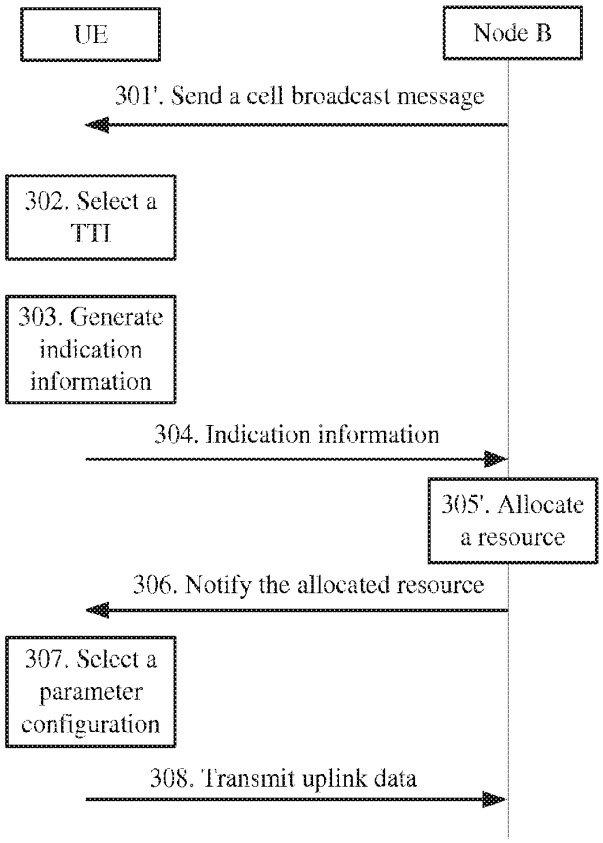


FIG. 3B

Samsung Exhibit 1009, Page 224 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

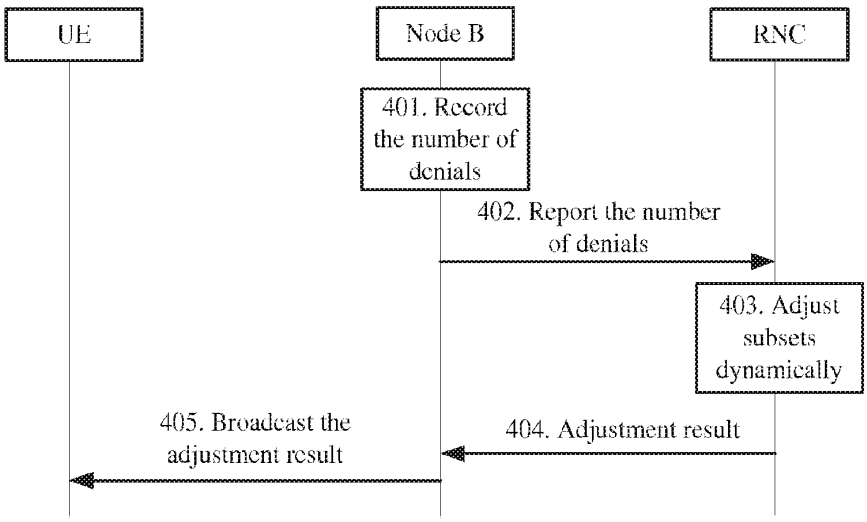


FIG. 4

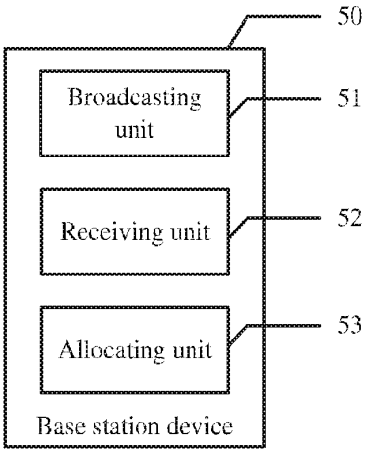


FIG. 5

Samsung Exhibit 1009, Page 225 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

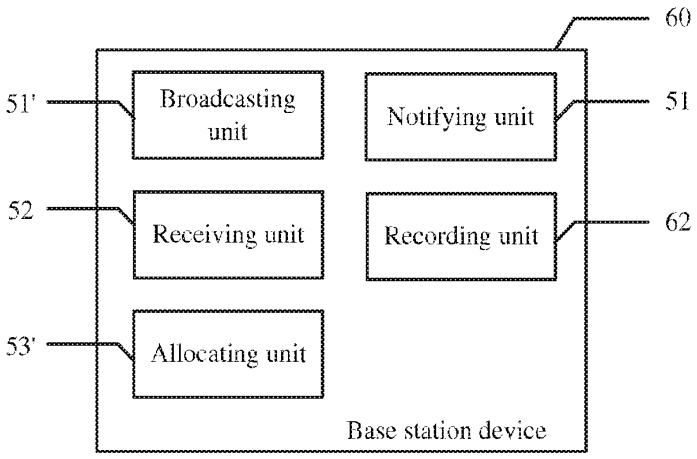


FIG. 6

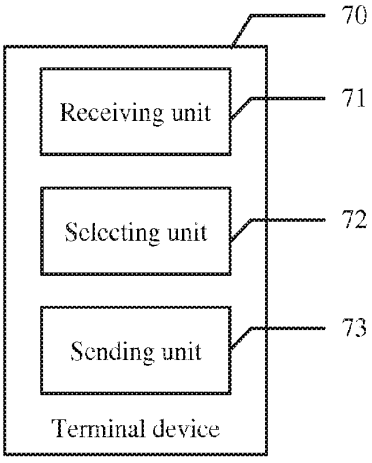


FIG. 7

Samsung Exhibit 1009, Page 226 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

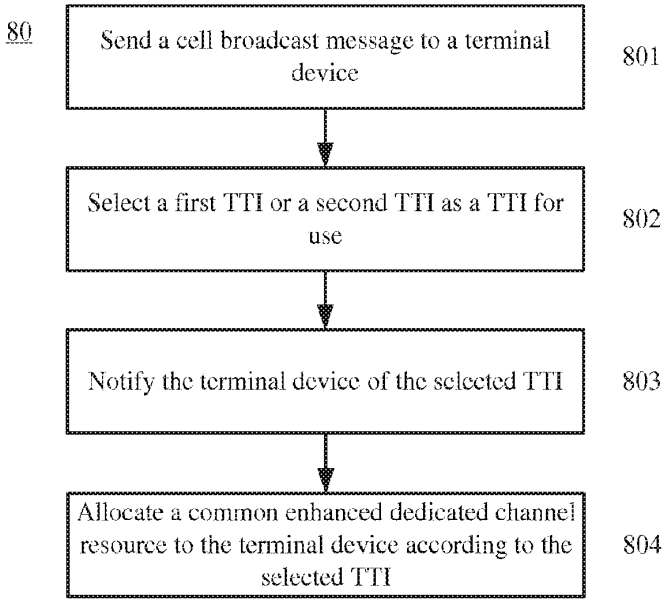


FIG. 8

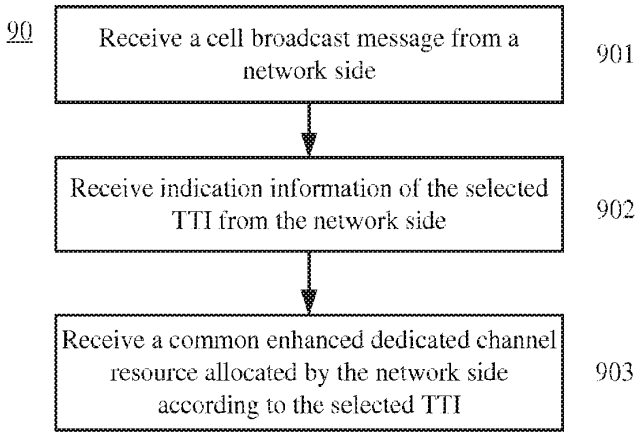


FIG. 9

Samsung Exhibit 1009, Page 227 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

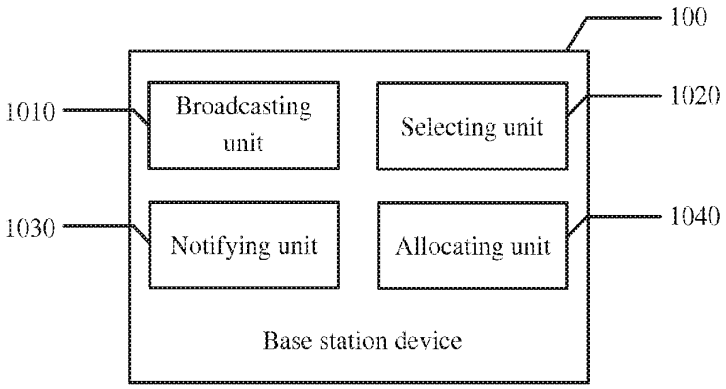


FIG. 10

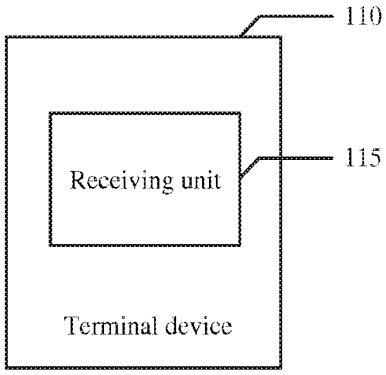


FIG. 11

Samsung Exhibit 1009, Page 228 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

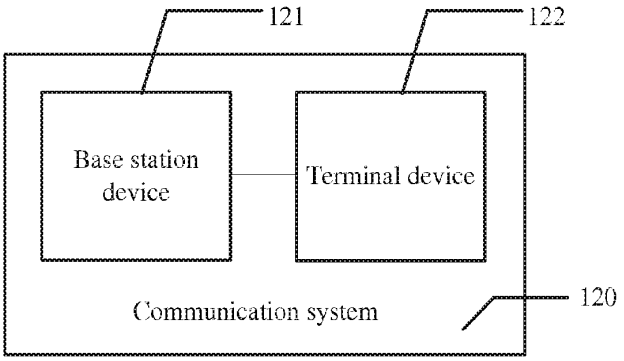


FIG. 12

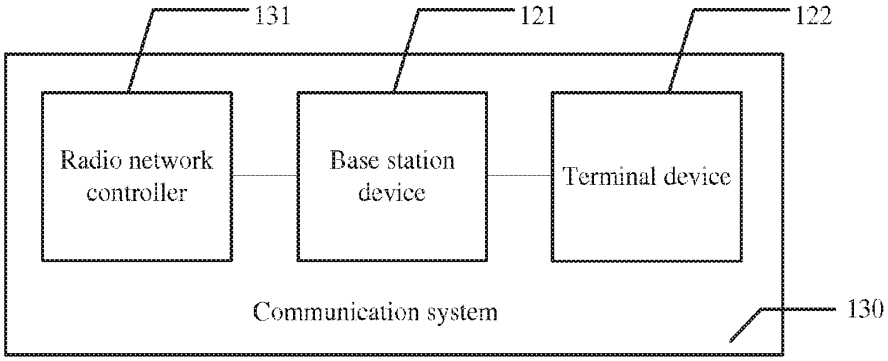


FIG. 13

Samsung Exhibit 1009, Page 229 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2012/073476

A. CLASSIFICATION OF SUBJECT MATTER

H04W 72/04(2009.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: H04W; H04L; H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CPRSABS, CNTXT, CNKI, VEN: broadcast, first, second, different, transmission time interval, TTI, select, indicate, enhanced dedicated channel, EDCH

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN101400072A (DATANG MOBILE COMMUNICATION APPARATUS) 01 Apr. 2009 (01.04.2009), the description page 4 line 12- page 6 line 22, claims 1, 8-11	7-8, 13, 17-19
Y	CN1852605A (HUAWEI TECHNOLOGIES CO., LTD.), 25 Oct. 2006 (25.10.2006) claims 1, 9	7-8, 13, 17-19
A	CN101902779A(HUAWEI TECHNOLOGIES CO., LTD.), 01 Dec. 2010 (01.12.2010) the whole document	1-19

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 Jun. 2012(15.06.2012)	12 Jul. 2012(12.07.2012)

Name and mailing address of the ISA/CN	Authorized officer
State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No. (86-10)62019451	LI, Qian Telephone No. (86-10) 62411283

Form PCT/ISA /210 (second sheet) (July 2009)

Samsung Exhibit 1009, Page 230 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2012/073476

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN101400072A	01.04.2009	NONE	
CN1852605A	25.10.2006	CN100421528C	24.09.2008
CN101902779A	01.12.2010	WO2010135985A1	02.12.2010

Form PCT/ISA /210 (patent family annex) (July 2009)

Samsung Exhibit 1009, Page 231 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 201110083708 **[0001]**

Samsung Exhibit 1009, Page 232 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

Electronic Patent Application Fee Transmittal

Application Number:	15663674
Filing Date:	28-Jul-2017
Title of Invention:	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM
First Named Inventor/Applicant Name:	Wei-Yu Chen
Filer:	Sang N. Dang/Sandy Kim
Attorney Docket Number:	1426-136.101

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($)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	1806	1	240	240
		Total in USD ($)		**240**

Electronic Acknowledgement Receipt	
EFS ID:	33921081
Application Number:	15663674
International Application Number:	
Confirmation Number:	8966
Title of Invention:	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM
First Named Inventor/Applicant Name:	Wei-Yu Chen
Customer Number:	106622
Filer:	Sang N. Dang/Sandy Kim
Filer Authorized By:	Sang N. Dang
Attorney Docket Number:	1426-136.101
Receipt Date:	04-OCT-2018
Filing Date:	28-JUL-2017
Time Stamp:	15:51:18
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$240
RAM confirmation Number	100518INTEFSW15520900
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		1426-136-101--IDSasFiled10042018v2.pdf	158071 ad8303f6e0fc2010686286cbb6d9eb9be46761ae	yes	6
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Transmittal Letter		1	3	
	Information Disclosure Statement (IDS) Form (SB08)		4	5	
	Miscellaneous Incoming Letter		6	6	
Warnings:					
Information:					
2	Foreign Reference	EP2680651.pdf	2874550 94592ca34c9aca34d37add38f229a38ab3c66e4c	no	23
Warnings:					
Information:					
3	Non Patent Literature	NPL-R2-163445.pdf	183636 96d524cbf1dba78475ee9447d3073062ea1d4962	no	4
Warnings:					
Information:					
4	Non Patent Literature	NPL--TWOfficeAction.pdf	674034 8e0c56eeda8f54d497503b04303acab1b09464a3	no	8
Warnings:					
Information:					
5	Fee Worksheet (SB06)	fee-info.pdf	30584 4d01fb35d9dd75077af45ad7ec694ead9aa1e66b	no	2

Warnings:	
Information:	
Total Files Size (in bytes):	3920875

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.

Information Disclosure Statement Transmittal

Docket Number
1426-136.101

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

In Re Application Of:

Wei-Yu Chen

Application No.	15/663,674
Filing Date	July 28, 2017
Examiner	Pakee Fang
Art Unit	2642

Title of Invention

METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM

BASIS FOR FILING (Select 1, 2 or 3 below.)

37 CFR 1.97(b)

1) ☐ The Information Disclosure Statement submitted herewith is being filed within three months of the filing of a national application other than a continued prosecution application under 37 CFR 1.53 (d); within three months of the date of entry of the national stage as set forth in 37 CFR 1.491 in an international application; before the mailing of a first Office Action on the merits, or before the mailing of a first Office Action after the filing of a request for continued examination under 37 CFR 1.114.

37 CFR 1.97(c)

2) ☐ The Information Disclosure Statement submitted herewith is being filed after the period specified in 37 CFR 1.97(b), but before the mailing date of a Final Action under 37 CFR 1.113, a Notice of Allowance under 37 CFR 1.311, or an Action that otherwise closes prosecution in the application, and is accompanied by one of:

a) ☐ the statement specified in 37 CFR 1.97(e);

OR

b) ☒ the fee set forth in 37 CFR 1.17(p).

37 CFR 1.97(d)

3) ☒ The Information Disclosure Statement submitted herewith is being filed after the period specified in 37 CFR 1.97(c), and on or before payment of the issue fee, and is accompanied by the Statement as specified in 37 CFR 1.97(e) and the fee set forth in 37 CFR 1.17(p).

Samsung Exhibit 1009, Page 238 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

Information Disclosure Statement Transmittal

Docket Number
1426-136.101

STATEMENT UNDER 37 CFR 1.97(e) ACCOMPANYING INFORMATION DISCLOSURE STATEMENT

The Information Disclosure Statement submitted herewith is submitted under one of the following conditions, which satisfies the requirement under 37 CFR 1.97(e). (Select 4 or 5 below if applicable.)

4) ☒ That each item of information contained in the Information Disclosure Statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the Information Disclosure Statement; or

5) ☐ That no item of information contained in the Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the Information Disclosure Statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the Information Disclosure Statement.

Remarks (Enter Remarks Below or Attach Document Containing Remarks)

Fee set forth in 37 CFR 1.17(p):

☐ No additional fee is required.

☐ A check in the amount of _____ is attached.

☐ The Director is hereby authorized to charge and credit Deposit Account No. _____ as described below.

- ☐ Charge the amount of _____
- ☐ Credit any overpayment.
- ☐ Charge any additional fee required.

☒ Payment by credit card. Form PTO-2038 is attached.

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.

Samsung Exhibit 1009, Page 239 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

Information Disclosure Statement Transmittal

Docket Number
1426-136.101

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 Transmittal Letter, 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 Transmittal Letter, 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 Transmittal Letter, accompanying documents and fee authorization (if appropriate) is 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 Trasmittal Letter 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	10/04/2018

Samsung Exhibit 1009, Page 240 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

PTO/SB/30EFS (02-18)
Approved for use through 11/30/2020. 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.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	15/663,674	Filing Date	2017-07-28	Docket Number (if applicable)	1426-136.101	Art Unit	2642
First Named Inventor	Wei-Yu Chen			Examiner Name	Pakee Fang		

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. The Instruction Sheet for this form is located at WWW.USPTO.GOV

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).

☐ 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.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☐ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ 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 CFR 1.17(i) required)

☐ Other _____

FEES

☐ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No _____

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (02-18)
Approved for use through 11/30/2020. 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.

Signature of Registered U.S. Patent Practitioner			
Signature	/Sang N. Dang/	Date (YYYY-MM-DD)	2018-12-24
Name	Sang N. Dang	Registration Number	51186

This collection of information is required by 37 CFR 1.114. 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.

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

Amendment Transmittal Letter

Docket Number
1426-136.101

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

Title of Invention

METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM

First Named Inventor	Wei-Yu Chen
Application No.	15/663,674
Filing Date	July 28, 2017
Examiner	Pakee Fang
Art Unit	2642

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	24	- 24 =		x =	
Total Indep. Claims	4	- 4 =		x =	
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

Samsung Exhibit 1009, Page 243 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

Amendment Transmittal Letter

Docket Number
1426-136.101

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	12-24-2018

Samsung Exhibit 1009, Page 244 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	15/663,674
Confirmation No.	:	8966
Applicant	:	Wei-Yu Chen and Li-Chi Tseng
Filed	:	July 28, 2017
Title	:	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM
TC/A.U.	:	2642
Examiner	:	Pakee Fang
Docket No.	:	1426-136.101 (1050153-US)
Customer No.	:	106622

RESPONSE 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 September 27, 2018, having a three-month period for filing a response to **December 27, 2018**, Applicants respectfully submit the following amendments and remarks along with an RCE:

Amendments to Claims begin on page 2.
Remarks begin on page 7.

Samsung Exhibit 1009, Page 245 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

IN THE CLAIMS:

1. (Currently Amended) A method of a UE (User Equipment) for performing random access procedure, comprising:

the UE receives a message from a network, wherein the message includes ~~a TTI (Transmission Time Interval) information~~ numerology of Msg3;

the UE transmits a preamble to the network;

the UE receives a Msg2 from the network for responding the preamble; and

the UE performs a Msg3 transmission to the network according to the ~~TTI information~~ numerology of Msg3.

2. (Currently Amended) The method of claim 1, further comprising:

the UE selects the ~~TTI information~~ numerology of Msg3 based on a PRACH (Physical Random Access Channel) resource set of the preamble or preamble set of the preamble, if there are multiple ~~TTI information~~ numerologies of Msg3 in the message.

3. (Currently Amended) The method of claim 1, further comprising:

the UE selects the ~~TTI information~~ numerology of Msg3 based on random access purpose, if there are multiple TTI information in the message.

4. (Currently Amended) The method of claim 1, further comprising:

the UE selects the ~~TTI information~~ numerology of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple ~~TTI information~~ numerologies of Msg3 in the message.

5. (Original) The method of claim 1, wherein the message is a downlink control signal.

6. (Original) The method of claim 1, wherein the message is a RRC (Radio Resource Control) message.

7. (Currently Amended) The method of claim 1, further comprising:

Samsung Exhibit 1009, Page 246 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

the UE selects the ~~TTI information~~ numerology of Msg3 based on a random access configuration of the preamble transmission, if there are multiple ~~TTI information~~ numerologies of Msg3 in the message.

8. (Withdrawn) A method of a UE (User Equipment) for performing random access procedure, comprising:

the UE transmits a preamble to a network;

the UE receives a Msg2 from the network in response to the preamble, wherein the Msg2 contains a TTI (Transmission Time Interval) information of Msg3; and

the UE performs a Msg3 transmission to the network according to the TTI information.

9. (Withdrawn) The method of claim 8, further comprising:

the UE selects the TTI information of Msg3 based on random access purpose, if there are multiple TTI information of Msg3 in the Msg2.

10. (Withdrawn) The method of claim 8, further comprising:

the UE selects the TTI information of Msg3 based on a PRACH (Physical Random Access Channel) resource set of the preamble transmission or a preamble set of the preamble transmission, if there are multiple TTI information of Msg3 in the Msg2.

11. (Withdrawn) The method of claim 8, further comprising:

the UE selects the TTI information of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple TTI information of Msg3 in the Msg2.

12. (Withdrawn) The method of claim 8, wherein the TTI information of Msg3 is included in a RAR (Random Access Response) for responding the preamble.

13. (Withdrawn) The method of claim 8, wherein the TTI information of Msg3 is included in a common field for multiple RARs in the Msg2.

14. (Withdrawn) The method of claim 8, wherein the TTI information of Msg3 includes a TTI duration of Msg3.

15. (Withdrawn) The method of claim 8, wherein the TTI information of Msg3 includes a start timing offset of Msg3.

16. (Currently Amended) A User Equipment (UE), comprising:

a control circuit;

a processor installed in the control circuit; and

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:

receive a message from a network, wherein the message includes ~~a TTI (Transmission Time Interval) information~~ numerology of Msg3;

transmit a preamble to the network;

receive a Msg2 from the network for responding the preamble; and

perform a Msg3 transmission to the network according to the ~~TTI information~~ numerology of Msg3.

17. (Currently Amended) The UE of claim 16, wherein the processor is further configured to execute the program code stored in the memory to:

select the ~~TTI information~~ numerology of Msg3 based on a PRACH (Physical Random Access Channel) resource set of the preamble or preamble set of the preamble, if there are multiple ~~TTI information~~ numerologies of Msg3 in the message.

18. (Currently Amended) The UE of claim 16, wherein the processor is further configured to execute the program code stored in the memory to:

select the ~~TTI information~~ numerology of Msg3 based on random access purpose, if there are multiple TTI information in the message.

19. (Currently Amended) The UE of claim 16, wherein the processor is further configured to execute the program code stored in the memory to:

select the ~~TTI information~~ numerology of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple ~~TTI information~~ numerologies of Msg3 in the message.

20. (Currently Amended) The UE of claim 16, wherein the processor is further configured to execute the program code stored in the memory to:

select the ~~TTI information~~ numerology of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple ~~TTI information~~ numerologies of Msg3 in the message.

21. (Withdrawn) A User Equipment (UE), comprising:

a control circuit;

a processor installed in the control circuit; and

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:

transmit a preamble to a network;

receive a Msg2 from the network in response to the preamble, wherein the Msg2 contains a TTI (Transmission Time Interval) information of Msg3; and

perform a Msg3 transmission to the network according to the TTI information of Msg3.

22. (Withdrawn) The UE of claim 21, wherein the processor is further configured to execute the program code stored in the memory to:

the UE selects the TTI information of Msg3 based on random access purpose, if there are multiple TTI information of Msg3 in the Msg2.

23. (Withdrawn) The UE of claim 21, wherein the processor is further configured to execute the program code stored in the memory to:

the UE selects the TTI information of Msg3 based on a PRACH (Physical Random Access Channel) resource set of the preamble or a preamble set of the preamble transmission, if there are multiple TTI information of Msg3 in the Msg2.

24. (Withdrawn) The UE of claim 21, wherein the processor is further configured to execute the program code stored in the memory to:

the UE selects the TTI information of Msg3 based on highest priority of logical channel having available data, if there are multiple TTI information of Msg3 in the Msg2.

Samsung Exhibit 1009, Page 250 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

REMARKS

Claims 1-7 and 16-20 are pending in the application. In the Office Action, claims 1-7 and 16-20 stand rejected under 35 U.S.C. 102(a)(2) as being anticipated by Mujtaba (U.S. Patent Publication No. 2016/0366705). *See* Office Action, ¶ 4. Claims 1-4, 7, and 16-20 have been amended. The claim amendments are supported by at least Paragraphs [0052] – [0053] of the present application. No new matter has been added. Applicants respectfully request reconsideration of the claims as amended.

Claims 1 and 16 recite "receives [or receive] a message from a network, wherein the message includes numerology of Msg3" and "performs [or perform] a Msg3 transmission to the network according to the numerology of Msg3." Applicants respectfully submit that Mujtaba fails to disclose the noted limitations.

Paragraphs [0052] and [0053] of the present application disclose that to achieve dynamic TTI concept, a UE needs to derive TTI information (e.g., TTI length, numerology) for transmitting Msg3 on air interface for improving resource efficiency. Consistent with Paragraphs [0052] and [0053] of the present application, claims 1 and 16 recite "receives [or receive] a message from a network, wherein the message includes a numerology of Msg3" and "performs [or perform] a Msg3 transmission to the network according to the numerology of Msg3."

As disclosed in Mujtaba, the TTI information refers to TTI bundling while the claimed invention pertains to transmission time interval of one transmission and the numerology concept. Paragraphs [0063] – [0065], [0076], and [0080] of Mujtaba teach that Msg3 parameter(s)/characteristic(s) are modulation and coding scheme (MSC) allocation which is utilized to determine what kind of modulation and coding scheme in different link budgets.

For the reasons discussed above, Applicants respectfully submit that claims 1-7 and 16-20 are patentable over Mujtaba.

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.

Samsung Exhibit 1009, Page 251 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

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: December 24, 2018

/Sang N. Dang/
Reg. No. 51,186
Tel.: (714) 839-3800

Samsung Exhibit 1009, Page 252 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Wei-Yu Chen and Li-Chih Tseng	
Title:	METHOD AND APPARATUS FOR IMPROVING Msg3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM	
Serial No.:	15/663,674	Filed: July 28, 2017
Examiner:	Pakee Fang	Group Art Unit: 8966
Attorney Docket No.:	1426-136.101 (1050153-US)	

CERTIFICATE OF EFS-WEB TRANSMISSION
UNDER 37 CFR § 1.8

I hereby certify that the enclosed 2 Page Request for Continued Examination; 2 Page Amendment Transmittal Sheet; and 8 Page Amendment are being transmitted to the United States Patent and Trademark Office via EFS-Web on December 24, 2018.

Date: December 24, 2018 /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:	15663674
Filing Date:	28-Jul-2017
Title of Invention:	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM
First Named Inventor/Applicant Name:	Wei-Yu Chen
Filer:	Sang N. Dang/Sandy Kim
Attorney Docket Number:	1426-136.101

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($)
Miscellaneous:				
RCE- 1ST REQUEST	1801	1	1300	1300
		Total in USD ($)		**1300**

Electronic Acknowledgement Receipt	
EFS ID:	34686550
Application Number:	15663674
International Application Number:	
Confirmation Number:	8966
Title of Invention:	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM
First Named Inventor/Applicant Name:	Wei-Yu Chen
Customer Number:	106622
Filer:	Sang N. Dang/Sandy Kim
Filer Authorized By:	Sang N. Dang
Attorney Docket Number:	1426-136.101
Receipt Date:	24-DEC-2018
Filing Date:	28-JUL-2017
Time Stamp:	16:13:54
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1300
RAM confirmation Number	122618INTEFSW16141300
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		1426-136-101--RFOAwRCEasFiled12242018.pdf	211352 3a966dd9bb22055cca72e846c1c149827da63fae	yes	13

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Request for Continued Examination (RCE)	1	2
	Transmittal Letter	3	4
	Amendment Submitted/Entered with Filing of CPA/RCE	5	5
	Claims	6	10
	Applicant Arguments/Remarks Made in an Amendment	11	12
	Miscellaneous Incoming Letter	13	13

Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30403 53090fdcc5bcd2d8460a4cd09ff997029e53e382	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	241755		

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.

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 Substitute for Form PTO-875	Application or Docket Number 15/663,674	Filing Date 07/28/2017	☐ 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 $80 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $420 =	
☐ 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

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	12/24/2018	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 24	Minus	** 24	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 4	= 0		x $460 =	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

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ 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.	SLIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/JULIET MCMILLAN/
*** 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.	

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)
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	15663674
Filing Date	2017-07-28
First Named Inventor	Chen, Wei-Yu
Art Unit	2642
Examiner Name	Pakee Fang
Attorney Docket Number	1426-136.101

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					

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	2014-511080	JP		2014-05-01	Kun Yan		☐
	2	2016-072843	JP		2016-05-09	OZEKI TAKEO		☐

If you wish to add additional Foreign Patent Document citation information please click the Add button

NON-PATENT LITERATURE DOCUMENTS

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15663674
	Filing Date	2017-07-28
	First Named Inventor	Chen, Wei-Yu
	Art Unit	2642
	Examiner Name	Pakee Fang
	Attorney Docket Number	1426-136.101

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	Office Action from Japan Patent Office in corresponding JP Application No. 2017-146452, dated November 27, 2018	☒
	2		☐

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Wei-Yu Chen and Li-Chih Tseng	
Title:	METHOD AND APPARATUS FOR IMPROVING Msg3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM	
Serial No.:	15/663,674	Filed: July 28, 2017
Examiner:	Pakee Fang	Group Art Unit: 8966
Attorney Docket No.:	1426-136.101 (1050153-US)	

CERTIFICATE OF EFS-WEB TRANSMISSION
UNDER 37 CFR § 1.8

I hereby certify that the enclosed 3 Page Information Disclosure Statement Transmittal; 2 Page Information Disclosure Statement by Applicant with 3 references are being transmitted to the United States Patent and Trademark Office via EFS-Web on December 26, 2018.

Date: December 26, 2018 /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:	34694464
Application Number:	15663674
International Application Number:	
Confirmation Number:	8966
Title of Invention:	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM
First Named Inventor/Applicant Name:	Wei-Yu Chen
Customer Number:	106622
Filer:	Sang N. Dang/Sandy Kim
Filer Authorized By:	Sang N. Dang
Attorney Docket Number:	1426-136.101
Receipt Date:	26-DEC-2018
Filing Date:	28-JUL-2017
Time Stamp:	16:28:34
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	Foreign Reference	JP2014511080.pdf	744913 cffa00e352a2016c51851b7095e6f111695fc2cb	no	43
Warnings:					

Information:					
2	Foreign Reference	JP201672843.pdf	496858 e5013b961a0d28d5315574512c3b057fbfadcceb	no	14
Warnings:					
Information:					
3	Non Patent Literature	NPL--JPOfficeAction.pdf	93797 1926cc8dd4137d485b1477faf9fcada36cc66e33	no	3
Warnings:					
Information:					
4	Non Patent Literature	NPL--JPOfficeActionEnglish.pdf	27636 99d7ae2d6e6a6b983b201f40512b27883da83b11	no	3
Warnings:					
Information:					
5		1426-136-101--IDSasFiled12242018.pdf	146709 c7198ff24c3b3101e2343c68e84928a82d2ddaec	yes	6

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	3
	Information Disclosure Statement (IDS) Form (SB08)	4	5
	Miscellaneous Incoming Letter	6	6

Warnings:	
Information:	
Total Files Size (in bytes):	1509913

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.

(19)日本国特許庁(JP)　(12)公表特許公報(A)　(11)特許出願公表番号
特表2014-511080
(P2014-511080A)
(43)公表日　平成26年5月1日(2014.5.1)

(51)Int.Cl.		F I			テーマコード（参考）
H04W 72/04	(2009.01)	H04W	72/04	130	5K067
H04W 74/08	(2009.01)	H04W	74/08		

審査請求 有　予備審査請求 未請求　（全 43 頁）

(21)出願番号	特願2014-501433 (P2014-501433)
(86)(22)出願日	平成24年4月1日 (2012.4.1)
(85)翻訳文提出日	平成25年11月8日 (2013.11.8)
(86)国際出願番号	PCT/CN2012/073476
(87)国際公開番号	WO2012/136130
(87)国際公開日	平成24年10月11日 (2012.10.11)
(31)優先権主張番号	201110083708.4
(32)優先日	平成23年4月2日 (2011.4.2)
(33)優先権主張国	中国 (CN)

(71)出願人　504277388
▲ホア▼▲ウェイ▼技術有限公司
中華人民共和国５１８１２９広東省深▲セン▼市龍岡区坂田華為本社ビル
(74)代理人　100146835
弁理士　佐伯　義文
(74)代理人　100140534
弁理士　木内　敬二
(72)発明者　▲ヤン▼　坤
中華人民共和国５１８１２９広東省深▲セン▼市龍岡区坂田華為本社ビル
(72)発明者　高　永▲強▼
中華人民共和国５１８１２９広東省深▲セン▼市龍岡区坂田華為本社ビル

最終頁に続く

(54)【発明の名称】チャネルリソース割振りのための方法、基地局デバイス、端末デバイス、および通信システム

(57)【要約】
本発明はチャネルリソース割振り方法、基地局デバイス、端末デバイス及び通信システムを提供する。セルブロードキャストメッセージを端末デバイスに送信する段階であって、セルブロードキャストメッセージがコモンエンハンスト専用チャネルリソースに対応する、第1パラメータ構成の記述情報および第2パラメータ構成の記述情報を含み、第1パラメータ構成が第1送信時間間隔TTIを対象とし、第2パラメータ構成が第1TTIとは異なる第2TTIを対象とする段階と、端末デバイスによって送信された指示情報を受信する段階であって、指示情報が端末デバイスが選択TTIとして第1TTIまたは第2TTIの選択を示す段階と、指示情報に従ってコモンエンハンスト専用チャネルリソースを端末デバイスに割り振る段階とを含む。本発明ではセル中で複数のTTIが構成され、複数のTTIのパラメータ構成情報が端末デバイスにブロードキャストされる。

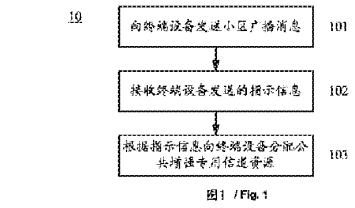


图1 / Fig. 1

101 SENDING OF A CELL BROADCAST MESSAGE TO A TERMINAL DEVICE
102 RECEPTION OF INDICATION INFORMATION SENT BY THE TERMINAL DEVICE
103 ALLOCATION OF A COMMON ENHANCED-DEDICATED CHANNEL RESOURCE TO THE TERMINAL DEVICE ACCORDING TO THE INDICATION INFORMATION

【特許請求の範囲】
【請求項１】
チャネルリソースを割り振る方法であって、
セルブロードキャストメッセージを端末デバイスに送信する段階であって、前記セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、前記第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、前記第2のパラメータ構成が、前記第1のTTIとは異なる第2の送信時間間隔(TTI)に特有である段階と、
前記端末デバイスから送信された指示情報を受信する段階であって、前記指示情報が、前記端末デバイスが使用TTIとして前記第1のTTIまたは前記第2のTTIを選択することを示すものである段階と、
前記指示情報に従ってコモンエンハンスト専用チャネルリソースを前記端末デバイスに割り振る段階とを含むことを特徴とする方法。
【請求項２】
前記セルブロードキャストメッセージを前記端末デバイスに送信する前記段階が、
前記セルブロードキャストメッセージを前記端末デバイスに送信する段階であって、前記セルブロードキャストメッセージ中で、前記コモンエンハンスト専用チャネルリソースが、前記第1のTTIに特有の第1のリソースサブセットと前記第2のTTIに特有の第2のリソースサブセットとにグループ化された段階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】
前記指示情報に従って前記コモンエンハンスト専用チャネルリソースを前記端末デバイスに割り振る前記段階が、
前記選択されたTTIが前記第1のTTIであることを前記指示情報が示すときに、前記第1のリソースサブセット中のコモンエンハンスト専用チャネルリソースを前記端末デバイスに割り振り、前記選択されたTTIが前記第2のTTIであることを前記指示情報が示すときに、前記第2のリソースサブセット中のコモンエンハンスト専用チャネルリソースを前記端末デバイスに割り振る段階を含むことを特徴とする、請求項2に記載の方法。
【請求項４】
前記端末デバイスに対する拒否回数を記録する段階と、
前記記録された回数を無線ネットワークコントローラに送信する段階とをさらに含み、それにより前記無線ネットワークコントローラが前記回数に従って前記第1のリソースサブセットおよび前記第2のリソースサブセット中のコモンエンハンスト専用チャネルリソースを調整することを特徴とする、請求項2に記載の方法。
【請求項５】
チャネルリソースを割り振る方法であって、
セルブロードキャストメッセージをネットワーク側から受信する段階であって、前記セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、前記第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成が、前記第1のTTIとは異なる第2のTTIに特有である段階と、
使用TTIとして前記第1のTTIまたは前記第2のTTIを選択し、前記選択したTTIの指示情報を生成する段階と、
前記ネットワーク側が前記指示情報に従ってコモンエンハンスト専用チャネルリソースを割り振るよう、前記指示情報を前記ネットワーク側に送信する段階とを含むことを特徴とする方法。
【請求項６】
前記セルブロードキャストメッセージを前記ネットワーク側から受信する前記段階が、
前記セルブロードキャストメッセージを受信する段階であって、前記セルブロードキャストメッセージ中で、前記コモンエンハンスト専用チャネルリソースが、前記第1のTTIに

特有の第1のリソースサブセットと前記第2のTTIに特有の第2のリソースサブセットとにグループ化された段階を含むことを特徴とする、請求項5に記載の方法。

【請求項７】

チャネルリソースを割り振る方法であって、

セルブロードキャストメッセージを端末デバイスに送信する段階であって、前記セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、前記第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、前記第2のパラメータ構成が、前記第1のTTIとは異なる第2のTTIに特有である段階と、

使用TTIとして前記第1のTTIまたは前記第2のTTIを選択する段階と、

前記選択されたTTIを前記端末デバイスに通知する段階と、

前記選択されたTTIに従ってコモンエンハンスト専用チャネルリソースを前記端末デバイスに割り振る段階とを含むことを特徴とする方法。

【請求項８】

チャネルリソースを割り振る方法であって、

セルブロードキャストメッセージをネットワーク側から受信する段階であって、前記セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、前記第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、前記第2のパラメータ構成が、前記第1のTTIとは異なる第2のTTIに特有である段階と、

指示情報を前記ネットワーク側から受信する段階であって、前記指示情報が、前記ネットワーク側デバイスが使用TTIとして前記第1のTTIまたは前記第2のTTIを選択することを示すものである段階と、

前記選択されたTTIに従って前記ネットワーク側によって割り振られたコモンエンハンスト専用チャネルリソースを受信する段階とを含むことを特徴とする方法。

【請求項９】

セルブロードキャストメッセージを端末デバイスに送信するように構成されたブロードキャスティングユニットであって、前記セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、前記第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、前記第2のパラメータ構成が、前記第1のTTIとは異なる第2のTTIに特有であるブロードキャスティングユニットと、

前記端末デバイスから送信された指示情報を受信するように構成された受信ユニットであって、前記指示情報が、前記端末デバイスが使用TTIとして前記第1のTTIまたは前記第2のTTIを選択することを示すものである受信ユニットと、

前記指示情報に従ってコモンエンハンスト専用チャネルリソースを前記端末デバイスに割り振るように構成された割振りユニットとを備えることを特徴とする基地局デバイス。

【請求項１０】

前記ブロードキャスティングユニットが前記セルブロードキャストメッセージを前記端末デバイスに送信し、前記セルブロードキャストメッセージ中で、前記コモンエンハンスト専用チャネルリソースが、前記第1のTTIに特有の第1のリソースサブセットと前記第2のTTIに特有の第2のリソースサブセットとにグループ化されたことを特徴とする、請求項9に記載の基地局デバイス。

【請求項１１】

前記割振りユニットが、前記選択されたTTIが前記第1のTTIであることを前記指示情報が示すときに、前記第1のリソースサブセット中のコモンエンハンスト専用チャネルリソースを前記端末デバイスに割り振り、前記選択されたTTIが前記第2のTTIであることを前記指示情報が示すときに、前記第2のリソースサブセット中のコモンエンハンスト専用チャネルリソースを前記端末デバイスに割り振ることを特徴とする、請求項10に記載の基地局デバイス。

【請求項１２】
前記端末デバイスに対する拒否回数を記録して、前記記録された回数を無線ネットワークコントローラに送信するように構成された記録ユニットをさらに備え、それにより前記無線ネットワークコントローラが前記回数に従って前記第1のリソースサブセットおよび前記第2のリソースサブセット中の前記コモンエンハンスト専用チャネルリソースを調整することを特徴とする、請求項10に記載の基地局デバイス。
【請求項１３】
セルブロードキャストメッセージを端末デバイスに送信するように構成されたブロードキャスティングユニットであって、前記セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、前記第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、前記第2のパラメータ構成が、前記第1のTTIとは異なる第2のTTIに特有であるブロードキャスティングユニットと、
使用TTIとして前記第1のTTIまたは前記第2のTTIを選択するように構成された選択ユニットと、
前記選択されたTTIを前記端末デバイスに通知するように構成された通知ユニットと、
前記選択されたTTIに従ってコモンエンハンスト専用チャネルリソースを前記端末デバイスに割り振るように構成された割振りユニットとを備えることを特徴とする基地局デバイス。
【請求項１４】
セルブロードキャストメッセージをネットワーク側から受信するように構成された受信ユニットであって、前記セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、前記第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、前記第2のパラメータ構成が、前記第1のTTIとは異なる第2のTTIに特有である受信ユニットと、
使用TTIとして前記第1のTTIまたは前記第2のTTIを選択し、前記選択したTTIの指示情報を生成するように構成された選択ユニットと、
前記ネットワーク側が前記指示情報に従ってコモンエンハンスト専用チャネルリソースを割り振るよう、前記指示情報を前記ネットワーク側に送信するように構成された送信ユニットとを備えることを特徴とする端末デバイス。
【請求項１５】
前記受信ユニットがさらに、前記割り振られたコモンエンハンスト専用チャネルリソースの通知を受信するように構成され、
前記選択ユニットがさらに、前記選択したTTIに従って前記第1のパラメータ構成または前記第2のパラメータ構成を選択するように構成されたことを特徴とする、請求項14に記載の端末デバイス。
【請求項１６】
前記受信ユニットが前記セルブロードキャストメッセージを受信し、前記セルブロードキャストメッセージ中で、前記コモンエンハンスト専用チャネルリソースが、前記第1のTTIに特有の第1のリソースサブセットと前記第2のTTIに特有の第2のリソースサブセットとにグループ化されたことを特徴とする、請求項14に記載の端末デバイス。
【請求項１７】
端末デバイスであって、
セルブロードキャストメッセージをネットワーク側から受信するように構成された受信ユニットを備え、前記セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、前記第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、前記第2のパラメータ構成が、前記第1のTTIとは異なる第2のTTIに特有であり、
前記受信ユニットがさらに、指示情報を前記ネットワーク側から受信するように構成さ

Samsung Exhibit 1009, Page 269 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

れ、前記指示情報が、前記ネットワーク側デバイスが使用TTIとして前記第1のTTIまたは前記第2のTTIを選択することを示し、

前記受信ユニットがさらに、前記選択されたTTIに従って前記ネットワーク側によって割り振られたコモンエンハンスト専用チャネルリソースを受信するように構成されたことを特徴とする端末デバイス。

【請求項１８】

請求項9から13のいずれか一項に記載の基地局デバイスと、

請求項14から17のいずれか一項に記載の端末デバイスとを備えることを特徴とする通信システム。

【請求項１９】

前記基地局デバイスによって記録された、前記端末デバイスに対する拒否回数を受信し、前記回数に従って前記第1のリソースサブセットおよび前記第2のリソースサブセット中の前記コモンエンハンスト専用チャネルリソースを調整するように構成された無線ネットワークコントローラをさらに備えることを特徴とする、請求項18に記載の通信システム。

【発明の詳細な説明】

【技術分野】

【０００１】

本出願は、参照によりその全体が本明細書に組み込まれる、2011年4月2日に中国特許庁に出願された「METHOD FOR ALLOCATING CHANNEL RESOURCE, BASE STATION DEVICE, TERMINAL DEVICE, AND COMMUNICATION SYSTEM」という名称の中国特許出願第201110083708.4号に対する優先権を主張するものである。

【０００２】

本発明の実施形態は、ワイヤレス通信の分野に関し、特に、チャネルリソースを割り振る方法、基地局デバイス、端末デバイス、および通信システムに関する。

【背景技術】

【０００３】

3GPP(The 3rd Generation Partnership Project、第3世代パートナーシッププロジェクト)UMTS(Universal Mobile Telecommunications System、ユニバーサルモバイルテレコミュニケーションズシステム)R8バージョンでは、遊休(idle)モードまたはCELL_FACH(CELL Forward Access Channel、セルフォワードアクセスチャネル)状態のUE(User Equipment、ユーザ機器)に関して、アップリンク送信遅延を低減しアップリンク送信レートを上げるために、エンハンストRACH(Random Access Channel、ランダムアクセスチャネル)と呼ばれる新しい機能が採用される。エンハンストRACHは、R99バージョンにおけるランダムアクセスを向上させる。エンハンストランダムアクセスは、RACHの代わりとするためのE-DCH(Enhanced Dedicated Channel、エンハンスト専用チャネル)を採用して、アップリンク送信を実施する。エンハンストCELL_FACHプロシージャは、概して、プリアンブルアクセスおよびリソース割振り段階と、衝突解決段階と、E-DCHデータ送信段階と、リソース解放段階とを含む。

【０００４】

リソース割振り段階で割り振られるリソースは、Common-EDCH(Common Enhanced-Dedicated Channel、コモンエンハンスト専用チャネル)リソースを指し、これは、セルのシステム情報中でブロードキャストされる。UEは、セルによってブロードキャストされたシステム情報を読むことによって、Common-EDCHリソース情報を得ることができる。既存のプロトコルによれば、全部で32セットのCommon-EDCHリソースがあり、これらには、F-DPCH(Fractional Dedicated Physical Channel、フラクショナル専用物理チャネル)、E-RGCH(E-DCH absolute grant channel、E-DCH絶対グラントチャネル)、E-HICH(E-DCH HARQ Acknowledgement Indicator Channel、E-DCHハイブリッド自動反復要求肯定応答インジケータチャネル)、およびアップリンクDPCH(Dedicated Physical Channel、専用物理チャネル)などの、符号情報が含まれる。Node Bは、リソース割振り段階で、AICH(Acquisition Indicator Channel、アクイジションインジケータチャネル)を介して、リソースインデックス

の使用をUEに通知する。UEは、リソースインデックスを受信した後、対応するリソースセットを使用してアップリンクデータを送信する。

【０００５】

エンハンストRACH機能については、アップリンクTTI(Transmission Time Interval、送信時間間隔)長さを各セルにつき1つだけ構成することができ、UEは、1つのTTI長さだけを使用する。このTTI長さは、アップリンクデータ送信では、2ミリ秒のTTIまたは10ミリ秒のTTIであることがある。したがって、前述の32セットのリソースは全て、UEが1つのTTI長さを使用する場合に向けて特に構成される。

【０００６】

しかし、この構成は十分にフレキシブルではない。セルのTTIが、UEによって必要とされるTTIと合致しない場合は、システムリソースの利用効率が低下することになる。

【発明の概要】

【発明が解決しようとする課題】

【０００７】

本発明の実施形態は、システムリソースの利用効率を高めることのできる、チャネルリソースを割り振る方法、基地局デバイス、端末デバイス、および通信システムを提供する。

【課題を解決するための手段】

【０００８】

一態様では、チャネルリソースを割り振る方法が提供される。この方法は、セルブロードキャストメッセージを端末デバイスに送信する段階であって、セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成が、第1のTTIとは異なる第2のTTIに特有である段階と、端末デバイスから送信された指示情報を受信する段階であって、指示情報が、端末デバイスが使用TTIとして第1のTTIまたは第2のTTIを選択することを示すものである段階と、指示情報に従ってコモンエンハンスト専用チャネルリソースを端末デバイスに割り振る段階とを含む。

【０００９】

別の態様では、チャネルリソースを割り振る方法が提供される。この方法は、セルブロードキャストメッセージをネットワーク側から受信する段階であって、セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成が、第1のTTIとは異なる第2のTTIに特有である段階と、使用TTIとして第1のTTIまたは第2のTTIを選択し、選択したTTIの指示情報を生成する段階と、ネットワーク側が指示情報に従ってコモンエンハンスト専用チャネルリソースを割り振るよう、指示情報をネットワーク側に送信する段階とを含む。

【００１０】

別の態様では、基地局デバイスが提供される。この基地局デバイスは、セルブロードキャストメッセージを端末デバイスに送信するように構成されたブロードキャスティングユニットであって、セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成が、第1のTTIとは異なる第2のTTIに特有であるブロードキャスティングユニットと、端末デバイスから送信された指示情報を受信するように構成された受信ユニットであって、指示情報が、端末デバイスが使用TTIとして第1のTTIまたは第2のTTIを選択することを示すものである受信ユニットと、指示情報に従ってコモンエンハンスト専用チャネルリソースを端末デバイスに割り振るように構成された割振りユニットとを備える。

【００１１】

別の態様では、端末デバイスが提供される。この端末デバイスは、セルブロードキャストメッセージをネットワーク側から受信するように構成された受信ユニットであって、セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成が、第1のTTIとは異なる第2のTTIに特有である受信ユニットと、使用TTIとして第1のTTIまたは第2のTTIを選択し、選択したTTIの指示情報を生成するように構成された選択ユニットと、ネットワーク側が指示情報に従ってコモンエンハンスト専用チャネルリソースを割り振るよう、指示情報をネットワーク側に送信するように構成された送信ユニットとを備える。

【００１２】

別の態様では、チャネルリソースを割り振る方法が提供される。この方法は、セルブロードキャストメッセージを端末デバイスに送信する段階であって、セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成が、第1のTTIとは異なる第2のTTIに特有である段階と、使用TTIとして第1のTTIまたは第2のTTIを選択する段階と、選択されたTTIを端末デバイスに通知する段階と、選択されたTTIに従ってコモンエンハンスト専用チャネルリソースを端末デバイスに割り振る段階とを含む。

【００１３】

別の態様では、チャネルリソースを割り振る方法が提供される。この方法は、セルブロードキャストメッセージをネットワーク側から受信する段階であって、セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成が、第1のTTIとは異なる第2のTTIに特有である段階と、指示情報をネットワーク側から受信する段階であって、指示情報が、ネットワーク側デバイスが使用TTIとして第1のTTIまたは第2のTTIを選択することを示すものである段階と、選択されたTTIに従ってネットワーク側によって割り振られたコモンエンハンスト専用チャネルリソースを受信する段階とを含む。

【００１４】

別の態様では、基地局デバイスが提供される。この基地局デバイスは、セルブロードキャストメッセージを端末デバイスに送信するように構成されたブロードキャスティングユニットであって、セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成が、第1のTTIとは異なる第2のTTIに特有であるブロードキャスティングユニットと、使用TTIとして第1のTTIまたは第2のTTIを選択するように構成された選択ユニットと、選択されたTTIを端末デバイスに通知するように構成された通知ユニットと、選択されたTTIに従ってコモンエンハンスト専用チャネルリソースを端末デバイスに割り振るように構成された割振りユニットとを備える。

【００１５】

別の態様では、端末デバイスが提供される。この端末デバイスは、セルブロードキャストメッセージをネットワーク側から受信するように構成された受信ユニットを備え、セルブロードキャストメッセージは、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成は第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成は、第1のTTIとは異なる第2のTTIに特有であり、受信ユニットはさらに、指示情報をネットワーク側から受信するように構成され、指示情報は、ネットワーク側デバイスが使用TTIとして第1のTTIまたは第2のTTIを選択することを示し、受信ユニットはさらに、選択されたTTIに従ってネットワーク側によって割り振られたコモンエンハンスト専用チャネルリソースを受信するように構成される。

【００１６】
別の態様では、通信システムが提供される。この通信システムは、上記の基地局デバイスまたは上記の端末デバイスを備える。
【発明の効果】
【００１７】
本発明の実施形態では、セルに対して複数のTTIが構成され、複数のTTIのパラメータ構成情報が端末デバイスにブロードキャストされる。したがって、端末デバイスは、複数のTTIから適切なTTIを選択することができ、ネットワーク側は、選択されたTTIに従ってチャネルリソースを割り振ることができ、それにより、システムリソースの割振りおよび利用の効率を高める。
【００１８】
本発明の実施形態における技術的解決法をより明確に例示するために、実施形態または従来技術を記述するのに必要とされる添付図面を以下に簡単に紹介する。明らかに、以下の記述における添付図面は本発明のいくつかの実施形態のみを示し、当業者なら、これらの添付図面から創意工夫なしに他の図面を導出することもなお可能である。
【図面の簡単な説明】
【００１９】
【図１】本発明の一実施形態による、チャネルリソースを割り振る方法の概略フローチャートである。
【図２】本発明の一実施形態による、チャネルリソースを割り振る方法の概略フローチャートである。
【図３Ａ】本発明の一実施形態による、チャネルリソース割振りのプロセスの概略フローチャートである。
【図３Ｂ】本発明の一実施形態による、チャネルリソース割振りのプロセスの概略フローチャートである。
【図４】本発明の一実施形態による、チャネルリソース割振りのプロセスの概略フローチャートである。
【図５】本発明の一実施形態による基地局デバイスの概略ブロック図である。
【図６】本発明の一実施形態による基地局デバイスの概略ブロック図である。
【図７】本発明の一実施形態による端末デバイスの概略ブロック図である。
【図８】本発明の一実施形態による、チャネルリソースを割り振る方法の概略フローチャートである。
【図９】本発明の一実施形態による、チャネルリソースを割り振る方法を示す図である。
【図１０】本発明の一実施形態による基地局デバイスの概略ブロック図である。
【図１１】本発明の一実施形態による端末デバイスの概略ブロック図である。
【図１２】本発明の一実施形態による通信システムの概略ブロック図である。
【図１３】本発明の別の実施形態による通信システムの概略ブロック図である。
【発明を実施するための形態】
【００２０】
以下、本発明の実施形態における添付図面を参照しながら、本発明の実施形態における技術的解決法について明確かつ完全に述べる。明らかに、述べる実施形態は、本発明の実施形態の全部ではなく一部でしかない。本発明の実施形態に基づいて当業者によって創意工夫なしに得られる他の全ての実施形態も、本発明の保護範囲に入るものとする。
【００２１】
本発明の技術的解決法は、GSM、符号分割多元接続(CDMA、Code Division Multiple Access)、広帯域符号分割多元接続(WCDMA（登録商標）、Wideband Code Division Multiple Access Wireless)、汎用パケット無線サービス(GPRS、General Packet Radio Service)、ロングタームエボリューション(LTE、Long Term Evolution)など、様々な通信システムに適用することができる。
【００２２】

Samsung Exhibit 1009, Page 273 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

モバイル端末(Mobile Terminal)は、モバイルユーザ(UE、User Equipment)またはモバイルユーザ機器などとも呼ばれるが、無線アクセスネットワーク(RAN、Radio Access Network)を介して1つまたは複数のコアネットワークと通信することができる。モバイル端末は、携帯電話機(あるいはセルラー電話機とも呼ばれる)などのモバイル端末とすることができ、または、ポータブル、ポケットサイズ、ハンドヘルド、コンピュータ組込み型、もしくは車載型のモバイル装置など、モバイル端末搭載コンピュータとすることができる。モバイル端末は、音声および/またはデータを無線アクセスネットワークと交換する。

【００２３】

基地局は、GSM（登録商標）もしくはCDMA中の基地局(BTS、Base Transceiver Station)、またはWCDMA中の基地局(NodeB)、またはLTE中の進化型基地局(eNBもしくはe-NodeB、evolutional Node B)とすることができ、本発明によって限定されない。記述を容易にするために、以下の実施形態では、Node Bを記述のための例にとる。

【００２４】

UEまたはネットワーク側は、UEの要件に従って動的にTTIの長さを調整することはできない。UEは、ネットワーク側によって構成されたTTIのみを使用することができる。例えば、セルが2ミリ秒のTTI長さのみをサポートするが、UEはセルのエッジに位置する。この場合、10ミリ秒のTTI長さに切り替えれば、よりよいカバレッジおよび伝送信頼性を達成することができる。あるいは、セルが10ミリ秒のTTI長さのみをサポートするが、UEはセルの中心に位置する。この場合、より多くの電力が利用可能であり、2ミリ秒のTTI長さに切り替えれば、アップリンク送信レートが効果的に上がることになる。このケースでは、セルのTTIが、UEによって必要とされるTTIと合致せず、これによりシステムリソースの利用効率が低下する。

【００２５】

本発明の実施形態は、各セル中で2つのTTI長さを構成できることを考慮に入れる。すなわち、1つのセル中で、エンハンストRACHをサポートするUEは、2つのTTI長さのうちの一方を動的に選択して、アップリンクデータを送信することができる。

【００２６】

以下では、端末デバイスを表すのにUEを使用し、基地局デバイスを表すのにNode Bを使用するが、本発明の実施形態は、これらの用語によって表される特定のシステムに限定されない。本発明の実施形態は、1つのセル中で複数のTTI長さを使用できる任意のシステムに適用可能である。

【００２７】

図1は、本発明の一実施形態による、チャネルリソースを割り振る方法の概略フローチャートである。図1に示す方法10は、主にネットワーク側で、例えば基地局(Node Bなど)によって実行される。

【００２８】

方法10のステップ101で、セルブロードキャストメッセージが端末デバイス(UEなど)に送信される。セルブロードキャストメッセージは、コモンエンハンスト専用チャネルCommon-EDCHリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成は、第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成は、第1のTTIとは異なる第2のTTIに特有である。

【００２９】

102.端末デバイスから送信された指示情報を受信する。指示情報は、端末デバイスが使用TTIとして第1のTTIまたは第2のTTIを選択することを示す。

【００３０】

103.指示情報に従って、コモンエンハンスト専用チャネルリソースを端末デバイスに割り振る。

【００３１】

本発明の実施形態では、セルに対して複数のTTIが構成され、複数のTTIのパラメータ構成情報が端末デバイスにブロードキャストされる。したがって、端末デバイスは、複数の

TTIから適切なTTIを選択することができ、ネットワーク側は、選択されたTTIに従ってチャネルリソースを割り振ることができ、それにより、システムリソースの割振りおよび利用の効率を高める。

【００３２】

対応する動作が端末側で実行される。図2は、本発明の一実施形態による、チャネルリソースを割り振る方法の概略フローチャートである。図2に示す方法20は、端末デバイス(UEなど)によって実行され、以下を含む。

【００３３】

201.セルブロードキャストメッセージをネットワーク側から受信する。セルブロードキャストメッセージは、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成は、第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成は、第1のTTIとは異なる第2のTTIに特有である。

【００３４】

202.使用TTIとして第1のTTIまたは第2のTTIを選択し、選択したTTIの指示情報を生成する。

【００３５】

203.ネットワーク側が指示情報に従ってコモンエンハンスト専用チャネルリソースを割り振るよう、指示情報をネットワーク側に送信する。

【００３６】

本発明の実施形態では、セルに対して複数のTTIが構成され、複数のTTIのパラメータ構成情報が端末デバイスにブロードキャストされる。したがって、端末デバイスは、複数のTTIから適切なTTIを選択することができ、ネットワーク側は、選択されたTTIに従ってチャネルリソースを割り振ることができ、それにより、システムリソースの割振りおよび利用の効率を高める。

【００３７】

本発明の一実施形態における、通信システム中でのチャネルリソース割振りのプロセスについて、以下に詳細に述べる。図3Aは、本発明の一実施形態による、チャネルリソース割振りのプロセスの概略フローチャートである。

【００３８】

図3Aに示すステップS301で、Node Bがセルブロードキャストメッセージを UEに送信する。セルブロードキャストメッセージは、Common-EDCHリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成は、第1のTTI(2ミリ秒または10ミリ秒など)に特有であり、第2のパラメータ構成は、第1のTTIとは異なる第2のTTI(10ミリ秒または2ミリ秒など)に特有である。言い換えれば、本発明の実施形態におけるブロードキャストメッセージは、既存のTTIに加えて、別のTTI長さに特有の追加パラメータ構成も含むことができる。

【００３９】

ステップ302で、UEは、ブロードキャストメッセージを受信した後、セルによってサポートされ得る2つのTTIの情報を得る。したがって、UEは、それ自体の要件に従って、使用TTIとして第1のTTIまたは第2のTTIを選択する。

【００４０】

ステップ303で、UEは、選択したTTIの指示情報を生成し、ステップ304で、指示情報をNode Bに送信する。指示情報は、専用の指示メッセージを介して送信されるか、または他のメッセージによって搬送されてよい。例えば、UEは、ランダムアクセス段階で、異なるシグネチャ(signature)を選択することによって、選択したTTI長さをNode Bに通知するか、または、UEは、ランダムアクセス段階で、異なるプリアンブルスクランブル符号(preamble scramble code)を選択することによって、選択したTTI長さをNode Bに通知する。

【００４１】

ステップ305で、Node Bは、UEによって選択されたTTIの指示情報を受信した後、Common

-EDCHリソースを割り振るようトリガされる。2ミリ秒のTTIおよび10ミリ秒のTTIが32セットのcommon E-DCHリソースを共有するシナリオでは、Node Bは、既存のプロトコル中で定義されるのと同様のリソース割振り方式に従って、common E-DCHリソースを割り振ることができる。

【００４２】

ステップ306で、Node Bは、割り振ったCommon-EDCHリソースをUEに通知する。

【００４３】

ステップ307で、UEは、Node Bの通知を受信した後、選択したTTIに従って、対応するパラメータ構成(第1のパラメータ構成または第2のパラメータ構成)を選択する。

【００４４】

ステップ308で、UEは、選択したパラメータ構成を使用してアップリンクデータを送信する。

【００４５】

本発明の実施形態では、セルに対して複数のTTIが構成され、複数のTTIのパラメータ構成情報が端末デバイスにブロードキャストされる。したがって、端末デバイスは、複数のTTIから適切なTTIを選択することができ、ネットワーク側は、選択されたTTIに従ってチャネルリソースを割り振ることができ、それにより、システムリソースの割振りおよび利用の効率を高める。

【００４６】

図3Aに示す例では、2ミリ秒のTTIおよび10ミリ秒のTTIが32セットのcommon E-DCHリソースを共有するシナリオで、Node Bは、common E-DCHリソースを割り振るとき、UEによって選択されたTTI長さを考慮しないものとすることができる。本発明の一実施形態では、common E-DCHリソースを割り振るとき、UEによって選択されたTTIを考慮することができる。

【００４７】

図3Bは、本発明によるチャネルリソース割振りのプロセスの概略フローチャートである。図3Bでは、図3Aのプロセスと同じかまたは同様のプロセスは、同じかまたは同様のマークで識別し、それらの詳細は適宜省略する。

【００４８】

ステップ301'は、図3Aのステップ301と同様であり、Node Bがセルブロードキャストメッセージを UEに送信する。違いは、ステップ301'で送信されるセルブロードキャストメッセージは、2つのTTI(2ミリ秒のTTI長さおよび10ミリ秒のTTI長さなど)のパラメータ構成の記述情報だけでなく、2ミリ秒のTTIおよび10ミリ秒のTTIによってそれぞれ使用されるcommon E-DCHリソースのインデックスも含むことである。すなわち、既存の32セットのcommon E-DCHリソースが、2ミリ秒のTTIおよび10ミリ秒のTTIの2つのリスト(リソースサブセット)にグループ化される。

【００４９】

ステップ302～304は、図3Aのステップ302～304と同じである。ステップ302で、UEは、ブロードキャストメッセージを受信した後、セルによってサポートされ得る2つのTTIの情報を得る。UEは、それ自体の必要性に従って、使用TTIとして第1のTTIまたは第2のTTIを選択する。

【００５０】

ステップ303で、UEは、選択したTTIの指示情報を生成し、ステップ304で、指示情報をNode Bに送信する。指示情報は、専用の指示メッセージを介して送信されるか、または他のメッセージによって搬送されてよい。例えば、UEは、ランダムアクセス段階で、異なるシグネチャ(signature)を選択することによって、選択したTTI長さをNode Bに通知するか、または、UEは、ランダムアクセス段階で、異なるプリアンブルスクランブル符号(preamble scramble code)を選択することによって、選択したTTI長さをNode Bに通知する。

【００５１】

ステップ305'で、Node Bは、UEによって選択されたTTIの指示情報を受信した後、Commo

n-EDCHリソースを割り振るようトリガされる。このケースでは、Node Bは、リソースを割り振るとき、UEによって選択されたTTIを考慮する。

【００５２】

例えば、32セットのcommon E-DCHリソースのインデックスが0～31であり、ブロードキャストメッセージ中では、0～15が2ミリ秒のTTIに割り振られ、16～31が10ミリ秒のTTIに割り振られる。この場合、2ミリ秒のTTI長さが選択されることをUEの指示メッセージが示すならば、Node Bは、0～15のインデックスを有するリソースサブセットから、UEに割り振られることになるcommon E-DCHリソースを選択する。10ミリ秒のTTI長さが選択されることをUEの指示メッセージが示すならば、Node Bは、16～31のインデックスを有するリソースサブセットから、UEに割り振られることになるcommon E-DCHリソースを選択する。

【００５３】

ステップ306～308は、図3Aのステップ306～308と同じである。ステップ306で、Node Bは、割り振ったCommon-EDCHリソースをUEに通知する。

【００５４】

ステップ307で、UEは、Node Bの通知を受信した後、選択したTTIに従って、対応するパラメータ構成(第1のパラメータ構成または第2のパラメータ構成)を選択する。

【００５５】

ステップ308で、UEは、選択したパラメータ構成を使用してアップリンクデータを送信する。

【００５６】

本発明の実施形態では、セルに対して複数のTTIが構成され、複数のTTIのパラメータ構成情報が端末デバイスにブロードキャストされる。したがって、端末デバイスは、複数のTTIから適切なTTIを選択することができ、ネットワーク側は、選択されたTTIに従ってチャネルリソースを割り振ることができ、それにより、システムリソースの割振りおよび利用の効率を高める。

【００５７】

選択したTTIをUEがNode Bに通知したとき、選択は拒否される場合がある(ステップ305または305')。例えば、割振りに利用可能なリソースの数(対応するリソースサブセットのサイズ)は2つのTTI長さについて同じであることがあるが、2ミリ秒のTTI長さを使用するUEの数が、10ミリ秒のTTI長さを使用するUEの数よりも多いので、2ミリ秒のTTI長さに対応するリソースサブセット中のリソースが全て占有されていることがあり、その結果、2ミリ秒のTTIを選択するUEが拒否される。この場合、本発明の実施形態では、UEに対する拒否の回数を記録することができ、リソースサブセットのサイズを動的に調整することができる。

【００５８】

図4は、本発明の一実施形態による、リソースサブセットの動的調整のプロセスの概略フローチャートである。

【００５９】

図4に示すように、ステップ401で、Node Bは、UEに対する拒否の回数を記録する。例えば、Node Bは、2ミリ秒のTTIを選択したUEに対する拒否の回数と、10ミリ秒のTTIを選択したUEに対する拒否の回数とを記録する。

【００６０】

ステップ402で、Node Bは、記録した回数をRNC(無線ネットワークコントローラ、Radio Network Controller)に報告する。例えば、Node Bは、Iubインタフェースを介して回数をRNCに報告する。本発明の一実施形態によれば、Node Bは、E-DCH RACH Reportの下で、Denied E-DCH RACH Resourcesメッセージを介して、回数をRNCに報告することができる。

【００６１】

ステップ403で、RNCは、Node Bによって報告された拒否回数に従って、2ミリ秒のTTIと10ミリ秒のTTIのリソースサブセット(リスト)中のリソースの数を調整する。例えば、以前は、0～15が2ミリ秒のTTIに割り振られ、16～31が10ミリ秒のTTIに割り振られているも

のとする。Node Bが2ミリ秒のTTIと10ミリ秒のTTIのDenied E-DCH RACH Resourcesの数を報告した後、2ミリ秒のTTIの拒否回数の方が多い場合は、RNCは、2ミリ秒のTTIに対応するcommon E-DCHリソースを増加させることができる。例えば、0～20のインデックスの付いたリソースを2ミリ秒のTTIに割り振り、21～31のインデックスの付いたリソースを10ミリ秒のTTIに割り振ることができる。これにより、リソースサブセット中のcommon E-DCHリソースが動的に調整される。

【００６２】

ステップ404で、RNCは、調整結果をNode Bに通知する。RNCは、専用メッセージまたは他の適切なメッセージを介して、調整結果をNode Bに通知することができる。

【００６３】

ステップ405で、Node Bは、ブロードキャストメッセージを介して、新しいリソースサブセット(リスト)情報をUEに通知する。これにより、UEは、ブロードキャストメッセージを読むことによって、調整済みリソースサブセット情報を得る。

【００６４】

よって、本発明の実施形態では、2つのTTI長さに対応するリソースの割振り方式を、ネットワークの稼働ステータスに従って動的に調整することができる。これによりリソースの利用効率がさらに高まる。

【００６５】

図5は、本発明の一実施形態による基地局デバイスの概略ブロック図である。図5に示すように、本発明の実施形態による基地局デバイス50は、ブロードキャスティングユニット51、受信ユニット52、および割振りユニット53を備える。

【００６６】

ブロードキャスティングユニット51は、セルブロードキャストメッセージを端末デバイスに送信するように構成され、セルブロードキャストメッセージは、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成は、第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成は、第1のTTIとは異なる第2のTTIに特有である。

【００６７】

受信ユニット52は、端末デバイスから送信された指示情報を受信するように構成され、指示情報は、端末デバイスが使用TTIとして第1のTTIまたは第2のTTIを選択することを示す。

【００６８】

割振りユニット53は、指示情報に従ってコモンエンハンスト専用チャネルリソースを端末デバイスに割り振るように構成される。

【００６９】

本発明の実施形態では、セルに対して複数のTTIが構成され、複数のTTIのパラメータ構成情報が端末デバイスにブロードキャストされる。したがって、端末デバイスは、複数のTTIから適切なTTIを選択することができ、ネットワーク側は、選択されたTTIに従ってチャネルリソースを割り振ることができ、それにより、システムリソースの割振りおよび利用の効率を高める。

【００７０】

図6は、本発明の一実施形態による基地局デバイスの概略ブロック図である。図6では、図5の部分と同じかまたは同様の部分は、同じかまたは同様のマークで識別し、それらの詳細は適宜省略する。

【００７１】

図6の基地局デバイス60は、ブロードキャスティングユニット51'、受信ユニット52、および割振りユニット53'を備える。ブロードキャスティングユニット51'から送信されるセルブロードキャストメッセージは、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、コモンエンハンスト専用チャネルリソースは、第1のTTIに特有の第1のリソースサブセットと、

第2のTTIに特有の第2のリソースサブセットとにグループ化される。

【００７２】

加えて、割振りユニット53'は、受信ユニット52によって受信された指示情報が、選択されたTTIが第1のTTIであることを示すときには、第1のリソースサブセット中のコモンエンハンスト専用チャネルリソースを端末デバイスに割り振り、受信ユニット52によって受信された指示情報が、選択されたTTIが第2のTTIであることを示すときには、第2のリソースサブセット中のコモンエンハンスト専用チャネルリソースを端末デバイスに割り振る。

【００７３】

図6に示すように、基地局デバイス60はさらに、通知ユニット61、および/または記録ユニット62を備える。

【００７４】

通知ユニット61は、割り振られたコモンエンハンスト専用チャネルリソースを端末デバイスに通知し、それにより端末デバイスは、選択したTTIに従って第1のパラメータ構成または第2のパラメータ構成を選択する。

【００７５】

記録ユニット62は、端末デバイスに対する拒否回数を記録して、記録した回数を無線ネットワークコントローラに送信するように構成され、それにより無線ネットワークコントローラは、回数に従って、第1のリソースサブセットおよび第2のリソースサブセット中のコモンエンハンスト専用チャネルリソースを調整する。

【００７６】

図5および図6の基地局デバイスは、コモンエンハンスト専用チャネルリソースを割り振るための前述の方法におけるNode Bに関係する全てのステップを実行することができ、ここでは、繰返しを避けるため、詳細を再度述べることはしない。

【００７７】

図7は、本発明の一実施形態による端末デバイスの概略ブロック図である。図7の端末デバイス70は、受信ユニット71、選択ユニット72、および送信ユニット73を備える。

【００７８】

受信ユニット71は、セルブロードキャストメッセージをネットワーク側から受信するように構成され、セルブロードキャストメッセージは、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成は、第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成は、第1のTTIとは異なる第2のTTIに特有である。

【００７９】

選択ユニット72は、使用TTIとして第1のTTIまたは第2のTTIを選択し、選択したTTIの指示情報を生成するように構成される。

【００８０】

送信ユニット73は、ネットワーク側が指示情報に従ってコモンエンハンスト専用チャネルリソースを割り振るよう、指示情報をネットワーク側に送信するように構成される。

【００８１】

本発明の実施形態では、セルに対して複数のTTIが構成され、複数のTTIのパラメータ構成情報が端末デバイスにブロードキャストされる。したがって、端末デバイスは、複数のTTIから適切なTTIを選択することができ、ネットワーク側は、選択されたTTIに従ってチャネルリソースを割り振ることができ、それにより、システムリソースの割振りおよび利用の効率を高める。

【００８２】

図7の端末デバイス70は、コモンエンハンスト専用チャネルリソースを割り振るための前述の方法におけるUEに関係する全てのステップを実行することができ、ここでは、繰返しを避けるため、詳細を再度述べることはしない。

【００８３】

例えば、受信ユニット71はさらに、割り振られたコモンエンハンスト専用チャネルリソ

ースの通知を受信するように構成される。選択ユニット72はさらに、選択したTTIに従って第1のパラメータ構成または第2のパラメータ構成を選択するように構成される。

【００８４】

本発明の別の実施形態によれば、受信ユニット71はセルブロードキャストメッセージを受信するが、セルブロードキャストメッセージ中では、コモンエンハンスト専用チャネルリソースが、第1のTTIに特有の第1のリソースサブセットと、第2のTTIに特有の第2のリソースサブセットとにグループ化される。

【００８５】

以上では、UEがTTIを選択する実施形態について述べているが、本発明はこれに限定されない。TTIの選択は、ネットワーク側によって決定されてもよい。

【００８６】

図8は、本発明の一実施形態による、チャネルリソースを割り振る方法の概略フローチャートである。図8に示す方法80は、主にネットワーク側で、例えば基地局(Node Bなど)によって実行される。

【００８７】

図8に示すように、方法80のステップ801は、方法10のステップ101と同様である。セルブロードキャストメッセージが、端末デバイスに送信される。セルブロードキャストメッセージは、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成は、第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成は、第1のTTIとは異なる第2のTTIに特有である。

【００８８】

ステップ802で、Node Bは、使用TTIとして第1のTTIまたは第2のTTIを選択する。セル中の情報に従って、Node Bは、UEによって使用されることになるTTIを選択することができる。例えば、Node Bは、UEのアップリンクアクセスのプリアンブル(preamble)電力に従って、選択するTTI長さを決定することができる。

【００８９】

ステップ803で、Node Bは、選択したTTIを端末デバイスに通知し、ステップ804で、Node Bは、選択したTTIに従ってコモンエンハンスト専用チャネルリソースを端末に割り振る。

【００９０】

本発明の実施形態では、セルに対して複数のTTIが構成され、ネットワーク側は、複数のTTIのパラメータ構成情報を端末デバイスにブロードキャストし、次いで、複数のTTIから適切なTTIを選択して、選択したTTIに従ってチャネルリソースを割り振り、それにより、システムリソースの割振りおよび利用の効率を高める。

【００９１】

対応する動作が端末側で実行される。図9は、本発明の一実施形態による、チャネルリソースを割り振る方法を示す。図9に示す方法90は、端末デバイス(UEなど)によって実行される。

【００９２】

901.セルブロードキャストメッセージをネットワーク側から受信する。セルブロードキャストメッセージは、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成は、第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成は、第1のTTIとは異なる第2のTTIに特有である。

【００９３】

902.指示情報をネットワーク側から受信する。指示情報は、ネットワーク側デバイスが使用TTIとして第1のTTIまたは第2のTTIを選択することを示す。

【００９４】

903.選択されたTTIに従ってネットワーク側によって割り振られたコモンエンハンスト

専用チャネルリソースを受信する。

【００９５】

よって、本発明の実施形態では、セルに対して複数のTTIが構成され、ネットワーク側は、複数のTTIのパラメータ構成情報を端末デバイスにブロードキャストし、次いで、複数のTTIから適切なTTIを選択して、選択したTTIに従ってチャネルリソースを割り振り、それにより、システムリソースの割振りおよび利用の効率を高める。

【００９６】

図10は、本発明の一実施形態による基地局デバイスの概略ブロック図である。図10に示す基地局デバイス100は、

セルブロードキャストメッセージを端末デバイスに送信するように構成されたブロードキャスティングユニット1010であって、セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成が、第1のTTIとは異なる第2のTTIに特有であるブロードキャスティングユニット1010と、

使用TTIとして第1のTTIまたは第2のTTIを選択するように構成された選択ユニット1020と、

選択されたTTIを端末デバイスに通知するように構成された通知ユニット1030と、

選択されたTTIに従ってコモンエンハンスト専用チャネルリソースを端末デバイスに割り振るように構成された割振りユニット1040とを備える。

【００９７】

よって、本発明の実施形態では、セルに対して複数のTTIが構成され、ネットワーク側は、複数のTTIのパラメータ構成情報を端末デバイスにブロードキャストし、次いで、複数のTTIから適切なTTIを選択して、選択したTTIに従ってチャネルリソースを割り振り、それにより、システムリソースの割振りおよび利用の効率を高める。

【００９８】

図11は、本発明の一実施形態による端末デバイスの概略ブロック図である。図11に示す端末デバイス110は、受信ユニット115を備える。受信ユニット115は、セルブロードキャストメッセージをネットワーク側から受信するように構成され、セルブロードキャストメッセージは、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成は、第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成は、第1のTTIとは異なる第2のTTIに特有である。

【００９９】

受信ユニット115はさらに、指示情報をネットワーク側から受信するように構成され、指示情報は、ネットワーク側デバイスが使用TTIとして第1のTTIまたは第2のTTIを選択することを示す。

【０１００】

受信ユニット115はさらに、選択されたTTIに従ってネットワーク側によって割り振られたコモンエンハンスト専用チャネルリソースを受信するように構成される。

【０１０１】

よって、本発明の実施形態では、セルに対して複数のTTIが構成され、ネットワーク側は、複数のTTIのパラメータ構成情報を端末デバイスにブロードキャストし、次いで、複数のTTIから適切なTTIを選択して、選択したTTIに従ってチャネルリソースを割り振り、それにより、システムリソースの割振りおよび利用の効率を高める。

【０１０２】

図12は、本発明の一実施形態による通信システムの概略ブロック図である。図12に示す通信システム120は、基地局デバイス121および端末デバイス122を備える。

【０１０３】

基地局デバイス121は、前述の基地局デバイス50、60、または100とすることができる。

端末デバイス122は、前述の端末デバイス70または110とすることができる。したがって、これらについての詳細な記述は省略する。

【０１０４】

図13は、本発明の別の実施形態による通信システムの概略ブロック図である。図13に示す通信システム130中では、図12中の部分と同じかまたは同様の部分は、同じかまたは同様のマークで識別する。

【０１０５】

図13に示すように、基地局デバイス121および端末デバイス122に加えて、通信システム130はさらに、無線ネットワークコントローラ(RNC)131も備える。異なるTTIに対して異なるリソースサブセット(第1のリソースサブセットおよび第2のリソースサブセットなど)が採用されるシナリオでは、無線ネットワークコントローラ131は、基地局デバイス121によって記録された、端末デバイス122に対する拒否回数を受信し、この回数に従って、第1のリソースサブセットおよび第2のリソースサブセット中のコモンエンハンスト専用チャネルリソースを調整するように構成される。

【０１０６】

本明細書に開示する実施形態で述べた例と組み合わせて、ユニットおよびアルゴリズムステップを、電子ハードウェア、コンピュータソフトウェア、またはこれらの組合せによって実現できることを、当業者なら認識するであろう。ハードウェアとソフトウェアとの間の交換可能性を明確に記述するために、上記では、各実施形態の構成およびステップを、機能に従って一般に述べた。機能がハードウェアによって実施されるかソフトウェアによって実施されるかは、技術的解決法の特定の適用例および設計制約条件に依存する。当業者なら、特定の適用例ごとに異なる方法を使用して、述べた機能を実施することができるが、こうした実施が本発明の範囲を超えると考えるべきではない。

【０１０７】

簡便な記述のために、前述のシステム、装置、およびユニットの詳細な動作プロセスについては、前述の方法実施形態における対応するプロセスを参照することができ、ここでは詳細を再度述べないことは、当業者には明確に理解されるであろう。

【０１０８】

本出願において提供されるいくつかの実施形態では、開示するシステム、装置、および方法を他の方式で実現してもよいことを理解されたい。例えば、述べた装置実施形態は例に過ぎない。例えば、ユニット分割は単に論理的な機能分割であり、実際の実装形態では他の分割であってもよい。例えば、複数のユニットもしくはコンポーネントを別のシステムに結合もしくは統合してもよく、または、いくつかの特徴を省略するかもしくは実行しなくてもよい。加えて、表示または考察した、相互結合、または直接的な結合もしくは通信接続は、いくつかのインタフェースを介して実現されてもよい。装置またはユニット間の間接的な結合または通信接続は、電気的、機械的、または他の形で実現されてよい。

【０１０９】

別々の部分として述べたユニットは、物理的に分離していてもそうでなくてもよく、ユニットとして表示した部分は、物理的なユニットであってもそうでなくてもよい。すなわち、これらのユニットは、1か所に位置してもよく、または複数のネットワーク要素上に分散してもよい。一部または全部のユニットを実際の必要性に従って選択して、実施形態の解決法の目的を達成することができる。

【０１１０】

加えて、本発明の実施形態における機能ユニットは、1つの処理ユニットに統合されてもよく、または各ユニットが物理的に単独で存在してもよく、または2つ以上のユニットが1つのユニットに統合されてもよい。統合されたユニットは、ハードウェアの形で実現されてもよく、またはソフトウェア機能ユニットの形で実現されてもよい。

【０１１１】

統合されたユニットがソフトウェア機能ユニットの形で実現されて、独立した製品として販売または使用されるとき、統合されたユニットはコンピュータ可読記憶媒体に記憶さ

れてよい。このような理解に基づき、本発明の技術的解決法は本質的に、または従来技術に寄与する部分は、または技術的解決法の全部もしくは一部は、ソフトウェア製品の形で実現することができる。コンピュータソフトウェア製品は記憶媒体に記憶され、コンピュータソフトウェア製品はまた、本発明の実施形態で述べた方法のステップの全部または一部を実施するようコンピュータデバイス(パーソナルコンピュータ、サーバ、またはネットワークデバイスなどとすることができる)に命令するためのいくつかの命令を含む。前述の記憶媒体は、USBフラッシュディスク、取外し可能ハードディスク、読取専用メモリ(ROM、Read-Only Memory)、ランダムアクセスメモリ(RAM、Random Access Memory)、磁気ディスク、または光ディスクなど、プログラムコードを記憶できる任意の媒体を含む。

【０１１２】

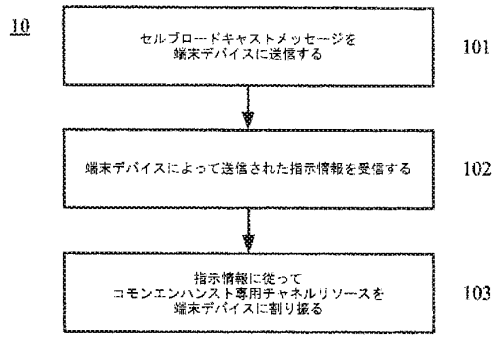
以上の記述は、本発明の特定の実施形態に過ぎず、本発明の保護範囲を限定するものとはしない。本発明において開示される技術範囲内で当業者によってすぐに見出されるどんな変形または置換も、本発明の保護範囲内に入るものとする。したがって、本発明の保護範囲は、特許請求の範囲の保護範囲に従うものとする。

【符号の説明】

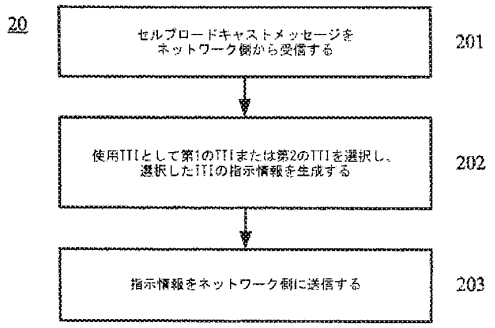
【０１１３】

50 基地局デバイス
51 ブロードキャスティングユニット
52 受信ユニット
53 割振りユニット
60 基地局デバイス
51' ブロードキャスティングユニット
53' 割振りユニット
61 通知ユニット
62 記録ユニット
70 端末デバイス
71 受信ユニット
72 選択ユニット
73 送信ユニット
100 基地局デバイス
1010 ブロードキャスティングユニット
1020 選択ユニット
1030 通知ユニット
1040 割振りユニット
110 端末デバイス
115 受信ユニット
120 通信システム
121 基地局デバイス
122 端末デバイス
130 通信システム
131 無線ネットワークコントローラ

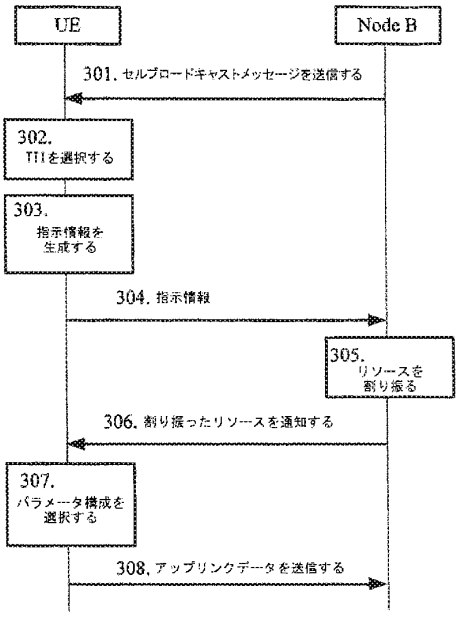
【図１】


10
セルブロードキャストメッセージを
端末デバイスに送信する
101
端末デバイスによって送信された指示情報を受信する
102
指示情報に従って
コモンエンハンスト専用チャネルリソースを
端末デバイスに割り振る
103

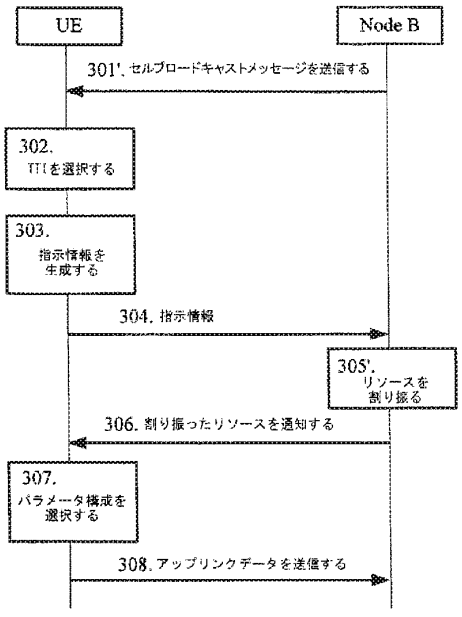
【図２】


20
セルブロードキャストメッセージを
ネットワーク側から受信する
201
使用TTIとして第1のTTIまたは第2のTTIを選択し、
選択したTTIの指示情報を生成する
202
指示情報をネットワーク側に送信する
203

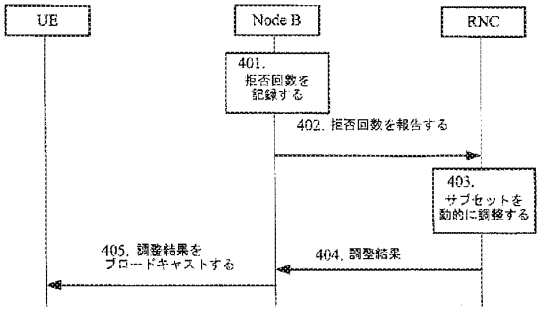
【図３Ａ】


UE
Node B
301. セルブロードキャストメッセージを送信する
302.
TTIを選択する
303.
指示情報を
生成する
304. 指示情報
305.
リソースを
割り振る
306. 割り振ったリソースを通知する
307.
パラメータ構成を
選択する
308. アップリンクデータを送信する

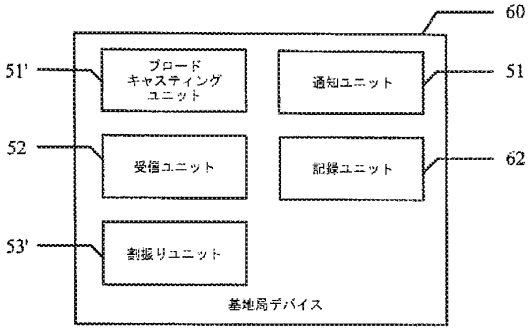
【図３Ｂ】


UE
Node B
301'. セルブロードキャストメッセージを送信する
302.
TTIを選択する
303.
指示情報を
生成する
304. 指示情報
305'.
リソースを
割り振る
306. 割り振ったリソースを通知する
307.
パラメータ構成を
選択する
308. アップリンクデータを送信する

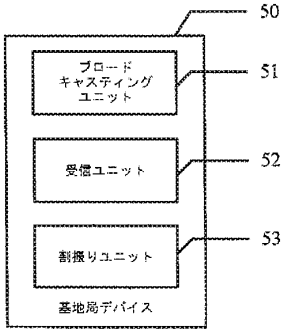
【図４】


UE
Node B
RNC
401. 拒否回数を記録する
402. 拒否回数を報告する
403. サブセットを動的に調整する
404. 調整結果
405. 調整結果をブロードキャストする

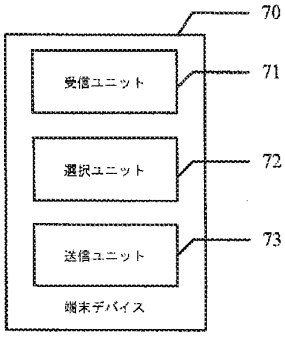
【図６】


60
51'
ブロードキャスティングユニット
通知ユニット
51
52
受信ユニット
記録ユニット
62
53'
割振りユニット
基地局デバイス

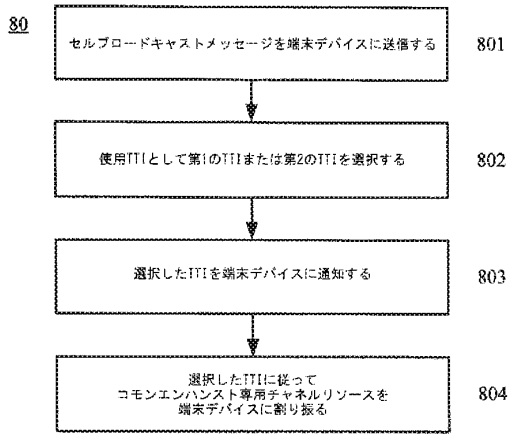
【図５】


50
ブロードキャスティングユニット
51
受信ユニット
52
割振りユニット
53
基地局デバイス

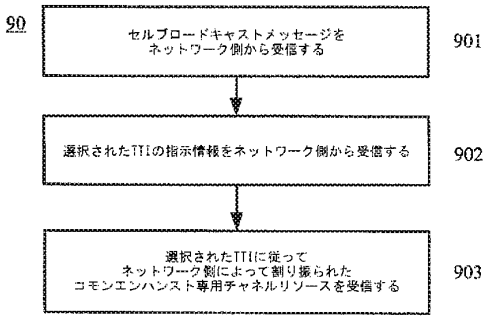
【図７】


70
受信ユニット
71
選択ユニット
72
送信ユニット
73
端末デバイス

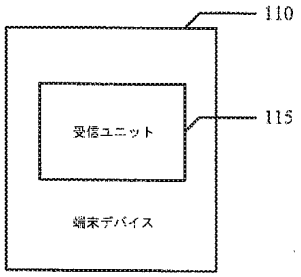
【図８】


80
セルブロードキャストメッセージを端末デバイスに送信する
801
使用TTIとして第1のTTIまたは第2のTTIを選択する
802
選択したTTIを端末デバイスに通知する
803
選択したTTIに従ってコモンエンハンスト専用チャネルリソースを端末デバイスに割り振る
804

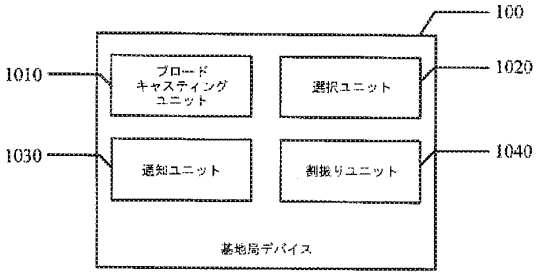
【図９】



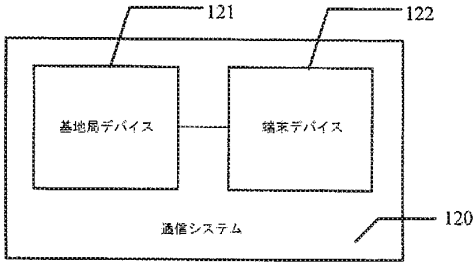
【図１１】



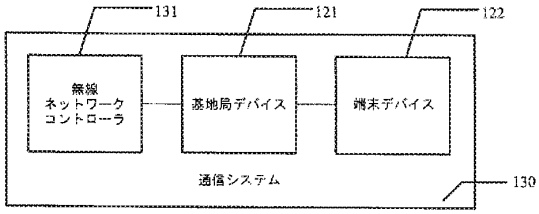
【図１０】



【図１２】



【図１３】



【手続補正書】
【提出日】平成25年11月8日(2013.11.8)
【手続補正１】
【補正対象書類名】明細書
【補正対象項目名】全文
【補正方法】変更
【補正の内容】
【発明の詳細な説明】
【技術分野】
【０００１】
本出願は、参照によりその全体が本明細書に組み込まれる、2011年4月2日に中国特許庁に出願された「METHOD FOR ALLOCATING CHANNEL RESOURCE, BASE STATION DEVICE, TERMINAL DEVICE, AND COMMUNICATION SYSTEM」という名称の中国特許出願第201110083708.4号に対する優先権を主張するものである。
【０００２】
本発明の実施形態は、ワイヤレス通信の分野に関し、特に、チャネルリソースを割り振る方法、基地局デバイス、端末デバイス、および通信システムに関する。
【背景技術】
【０００３】
3GPP(The 3rd Generation Partnership Project、第3世代パートナーシッププロジェクト)UMTS(Universal Mobile Telecommunications System、ユニバーサルモバイルテレコミュニケーションズシステム)R8バージョンでは、遊休(idle)モードまたはCELL_FACH(CELL Forward Access Channel、セルフォワードアクセスチャネル)状態のUE(User Equipment、ユーザ機器)に関して、アップリンク送信遅延を低減しアップリンク送信レートを上げるために、エンハンストRACH(Random Access Channel、ランダムアクセスチャネル)と呼ばれる新しい機能が採用される。エンハンストRACHは、R99バージョンにおけるランダムアクセスを向上させる。エンハンストランダムアクセスは、RACHの代わりとするためのE-DCH(Enhanced Dedicated Channel、エンハンスト専用チャネル)を採用して、アップリンク送信を実施する。エンハンストCELL_FACHプロシージャは、概して、プリアンブルアクセスおよびリソース割振り段階と、衝突解決段階と、E-DCHデータ送信段階と、リソース解放段階とを含む。
【０００４】
リソース割振り段階で割り振られるリソースは、Common E-DCH(Common Enhanced Dedicated Channel、コモンエンハンスト専用チャネル)リソースを指し、これは、セルのシステム情報中でブロードキャストされる。UEは、セルによってブロードキャストされたシステム情報を読むことによって、Common-EDCHリソース情報を得ることができる。既存のプロトコルによれば、全部で32セットのCommon-EDCHリソースがあり、これらには、F-DPCH(Fractional Dedicated Physical Channel、フラクショナル専用物理チャネル)、E-RGCH(E-DCH relative grant channel、E-DCH相対グラントチャネル)、E-HICH(E-DCH HARQ Acknowledgement Indicator Channel、E-DCHハイブリッド自動反復要求肯定応答インジケータチャネル)、およびアップリンクDPCH(Dedicated Physical Channel、専用物理チャネル)などの、符号情報が含まれる。NodeBは、リソース割振り段階で、AICH(Acquisition Indicator Channel、アクイジションインジケータチャネル)を介して、リソースインデックスの使用をUEに通知する。UEは、リソースインデックスを受信した後、対応するリソースセットを使用してアップリンクデータを送信する。
【０００５】
エンハンストRACH機能については、アップリンクTTI(Transmission Time Interval、送信時間間隔)を各セルにつき1つだけ構成することができ、UEは、1つのTTI長さだけを使用する。このTTI長さは、アップリンクデータ送信では、2ミリ秒または10ミリ秒であることがある。したがって、前述の32セットのリソースは全て、UEが1つのTTI長さを使用する場

合に向けて特に構成される。

【０００６】

しかし、この構成は十分にフレキシブルではない。セルのTTIが、UEによって必要とされるTTIと合致しない場合は、システムリソースの利用効率が低下することになる。

【発明の概要】

【発明が解決しようとする課題】

【０００７】

本発明の実施形態は、システムリソースの利用効率を高めることのできる、チャネルリソースを割り振る方法、基地局デバイス、端末デバイス、および通信システムを提供する。

【課題を解決するための手段】

【０００８】

一態様では、チャネルリソースを割り振る方法が提供される。この方法は、セルブロードキャストメッセージを端末デバイスに送信する段階であって、セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成が、第1のTTIとは異なる第2のTTIに特有である段階と、端末デバイスから送信された指示情報を受信する段階であって、指示情報が、端末デバイスが使用TTIとして第1のTTIまたは第2のTTIを選択することを示すものである段階と、指示情報に従ってコモンエンハンスト専用チャネルリソースを端末デバイスに割り振る段階とを含む。

【０００９】

別の態様では、チャネルリソースを割り振る方法が提供される。この方法は、セルブロードキャストメッセージをネットワークから受信する段階であって、セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成が、第1のTTIとは異なる第2のTTIに特有である段階と、使用TTIとして第1のTTIまたは第2のTTIを選択し、選択したTTIの指示情報を生成する段階と、ネットワークが指示情報に従ってコモンエンハンスト専用チャネルリソースを割り振るよう、指示情報をネットワークに送信する段階とを含む。

【００１０】

別の態様では、基地局デバイスが提供される。この基地局デバイスは、セルブロードキャストメッセージを端末デバイスに送信するように構成されたブロードキャスティングユニットであって、セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成が、第1のTTIとは異なる第2のTTIに特有であるブロードキャスティングユニットと、端末デバイスから送信された指示情報を受信するように構成された受信ユニットであって、指示情報が、端末デバイスが使用TTIとして第1のTTIまたは第2のTTIを選択することを示すものである受信ユニットと、指示情報に従ってコモンエンハンスト専用チャネルリソースを端末デバイスに割り振るように構成された割振りユニットとを備える。

【００１１】

別の態様では、端末デバイスが提供される。この端末デバイスは、セルブロードキャストメッセージをネットワークから受信するように構成された受信ユニットであって、セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成が、第1のTTIとは異なる第2のTTIに特有である受信ユニットと、使用TTIとして第1のTTIまたは第2のTTIを選択し、選択したTTIの指示情報を生成するように構成された選択ユニットと、ネットワークが指示情報に従ってコモンエンハンスト専用チャネルリソースを割り振るよう、

指示情報をネットワークに送信するように構成された送信ユニットとを備える。

【００１２】

別の態様では、チャネルリソースを割り振る方法が提供される。この方法は、セルブロードキャストメッセージを端末デバイスに送信する段階であって、セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成が、第1のTTIとは異なる第2のTTIに特有である段階と、使用TTIとして第1のTTIまたは第2のTTIを選択する段階と、選択されたTTIを端末デバイスに通知する段階と、選択されたTTIに従ってコモンエンハンスト専用チャネルリソースを端末デバイスに割り振る段階とを含む。

【００１３】

別の態様では、チャネルリソースを割り振る方法が提供される。この方法は、セルブロードキャストメッセージをネットワークから受信する段階であって、セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成が、第1のTTIとは異なる第2のTTIに特有である段階と、指示情報をネットワークから受信する段階であって、指示情報が、ネットワークが使用TTIとして第1のTTIまたは第2のTTIを選択することを示すものである段階と、選択されたTTIに従ってネットワークによって割り振られたコモンエンハンスト専用チャネルリソースを受信する段階とを含む。

【００１４】

別の態様では、基地局デバイスが提供される。この基地局デバイスは、セルブロードキャストメッセージを端末デバイスに送信するように構成されたブロードキャスティングユニットであって、セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成が、第1のTTIとは異なる第2のTTIに特有であるブロードキャスティングユニットと、使用TTIとして第1のTTIまたは第2のTTIを選択するように構成された選択ユニットと、選択されたTTIを端末デバイスに通知するように構成された通知ユニットと、選択されたTTIに従ってコモンエンハンスト専用チャネルリソースを端末デバイスに割り振るように構成された割振りユニットとを備える。

【００１５】

別の態様では、端末デバイスが提供される。この端末デバイスは、セルブロードキャストメッセージをネットワークから受信するように構成された受信ユニットを備え、セルブロードキャストメッセージは、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成は第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成は、第1のTTIとは異なる第2のTTIに特有であり、受信ユニットはさらに、指示情報をネットワークから受信するように構成され、指示情報は、ネットワークが使用TTIとして第1のTTIまたは第2のTTIを選択することを示し、受信ユニットはさらに、選択されたTTIに従ってネットワークによって割り振られたコモンエンハンスト専用チャネルリソースを受信するように構成される。

【００１６】

別の態様では、通信システムが提供される。この通信システムは、上記の基地局デバイスおよび上記の端末デバイスを備える。

【発明の効果】

【００１７】

本発明の実施形態では、セルに対して複数のTTIが構成され、複数のTTIのパラメータ構成情報が端末デバイスにブロードキャストされる。したがって、端末デバイスは、複数のTTIから適切なTTIを選択することができ、ネットワークは、選択されたTTIに従ってチャ

ネルリソースを割り振ることができ、それにより、システムリソースの割振りおよび利用の効率を高める。

【００１８】

本発明の実施形態における技術的解決法をより明確に例示するために、実施形態を記述するのに必要とされる添付図面を以下に簡単に紹介する。明らかに、以下の記述における添付図面は本発明のいくつかの実施形態のみを示し、当業者なら、これらの添付図面から創意工夫なしに他の図面を導出することもなお可能である。

【図面の簡単な説明】

【００１９】

【図１】本発明の一実施形態による、チャネルリソースを割り振る方法の概略フローチャートである。

【図２】本発明の一実施形態による、チャネルリソースを割り振る方法の概略フローチャートである。

【図３Ａ】本発明の一実施形態による、チャネルリソース割振りのプロセスの概略フローチャートである。

【図３Ｂ】本発明の一実施形態による、チャネルリソース割振りのプロセスの概略フローチャートである。

【図４】本発明の一実施形態による、リソースサブセットの動的調整のプロセスの概略フローチャートである。

【図５】本発明の一実施形態による基地局デバイスの概略ブロック図である。

【図６】本発明の一実施形態による基地局デバイスの概略ブロック図である。

【図７】本発明の一実施形態による端末デバイスの概略ブロック図である。

【図８】本発明の一実施形態による、チャネルリソースを割り振る方法の概略フローチャートである。

【図９】本発明の一実施形態による、チャネルリソースを割り振る方法を示す図である。

【図１０】本発明の一実施形態による基地局デバイスの概略ブロック図である。

【図１１】本発明の一実施形態による端末デバイスの概略ブロック図である。

【図１２】本発明の一実施形態による通信システムの概略ブロック図である。

【図１３】本発明の別の実施形態による通信システムの概略ブロック図である。

【発明を実施するための形態】

【００２０】

以下、本発明の実施形態における添付図面を参照しながら、本発明の実施形態における技術的解決法について明確に述べる。明らかに、述べる実施形態は、本発明の実施形態の全部ではなく一部でしかない。本発明の実施形態に基づいて当業者によって創意工夫なしに得られる他の全ての実施形態も、本発明の保護範囲に入るものとする。

【００２１】

本発明の技術的解決法は、GSM(Global System for Mobile Communications)、符号分割多元接続(CDMA、Code Division Multiple Access)、広帯域符号分割多元接続(WCDMA、Wideband Code Division Multiple Access)、汎用パケット無線サービス(GPRS、General Packet Radio Service)、ロングタームエボリューション(LTE、Long Term Evolution)など、様々な通信システムに適用することができる。

【００２２】

モバイル端末(Mobile Terminal)は、ユーザ機器(UE、User Equipment)またはモバイルユーザ機器などとも呼ばれるが、無線アクセスネットワーク(RAN、Radio Access Network)を介して1つまたは複数のコアネットワークと通信することができる。モバイル端末は、携帯電話機(あるいはセルラー電話機とも呼ばれる)とすることができ、または、ポータブル、ポケットサイズ、ハンドヘルド、コンピュータ組込み型、もしくは車載型のモバイル装置など、モバイル端末搭載コンピュータとすることができる。モバイル端末は、音声および/またはデータを無線アクセスネットワークと交換する。

【００２３】

基地局は、GSMもしくはCDMA中のトランシーバ基地局(BTS、Base Transceiver Station)、またはWCDMA中の基地局(NodeB)、またはLTE中の進化型NodeB(eNBもしくはe-NodeB、evolved NodeB)とすることができ、本発明によって限定されない。記述を容易にするために、以下の実施形態では、NodeBを記述のための例にとる。

【００２４】

UEまたはネットワークは、UEの要件に従って動的にTTIの長さを調整することはできない。UEは、ネットワークによって構成されたTTIのみを使用することができる。例えば、セルが2ミリ秒のTTIのみをサポートするが、UEはセルのエッジに位置する。この場合、10ミリ秒のTTI長さに切り替えれば、よりよいカバレッジおよび伝送信頼性を達成することができる。あるいは、セルが10ミリ秒のTTI長さのみをサポートするが、UEはセルの中心に位置する。この場合、より多くの電力が利用可能であり、2ミリ秒のTTIに切り替えれば、アップリンク送信レートが効果的に上がることになる。このケースでは、セルのTTIが、UEによって必要とされるTTIと合致せず、これによりシステムリソースの利用効率が低下する。

【００２５】

本発明の実施形態は、各セル中で2つのTTI長さを構成できることを考慮に入れる。すなわち、1つのセル中で、エンハンストRACHをサポートするUEは、2つのTTI長さのうちの一方を動的に選択して、アップリンクデータを送信することができる。

【００２６】

以下では、端末デバイスを表すのにUEを使用し、基地局デバイスを表すのにNodeBを使用するが、本発明の実施形態は、これらの用語によって表される特定のシステムに限定されない。本発明の実施形態は、1つのセル中で複数のTTI長さを使用できる任意のシステムに適用可能である。

【００２７】

図1は、本発明の一実施形態による、チャネルリソースを割り振る方法の概略フローチャートである。図1に示す方法10は、主にネットワーク側で、例えば基地局(NodeBなど)によって実行される。

【００２８】

方法10は以下を含む。101.セルブロードキャストメッセージを端末デバイス(UEなど)に送信する。セルブロードキャストメッセージは、コモンエンハンスト専用チャネルCommon-EDCHリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成は、第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成は、第1のTTIとは異なる第2のTTIに特有である。

【００２９】

102.端末デバイスから送信された指示情報を受信する。指示情報は、端末デバイスが使用TTIとして第1のTTIまたは第2のTTIを選択することを示す。

【００３０】

103.指示情報に従って、コモンエンハンスト専用チャネルリソースを端末デバイスに割り振る。

【００３１】

本発明の実施形態では、セルに対して複数のTTIが構成され、複数のTTIのパラメータ構成情報が端末デバイスにブロードキャストされる。したがって、端末デバイスは、複数のTTIから適切なTTIを選択することができ、ネットワークは、選択されたTTIに従ってチャネルリソースを割り振ることができ、それにより、システムリソースの割振りおよび利用の効率を高める。

【００３２】

対応する動作が端末で実行される。図2は、本発明の一実施形態による、チャネルリソースを割り振る方法の概略フローチャートである。図2に示す方法20は、端末デバイス(UEなど)によって実行され、以下を含む。

【００３３】

201.セルブロードキャストメッセージをネットワークから受信する。セルブロードキャストメッセージは、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成は、第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成は、第1のTTIとは異なる第2のTTIに特有である。

【００３４】

202.使用TTIとして第1のTTIまたは第2のTTIを選択し、選択したTTIの指示情報を生成する。

【００３５】

203.ネットワークが指示情報に従ってコモンエンハンスト専用チャネルリソースを割り振るよう、指示情報をネットワークに送信する。

【００３６】

本発明の実施形態では、セルに対して複数のTTIが構成され、複数のTTIのパラメータ構成情報が端末デバイスにブロードキャストされる。したがって、端末デバイスは、複数のTTIから適切なTTIを選択することができ、ネットワークは、選択されたTTIに従ってチャネルリソースを割り振ることができ、それにより、システムリソースの割振りおよび利用の効率を高める。

【００３７】

本発明の一実施形態における、通信システム中でのチャネルリソース割振りのプロセスについて、以下に詳細に述べる。図3Aは、本発明の一実施形態による、チャネルリソース割振りのプロセスの概略フローチャートである。

【００３８】

図3Aに示すステップS301で、NodeBがセルブロードキャストメッセージをUEに送信する。セルブロードキャストメッセージは、Common-EDCHリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成は、第1のTTI(2ミリ秒または10ミリ秒など)に特有であり、第2のパラメータ構成は、第1のTTIとは異なる第2のTTI(10ミリ秒または2ミリ秒など)に特有である。言い換えれば、本発明の実施形態におけるブロードキャストメッセージは、既存のTTIに加えて、別のTTI長さに特有の追加パラメータ構成も含むことができる。

【００３９】

ステップ302で、UEは、ブロードキャストメッセージを受信した後、セルによってサポートされ得る2つのTTIの情報を得る。したがって、UEは、それ自体の要件に従って、使用TTIとして第1のTTIまたは第2のTTIを選択する。

【００４０】

ステップ303で、UEは、選択したTTIの指示情報を生成し、ステップ304で、指示情報をNodeBに送信する。指示情報は、専用の指示メッセージを介して送信されるか、または他のメッセージによって搬送されてよい。例えば、UEは、ランダムアクセス段階で、異なるシグネチャ(signature)を選択することによって、選択したTTI長さをNodeBに通知するか、または、UEは、ランダムアクセス段階で、異なるプリアンブルスクランブリング符号(preamble scrambling code)を選択することによって、選択したTTI長さをNodeBに通知する。

【００４１】

ステップ305で、NodeBは、UEによって選択されたTTIの指示情報を受信した後、Common-EDCHリソースを割り振るようトリガされる。2ミリ秒のTTIおよび10ミリ秒のTTIが32セットのcommon E-DCHリソースを共有するシナリオでは、NodeBは、既存のプロトコル中で定義されるのと同様のリソース割振り方式に従って、common E-DCHリソースを割り振ることができる。

【００４２】

ステップ306で、NodeBは、割り振ったCommon-EDCHリソースをUEに通知する。

【００４３】

ステップ307で、UEは、NodeBの通知を受信した後、選択したTTIに従って、対応するパ

ラメータ構成(第1のパラメータ構成または第2のパラメータ構成)を選択する。

【００４４】

ステップ308で、UEは、選択したパラメータ構成を使用してアップリンクデータを送信する。

【００４５】

本発明の実施形態では、セルに対して複数のTTIが構成され、複数のTTIのパラメータ構成情報が端末デバイスにブロードキャストされる。したがって、端末デバイスは、複数のTTIから適切なTTIを選択することができ、ネットワークは、選択されたTTIに従ってチャネルリソースを割り振ることができ、それにより、システムリソースの割振りおよび利用の効率を高める。

【００４６】

図3Aに示す例では、2ミリ秒のTTIおよび10ミリ秒のTTIが32セットのcommon E-DCHリソースを共有するシナリオで、NodeBは、common E-DCHリソースを割り振るとき、UEによって選択されたTTI長さを考慮しないものとすることができる。本発明の一実施形態では、common E-DCHリソースを割り振るとき、UEによって選択されたTTIを考慮することができる。

【００４７】

図3Bは、本発明によるチャネルリソース割振りのプロセスの概略フローチャートである。図3Bでは、図3Aのプロセスと同じかまたは同様のプロセスは、同じかまたは同様のマークで識別し、それらの詳細は適宜省略する。

【００４８】

ステップ301'は、図3Aのステップ301と同様であり、NodeBがセルブロードキャストメッセージをUEに送信する。違いは、ステップ301'で送信されるセルブロードキャストメッセージは、2つのTTI(2ミリ秒のTTIおよび10ミリ秒のTTI長さなど)のパラメータ構成の記述情報だけでなく、2ミリ秒のTTIおよび10ミリ秒のTTIによってそれぞれ使用されるcommon E-DCHリソースのインデックスも含むことである。すなわち、既存の32セットのcommon E-DCHリソースが、2ミリ秒のTTIおよび10ミリ秒のTTIの2つのリスト(リソースサブセット)にグループ化される。

【００４９】

ステップ302～304は、図3Aのステップ302～304と同じである。ステップ302で、UEは、ブロードキャストメッセージを受信した後、セルによってサポートされ得る2つのTTIの情報を得る。UEは、それ自体の必要性に従って、使用TTIとして第1のTTIまたは第2のTTIを選択する。

【００５０】

ステップ303で、UEは、選択したTTIの指示情報を生成し、ステップ304で、指示情報をNodeBに送信する。指示情報は、専用の指示メッセージを介して送信されるか、または他のメッセージによって搬送されてよい。例えば、UEは、ランダムアクセス段階で、異なるシグネチャ(signature)を選択することによって、選択したTTI長さをNodeBに通知するか、または、UEは、ランダムアクセス段階で、異なるプリアンブルスクランブリング符号(preamble scramble code)を選択することによって、選択したTTI長さをNodeBに通知する。

【００５１】

ステップ305'で、NodeBは、UEによって選択されたTTIの指示情報を受信した後、Common-EDCHリソースを割り振るようトリガされる。このケースでは、NodeBは、リソースを割り振るとき、UEによって選択されたTTIを考慮する。

【００５２】

例えば、32セットのcommon E-DCHリソースのインデックスが0～31であり、ブロードキャストメッセージ中では、0～15が2ミリ秒のTTIに割り振られ、16～31が10ミリ秒のTTIに割り振られる。この場合、2ミリ秒のTTIが選択されることをUEの指示メッセージが示すならば、NodeBは、0～15のインデックスを有するリソースサブセットから、UEに割り振られることになるcommon E-DCHリソースを選択する。10ミリ秒のTTI長さが選択されることをU

Eの指示メッセージが示すならば、NodeBは、16～31のインデックスを有するリソースサブセットから、UEに割り振られることになるcommon E-DCHリソースを選択する。

【００５３】

ステップ306～308は、図3Aのステップ306～308と同じである。ステップ306で、NodeBは、割り振ったCommon-EDCHリソースをUEに通知する。

【００５４】

ステップ307で、UEは、NodeBの通知を受信した後、選択したTTIに従って、対応するパラメータ構成(第1のパラメータ構成または第2のパラメータ構成)を選択する。

【００５５】

ステップ308で、UEは、選択したパラメータ構成を使用してアップリンクデータを送信する。

【００５６】

本発明の実施形態では、セルに対して複数のTTIが構成され、複数のTTIのパラメータ構成情報が端末デバイスにブロードキャストされる。したがって、端末デバイスは、複数のTTIから適切なTTIを選択することができ、ネットワークは、選択されたTTIに従ってチャネルリソースを割り振ることができ、それにより、システムリソースの割振りおよび利用の効率を高める。

【００５７】

選択したTTIをUEがNodeBに通知したとき、選択は拒否される場合がある(ステップ305または305')。例えば、割振りに利用可能なリソースの数(対応するリソースサブセットのサイズ)は2つのTTI長さについて同じであることがあるが、2ミリ秒のTTIを使用するUEの数が、10ミリ秒のTTI長さを使用するUEの数よりも多いので、2ミリ秒のTTIに対応するリソースサブセット中のリソースが全て占有されていることがあり、その結果、2ミリ秒のTTIを選択するUEが拒否される。この場合、本発明の実施形態では、UEに対する拒否の回数を記録することができ、リソースサブセットのサイズを動的に調整することができる。

【００５８】

図4は、本発明の一実施形態による、リソースサブセットの動的調整のプロセスの概略フローチャートである。

【００５９】

図4に示すように、ステップ401で、NodeBは、UEに対する拒否の回数を記録する。例えば、NodeBは、2ミリ秒のTTIを選択したUEに対する拒否の回数と、10ミリ秒のTTIを選択したUEに対する拒否の回数とを記録する。

【００６０】

ステップ402で、NodeBは、記録した回数をRNC(無線ネットワークコントローラ、Radio Network Controller)に報告する。例えば、NodeBは、Iubインタフェースを介して回数をRNCに報告する。本発明の一実施形態によれば、NodeBは、E-DCH RACH Reportの下で、Denied E-DCH RACH Resourcesメッセージを介して、回数をRNCに報告することができる。

【００６１】

ステップ403で、RNCは、NodeBによって報告された拒否回数に従って、2ミリ秒のTTIと10ミリ秒のTTIのリソースサブセット(リスト)中のリソースの数を調整する。例えば、以前は、0～15が2ミリ秒のTTIに割り振られ、16～31が10ミリ秒のTTIに割り振られているものとする。NodeBが2ミリ秒のTTIと10ミリ秒のTTIのDenied E-DCH RACH Resourcesの数を報告した後、2ミリ秒のTTIの拒否回数の方が多い場合は、RNCは、2ミリ秒のTTIに対応するcommon E-DCHリソースを増加させることができる。例えば、0～20のインデックスの付いたリソースを2ミリ秒のTTIに割り振り、21～31のインデックスの付いたリソースを10ミリ秒のTTIに割り振ることができる。これにより、リソースサブセット中のcommon E-DCHリソースが動的に調整される。

【００６２】

ステップ404で、RNCは、調整結果をNodeBに通知する。RNCは、専用メッセージまたは他の適切なメッセージを介して、調整結果をNodeBに通知することができる。

【００６３】
ステップ405で、NodeBは、ブロードキャストメッセージを介して、新しいリソースサブセット(リスト)情報をUEに通知する。これにより、UEは、ブロードキャストメッセージを読むことによって、調整済みリソースサブセット情報を得る。
【００６４】
よって、本発明の実施形態では、2つのTTI長さに対応するリソースの割振り方式を、ネットワークの稼働ステータスに従って動的に調整することができる。これによりリソースの利用効率がさらに高まる。
【００６５】
図5は、本発明の一実施形態による基地局デバイスの概略ブロック図である。図5に示すように、本発明の実施形態による基地局デバイス50は、ブロードキャスティングユニット51、受信ユニット52、および割振りユニット53を備える。
【００６６】
ブロードキャスティングユニット51は、セルブロードキャストメッセージを端末デバイスに送信するように構成され、セルブロードキャストメッセージは、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成は、第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成は、第1のTTIとは異なる第2のTTIに特有である。
【００６７】
受信ユニット52は、端末デバイスから送信された指示情報を受信するように構成され、指示情報は、端末デバイスが使用TTIとして第1のTTIまたは第2のTTIを選択することを示す。
【００６８】
割振りユニット53は、指示情報に従ってコモンエンハンスト専用チャネルリソースを端末デバイスに割り振るように構成される。
【００６９】
本発明の実施形態では、セルに対して複数のTTIが構成され、複数のTTIのパラメータ構成情報が端末デバイスにブロードキャストされる。したがって、端末デバイスは、複数のTTIから適切なTTIを選択することができ、ネットワークは、選択されたTTIに従ってチャネルリソースを割り振ることができ、それにより、システムリソースの割振りおよび利用の効率を高める。
【００７０】
図6は、本発明の一実施形態による基地局デバイスの概略ブロック図である。図6では、図5の部分と同じかまたは同様の部分は、同じかまたは同様のマークで識別し、それらの詳細は適宜省略する。
【００７１】
図6の基地局デバイス60は、ブロードキャスティングユニット51'、受信ユニット52、および割振りユニット53'を備える。ブロードキャスティングユニット51'から送信されるセルブロードキャストメッセージは、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、コモンエンハンスト専用チャネルリソースは、第1のTTIに特有の第1のリソースサブセットと、第2のTTIに特有の第2のリソースサブセットとにグループ化される。
【００７２】
加えて、割振りユニット53'は、受信ユニット52によって受信された指示情報が、選択されたTTIが第1のTTIであることを示すときには、第1のリソースサブセット中のコモンエンハンスト専用チャネルリソースを端末デバイスに割り振り、受信ユニット52によって受信された指示情報が、選択されたTTIが第2のTTIであることを示すときには、第2のリソースサブセット中のコモンエンハンスト専用チャネルリソースを端末デバイスに割り振る。
【００７３】
図6に示すように、基地局デバイス60はさらに、通知ユニット61、および/または記録ユ

ニット62を備える。

【００７４】

通知ユニット61は、割り振られたコモンエンハンスト専用チャネルリソースを端末デバイスに通知し、それにより端末デバイスは、選択したTTIに従って第1のパラメータ構成または第2のパラメータ構成を選択する。

【００７５】

記録ユニット62は、端末デバイスに対する拒否回数を記録して、記録した回数を無線ネットワークコントローラに送信するように構成され、それにより無線ネットワークコントローラは、回数に従って、第1のリソースサブセットおよび第2のリソースサブセット中のコモンエンハンスト専用チャネルリソースを調整する。

【００７６】

図5および図6の基地局デバイスは、コモンエンハンスト専用チャネルリソースを割り振るための前述の方法におけるNodeBに関係する全てのステップを実行することができ、ここでは、繰返しを避けるため、詳細を再度述べることはしない。

【００７７】

図7は、本発明の一実施形態による端末デバイスの概略ブロック図である。図7の端末デバイス70は、受信ユニット71、選択ユニット72、および送信ユニット73を備える。

【００７８】

受信ユニット71は、セルブロードキャストメッセージをネットワークから受信するように構成され、セルブロードキャストメッセージは、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成は、第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成は、第1のTTIとは異なる第2のTTIに特有である。

【００７９】

選択ユニット72は、使用TTIとして第1のTTIまたは第2のTTIを選択し、選択したTTIの指示情報を生成するように構成される。

【００８０】

送信ユニット73は、ネットワークが指示情報に従ってコモンエンハンスト専用チャネルリソースを割り振るよう、指示情報をネットワークに送信するように構成される。

【００８１】

本発明の実施形態では、セルに対して複数のTTIが構成され、複数のTTIのパラメータ構成情報が端末デバイスにブロードキャストされる。したがって、端末デバイスは、複数のTTIから適切なTTIを選択することができ、ネットワークは、選択されたTTIに従ってチャネルリソースを割り振ることができ、それにより、システムリソースの割振りおよび利用の効率を高める。

【００８２】

図7の端末デバイス70は、コモンエンハンスト専用チャネルリソースを割り振るための前述の方法におけるUEに関係する全てのステップを実行することができ、ここでは、繰返しを避けるため、詳細を再度述べることはしない。

【００８３】

例えば、受信ユニット71はさらに、割り振られたコモンエンハンスト専用チャネルリソースの通知を受信するように構成される。選択ユニット72はさらに、選択したTTIに従って第1のパラメータ構成または第2のパラメータ構成を選択するように構成される。

【００８４】

本発明の別の実施形態によれば、受信ユニット71はセルブロードキャストメッセージを受信するが、セルブロードキャストメッセージ中では、コモンエンハンスト専用チャネルリソースが、第1のTTIに特有の第1のリソースサブセットと、第2のTTIに特有の第2のリソースサブセットとにグループ化される。

【００８５】

以上では、UEがTTIを選択する実施形態について述べているが、本発明はこれに限定さ

れない。TTIの選択は、ネットワークによって決定されてもよい。

【００８６】

図8は、本発明の一実施形態による、チャネルリソースを割り振る方法の概略フローチャートである。図8に示す方法80は、主にネットワークで、例えば基地局(NodeBなど)によって実行される。

【００８７】

図8に示すように、方法80のステップ801は、方法10のステップ101と同様である。セルブロードキャストメッセージが、端末デバイスに送信される。セルブロードキャストメッセージは、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成は、第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成は、第1のTTIとは異なる第2のTTIに特有である。

【００８８】

ステップ802で、NodeBは、使用TTIとして第1のTTIまたは第2のTTIを選択する。セル中の情報に従って、NodeBは、UEによって使用されることになるTTIを選択することができる。例えば、NodeBは、UEのアップリンクアクセスのプリアンブル(preamble)電力に従って、選択するTTI長さを決定することができる。

【００８９】

ステップ803で、NodeBは、選択したTTIを端末デバイスに通知し、ステップ804で、NodeBは、選択したTTIに従ってコモンエンハンスト専用チャネルリソースを端末に割り振る。

【００９０】

本発明の実施形態では、セルに対して複数のTTIが構成され、ネットワークは、複数のTTIのパラメータ構成情報を端末デバイスにブロードキャストし、次いで、複数のTTIから適切なTTIを選択して、選択したTTIに従ってチャネルリソースを割り振り、それにより、システムリソースの割振りおよび利用の効率を高める。

【００９１】

対応する動作が端末で実行される。図9は、本発明の一実施形態による、チャネルリソースを割り振る方法を示す。図9に示す方法90は、端末デバイス(UEなど)によって実行される。

【００９２】

901.セルブロードキャストメッセージをネットワークから受信する。セルブロードキャストメッセージは、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成は、第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成は、第1のTTIとは異なる第2のTTIに特有である。

【００９３】

902.指示情報をネットワークから受信する。指示情報は、ネットワークが使用TTIとして第1のTTIまたは第2のTTIを選択することを示す。

【００９４】

903.選択されたTTIに従ってネットワークによって割り振られたコモンエンハンスト専用チャネルリソースを受信する。

【００９５】

よって、本発明の実施形態では、セルに対して複数のTTIが構成され、ネットワークは、複数のTTIのパラメータ構成情報を端末デバイスにブロードキャストし、次いで、複数のTTIから適切なTTIを選択して、選択したTTIに従ってチャネルリソースを割り振り、それにより、システムリソースの割振りおよび利用の効率を高める。

【００９６】

図10は、本発明の一実施形態による基地局デバイスの概略ブロック図である。図10に示す基地局デバイス100は、

セルブロードキャストメッセージを端末デバイスに送信するように構成されたブロード

キャスティングユニット1010であって、セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成が、第1のTTIとは異なる第2のTTIに特有であるブロードキャスティングユニット1010と、

使用TTIとして第1のTTIまたは第2のTTIを選択するように構成された選択ユニット1020と、

選択されたTTIを端末デバイスに通知するように構成された通知ユニット1030と、

選択されたTTIに従ってコモンエンハンスト専用チャネルリソースを端末デバイスに割り振るように構成された割振りユニット1040とを備える。

【００９７】

よって、本発明の実施形態では、セルに対して複数のTTIが構成され、ネットワークは、複数のTTIのパラメータ構成情報を端末デバイスにブロードキャストし、次いで、複数のTTIから適切なTTIを選択して、選択したTTIに従ってチャネルリソースを割り振り、それにより、システムリソースの割振りおよび利用の効率を高める。

【００９８】

図11は、本発明の一実施形態による端末デバイスの概略ブロック図である。図11に示す端末デバイス110は、受信ユニット115を備える。受信ユニット115は、セルブロードキャストメッセージをネットワークから受信するように構成され、セルブロードキャストメッセージは、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、第1のパラメータ構成は、第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成は、第1のTTIとは異なる第2のTTIに特有である。

【００９９】

受信ユニット115はさらに、指示情報をネットワークから受信するように構成され、指示情報は、ネットワークが使用TTIとして第1のTTIまたは第2のTTIを選択することを示す。

【０１００】

受信ユニット115はさらに、選択されたTTIに従ってネットワークによって割り振られたコモンエンハンスト専用チャネルリソースを受信するように構成される。

【０１０１】

よって、本発明の実施形態では、セルに対して複数のTTIが構成され、ネットワークは、複数のTTIのパラメータ構成情報を端末デバイスにブロードキャストし、次いで、複数のTTIから適切なTTIを選択して、選択したTTIに従ってチャネルリソースを割り振り、それにより、システムリソースの割振りおよび利用の効率を高める。

【０１０２】

図12は、本発明の一実施形態による通信システムの概略ブロック図である。図12に示す通信システム120は、基地局デバイス121および端末デバイス122を備える。

【０１０３】

基地局デバイス121は、前述の基地局デバイス50、60、または100とすることができる。端末デバイス122は、前述の端末デバイス70または110とすることができる。したがって、これらについての詳細な記述は省略する。

【０１０４】

図13は、本発明の別の実施形態による通信システムの概略ブロック図である。図13に示す通信システム130中では、図12中の部分と同じかまたは同様の部分は、同じかまたは同様のマークで識別する。

【０１０５】

図13に示すように、基地局デバイス121および端末デバイス122に加えて、通信システム130はさらに、無線ネットワークコントローラ(RNC)131も備える。異なるTTIに対して異なるリソースサブセット(第1のリソースサブセットおよび第2のリソースサブセットなど)が

採用されるシナリオでは、無線ネットワークコントローラ131は、基地局デバイス121によって記録された、端末デバイス122に対する拒否回数を受信し、この回数に従って、第1のリソースサブセットおよび第2のリソースサブセット中のコモンエンハンスト専用チャネルリソースを調整するように構成される。

【０１０６】

本明細書に開示する実施形態で述べた例と組み合わせて、ユニットおよびアルゴリズムステップを、電子ハードウェア、コンピュータソフトウェア、またはこれらの組合せによって実現できることを、当業者なら認識するであろう。ハードウェアとソフトウェアとの間の交換可能性を明確に記述するために、上記では、各実施形態の構成およびステップを、機能に従って一般に述べた。機能がハードウェアによって実施されるかソフトウェアによって実施されるかは、技術的解決法の特定の適用例および設計制約条件に依存する。当業者なら、特定の適用例ごとに異なる方法を使用して、述べた機能を実施することができるが、こうした実施が本発明の範囲を超えると考えるべきではない。

【０１０７】

簡便な記述のために、前述のシステム、装置、およびユニットの詳細な動作プロセスについては、前述の方法実施形態における対応するプロセスを参照することができ、ここでは詳細を再度述べないことは、当業者には明確に理解されるであろう。

【０１０８】

本出願において提供されるいくつかの実施形態では、開示するシステム、装置、および方法を他の方式で実現してもよいことを理解されたい。例えば、述べた装置実施形態は例に過ぎない。例えば、ユニット分割は単に論理的な機能分割であり、実際の実装形態では他の分割であってもよい。例えば、複数のユニットもしくはコンポーネントを別のシステムに結合もしくは統合してもよく、または、いくつかの特徴を省略するかもしくは実行しなくてもよい。加えて、表示または考察した、相互結合、または直接的な結合もしくは通信接続は、いくつかのインタフェースを介して実現されてもよい。装置またはユニット間の間接的な結合または通信接続は、電気的、機械的、または他の形で実現されてよい。

【０１０９】

別々の部分として述べたユニットは、物理的に分離していてもそうでなくてもよく、ユニットとして表示した部分は、物理的なユニットであってもそうでなくてもよい。すなわち、これらのユニットは、1か所に位置してもよく、または複数のネットワーク要素上に分散してもよい。一部または全部のユニットを実際の必要性に従って選択して、実施形態の解決法の目的を達成することができる。

【０１１０】

加えて、本発明の実施形態における機能ユニットは、1つの処理ユニットに統合されてもよく、または各ユニットが物理的に単独で存在してもよく、または2つ以上のユニットが1つのユニットに統合されてもよい。統合されたユニットは、ハードウェアの形で実現されてもよく、またはソフトウェア機能ユニットの形で実現されてもよい。

【０１１１】

統合されたユニットがソフトウェア機能ユニットの形で実現されて、独立した製品として販売または使用されるとき、統合されたユニットはコンピュータ可読記憶媒体に記憶されてよい。このような理解に基づき、本発明の技術的解決法は本質的に、または従来技術に寄与する部分は、または技術的解決法の全部もしくは一部は、ソフトウェア製品の形で実現することができる。コンピュータソフトウェア製品は記憶媒体に記憶され、コンピュータソフトウェア製品はまた、本発明の実施形態で述べた方法のステップの全部または一部を実施するようコンピュータデバイス(パーソナルコンピュータ、サーバ、またはネットワークデバイスなどとすることができる)に命令するためのいくつかの命令を含む。前述の記憶媒体は、USBフラッシュディスク、取外し可能ハードディスク、読取専用メモリ(ROM、Read-Only Memory)、ランダムアクセスメモリ(RAM、Random Access Memory)、磁気ディスク、または光ディスクなど、プログラムコードを記憶できる任意の媒体を含む。

【０１１２】

以上の記述は、本発明の特定の実施形態に過ぎず、本発明の保護範囲を限定するものとはしない。本発明において開示される技術範囲内で当業者によってすぐに見出されるどんな変形または置換も、本発明の保護範囲内に入るものとする。したがって、本発明の保護範囲は、特許請求の範囲の保護範囲に従うものとする。

【符号の説明】

【０１１３】

50 基地局デバイス
51 ブロードキャスティングユニット
52 受信ユニット
53 割振りユニット
60 基地局デバイス
51' ブロードキャスティングユニット
53' 割振りユニット
61 通知ユニット
62 記録ユニット
70 端末デバイス
71 受信ユニット
72 選択ユニット
73 送信ユニット
100 基地局デバイス
1010 ブロードキャスティングユニット
1020 選択ユニット
1030 通知ユニット
1040 割振りユニット
110 端末デバイス
115 受信ユニット
120 通信システム
121 基地局デバイス
122 端末デバイス
130 通信システム
131 無線ネットワークコントローラ

【手続補正２】
【補正対象書類名】特許請求の範囲
【補正対象項目名】全文
【補正方法】変更
【補正の内容】
【特許請求の範囲】
【請求項１】

チャネルリソースを割り振る方法であって、

セルブロードキャストメッセージを端末デバイスに送信する段階であって、前記セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、前記第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、前記第2のパラメータ構成が、前記第1のTTIとは異なる第2の送信時間間隔(TTI)に特有である段階と、

前記端末デバイスから送信された指示情報を受信する段階であって、前記指示情報が、前記端末デバイスが使用TTIとして前記第1のTTIまたは前記第2のTTIを選択することを示すものである段階と、

前記指示情報に従ってコモンエンハンスト専用チャネルリソースを前記端末デバイスに割り振る段階とを含むことを特徴とする方法。

【請求項２】

前記セルブロードキャストメッセージを前記端末デバイスに送信する前記段階が、
前記セルブロードキャストメッセージを前記端末デバイスに送信する段階であって、前記セルブロードキャストメッセージ中で、前記コモンエンハンスト専用チャネルリソースが、前記第1のTTIに特有の第1のリソースサブセットと前記第2のTTIに特有の第2のリソースサブセットとにグループ化された段階を含む、請求項1に記載の方法。
【請求項３】
前記指示情報に従って前記コモンエンハンスト専用チャネルリソースを前記端末デバイスに割り振る前記段階が、
前記選択されたTTIが前記第1のTTIであることを前記指示情報が示すときに、前記第1のリソースサブセット中のコモンエンハンスト専用チャネルリソースを前記端末デバイスに割り振り、前記選択されたTTIが前記第2のTTIであることを前記指示情報が示すときに、前記第2のリソースサブセット中のコモンエンハンスト専用チャネルリソースを前記端末デバイスに割り振る段階を含む、請求項2に記載の方法。
【請求項４】
前記端末デバイスに対する拒否回数を記録する段階と、
前記記録された回数を無線ネットワークコントローラに送信する段階とをさらに含み、それにより前記無線ネットワークコントローラが前記回数に従って前記第1のリソースサブセットおよび前記第2のリソースサブセット中のコモンエンハンスト専用チャネルリソースを調整する、請求項2に記載の方法。
【請求項５】
チャネルリソースを割り振る方法であって、
セルブロードキャストメッセージをネットワークから受信する段階であって、前記セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、前記第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、第2のパラメータ構成が、前記第1のTTIとは異なる第2のTTIに特有である段階と、
使用TTIとして前記第1のTTIまたは前記第2のTTIを選択し、前記選択したTTIの指示情報を生成する段階と、
前記ネットワークが前記指示情報に従ってコモンエンハンスト専用チャネルリソースを割り振るよう、前記指示情報を前記ネットワークに送信する段階とを含むことを特徴とする方法。
【請求項６】
前記セルブロードキャストメッセージを前記ネットワークから受信する前記段階が、
前記セルブロードキャストメッセージを受信する段階であって、前記セルブロードキャストメッセージ中で、前記コモンエンハンスト専用チャネルリソースが、前記第1のTTIに特有の第1のリソースサブセットと前記第2のTTIに特有の第2のリソースサブセットとにグループ化された段階を含む、請求項5に記載の方法。
【請求項７】
前記割り振られたコモンエンハンスト専用チャネルリソースの通知を受信する段階と、
前記選択されたTTIに従って前記第1のパラメータ構成または前記第2のパラメータ構成を選択する段階とをさらに含む、請求項5に記載の方法。
【請求項８】
セルブロードキャストメッセージを端末デバイスに送信するように構成されたブロードキャスティングユニットであって、前記セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、前記第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、前記第2のパラメータ構成が、前記第1のTTIとは異なる第2のTTIに特有であるブロードキャスティングユニットと、
前記端末デバイスから送信された指示情報を受信するように構成された受信ユニットであって、前記指示情報が、前記端末デバイスが使用TTIとして前記第1のTTIまたは前記第2

のTTIを選択することを示すものである受信ユニットと、
前記指示情報に従ってコモンエンハンスト専用チャネルリソースを前記端末デバイスに割り振るように構成された割振りユニットとを備えることを特徴とする基地局デバイス。
【請求項９】
前記ブロードキャスティングユニットが前記セルブロードキャストメッセージを前記端末デバイスに送信し、前記セルブロードキャストメッセージ中で、前記コモンエンハンスト専用チャネルリソースが、前記第1のTTIに特有の第1のリソースサブセットと前記第2のTTIに特有の第2のリソースサブセットとにグループ化される、請求項8に記載の基地局デバイス。
【請求項１０】
前記割振りユニットが、前記選択されたTTIが前記第1のTTIであることを前記指示情報が示すときに、前記第1のリソースサブセット中のコモンエンハンスト専用チャネルリソースを前記端末デバイスに割り振り、前記選択されたTTIが前記第2のTTIであることを前記指示情報が示すときに、前記第2のリソースサブセット中のコモンエンハンスト専用チャネルリソースを前記端末デバイスに割り振る、請求項9に記載の基地局デバイス。
【請求項１１】
前記端末デバイスに対する拒否回数を記録して、前記記録された回数を無線ネットワークコントローラに送信するように構成された記録ユニットをさらに備え、それにより前記無線ネットワークコントローラが前記回数に従って前記第1のリソースサブセットおよび前記第2のリソースサブセット中の前記コモンエンハンスト専用チャネルリソースを調整する、請求項9に記載の基地局デバイス。
【請求項１２】
セルブロードキャストメッセージをネットワークから受信するように構成された受信ユニットであって、前記セルブロードキャストメッセージが、コモンエンハンスト専用チャネルリソースに対応する、第1のパラメータ構成の記述情報および第2のパラメータ構成の記述情報を含み、前記第1のパラメータ構成が第1の送信時間間隔(TTI)に特有であり、前記第2のパラメータ構成が、前記第1のTTIとは異なる第2のTTIに特有である受信ユニットと、
使用TTIとして前記第1のTTIまたは前記第2のTTIを選択し、前記選択したTTIの指示情報を生成するように構成された選択ユニットと、
前記ネットワークが前記指示情報に従ってコモンエンハンスト専用チャネルリソースを割り振るよう、前記指示情報を前記ネットワークに送信するように構成された送信ユニットとを備えることを特徴とする端末デバイス。
【請求項１３】
前記受信ユニットがさらに、前記割り振られたコモンエンハンスト専用チャネルリソースの通知を受信するように構成され、
前記選択ユニットがさらに、前記選択したTTIに従って前記第1のパラメータ構成または前記第2のパラメータ構成を選択するように構成される、請求項12に記載の端末デバイス。
【請求項１４】
前記受信ユニットが前記セルブロードキャストメッセージを受信し、前記セルブロードキャストメッセージ中で、前記コモンエンハンスト専用チャネルリソースが、前記第1のTTIに特有の第1のリソースサブセットと前記第2のTTIに特有の第2のリソースサブセットとにグループ化される、請求項12に記載の端末デバイス。
【請求項１５】
請求項8から11のいずれか一項に記載の基地局デバイスと、
請求項12から14のいずれか一項に記載の端末デバイスとを備えることを特徴とする通信システム。
【請求項１６】
前記基地局デバイスによって記録された、前記端末デバイスに対する拒否回数を受信し

、前記回数に従って前記第1のリソースサブセットおよび前記第2のリソースサブセット中の前記コモンエンハンスト専用チャネルリソースを調整するように構成された無線ネットワークコントローラをさらに備える、請求項15に記載の通信システム。

【国際調査報告】

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2012/073476

A. CLASSIFICATION OF SUBJECT MATTER

H04W 72/04(2009.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: H04W; H04L; H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CPRSABS, CNTXT, CNKI, VEN: broadcast, first, second, different, transmission time interval, TTI, select, indicate, enhanced dedicated channel, EDCH

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN101400072A (DA TANG MOBILE COMMUNICATION APPARATUS) 01 Apr. 2009 (01.04.2009), the description page 4 line 12- page 6 line 22, claims 1, 8-11	7-8, 13, 17-19
Y	CN1852605A (HUAWEI TECHNOLOGIES CO., LTD.), 25 Oct. 2006 (25.10.2006) claims 1, 9	7-8, 13, 17-19
A	CN101902779A(HUAWEI TECHNOLOGIES CO., LTD.), 01 Dec. 2010 (01.12.2010) the whole document	1-19

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 Jun. 2012(15.06.2012)	12 Jul. 2012(12.07.2012)

Name and mailing address of the ISA/CN	Authorized officer
State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No. (86-10)62019451	LI, Qian Telephone No. (86-10) 62411283

Form PCT/ISA /210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2012/073476

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN101400072A	01.04.2009	NONE	
CN1852605A	25.10.2006	CN100421528C	24.09.2008
CN101902779A	01.12.2010	WO2010135985A1	02.12.2010

Form PCT/ISA/210 (patent family annex) (July 2009)

国际检索报告	国际申请号 PCT/CN2012/073476

A. 主题的分类

H04W 72/04(2009.01) i

按照国际专利分类(IPC)或者同时按照国家分类和 IPC 两种分类

B. 检索领域

检索的最低限度文献(标明分类系统和分类号)

IPC: H04W; H04L; H04Q

包含在检索领域中的除最低限度文献以外的检索文献

在国际检索时查阅的电子数据库(数据库的名称，和使用的检索词（如使用））

CPRSABS, CNTXT, CNKI:广播，第一，第二，不同，传输时间间隔，TTI，选择，指示，增强专用信道，EDCH; VEN: broadcast, first, second, different, transmission time interval, TTI, select, indicate, enhanced dedicated channel, EDCH

C. 相关文件

类 型*	引用文件，必要时，指明相关段落	相关的权利要求
Y	CN101400072A (大唐移动通信设备有限公司), 01.4 月 2009 (01.04.2009) 说明书第 4 页第 12 行-第 6 页第 22 行、权利要求 1、8-11	7-8、13、17-19
Y	CN1852605A (华为技术有限公司), 25.10 月 2006 (25.10.2006) 权利要求 1、9	7-8、13、17-19
A	CN101902779A(华为技术有限公司), 01.12 月 2010 (01.12.2010) 全文	1-19

☐ 其余文件在 C 栏的续页中列出。 ☒ 见同族专利附件。

* 引用文件的具体类型：

"A" 认为不特别相关的表示了现有技术一般状态的文件

"E" 在国际申请日的当天或之后公布的在先申请或专利

"L" 可能对优先权要求构成怀疑的文件，或为确定另一篇引用文件的公布日而引用的或者因其他特殊理由而引用的文件（如具体说明的）

"O" 涉及口头公开、使用、展览或其他方式公开的文件

"P" 公布日先于国际申请日但迟于所要求的优先权日的文件

"T" 在申请日或优先权日之后公布，与申请不相抵触，但为了理解发明之理论或原理的在后文件

"X" 特别相关的文件，单独考虑该文件，认定要求保护的发明不是新颖的或不具有创造性

"Y" 特别相关的文件，当该文件与另一篇或者多篇该类文件结合并且这种结合对于本领域技术人员为显而易见时，要求保护的发明不具有创造性

"&" 同族专利的文件

国际检索实际完成的日期	国际检索报告邮寄日期
15.6 月 2012(15.06.2012)	**12.7 月 2012 (12.07.2012)**
ISA/CN 的名称和邮寄地址： 中华人民共和国国家知识产权局 中国北京市海淀区蓟门桥西土城路 6 号 100088 传真号： (86-10)62019451	受权官员 李倩 电话号码：(86-10) **62411283**

PCT/ISA/210 表(第 2 页) (2009 年 7 月)

国际检索报告
关于同族专利的信息

国际申请号
PCT/CN2012/073476

检索报告中引用的专利文件	公布日期	同族专利	公布日期
CN101400072A	01.04.2009	无	
CN1852605A	25.10.2006	CN100421528C	24.09.2008
CN101902779A	01.12.2010	WO2010135985A1	02.12.2010

PCT/ISA/210 表(同族专利附件) (2009 年 7 月)

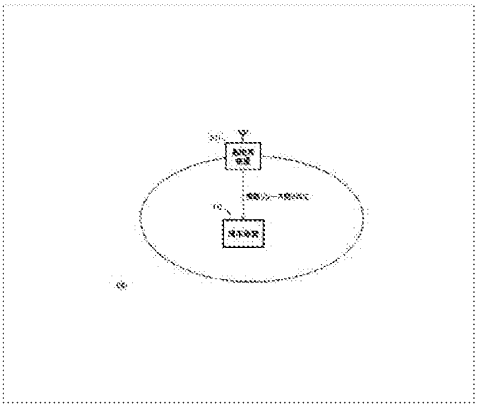
フロントページの続き

(81)指定国 AP(BW,GH,GM,KE,LR,LS,MW,MZ,NA,RW,SD,SL,SZ,TZ,UG,ZM,ZW),EA(AM,AZ,BY,KG,KZ,MD,RU,TJ,TM),EP(AL,AT,BE,BG,CH,CY,CZ,DE,DK,EE,ES,FI,FR,GB,GR,HR,HU,IE,IS,IT,LT,LU,LV,MC,MK,MT,NL,NO,PL,PT,RO,RS,SE,SI,SK,SM,TR),OA(BF,BJ,CF,CG,CI,CM,GA,GN,GQ,GW,ML,MR,NE,SN,TD,TG),AE,AG,AL,AM,AO,AT,AU,AZ,BA,BB,BG,BH,BR,BW,BY,BZ,CA,CH,CL,CN,CO,CR,CU,CZ,DE,DK,DM,DO,DZ,EC,EE,EG,ES,FI,GB,GD,GE,GH,GM,GT,HN,HR,HU,ID,IL,IN,IS,JP,KE,KG,KM,KN,KP,KR,KZ,LA,LC,LK,LR,LS,LT,LU,LY,MA,MD,ME,MG,MK,MN,MW,MX,MY,MZ,NA,NG,NI,NO,NZ,OM,PE,PG,PH,PL,PT,QA,RO,RS,RU,RW,SC,SD,SE,SG,SK,SL,SM,ST,SV,SY,TH,TJ,TM,TN,TR,TT,TZ,UA,UG,US,UZ,VC,VN

Ｆターム(参考) 5K067 AA11 CC14 DD57 EE02 EE10 EE16 EE22 EE71 HH23

Legal Status

(11)Publication number	2016-072843
(43)Date of publication of application	09.05.2016
(51)Int.Cl.	*H04W 28/08 (2009.01)* *H04W 72/04 (2009.01)* *H04W 92/10 (2009.01)*
(21)Application number	2014-201306
(22)Date of filing	30.09.2014
(71)Applicant	KDDI CORP
(72)Inventor	OZEKI TAKEO YAMAMOTO TOSHIAKI SUEGARA YASUHIRO



(54)BASE STATION DEVICE, COMMUNICATION METHOD, AND COMMUNICATION SYSTEM

(57)Abstract

PROBLEM TO BE SOLVED: To enable the shortening of a TTI.

SOLUTION: A base station device 30 is able to perform radio communication with a terminal device 10 using a sub-frame including one or more OFDM symbols. The base station device allocates the terminal device 10 TTI time length to be used and offset information indicating the start position of the TTI in the sub-frame, and notifies the terminal device 10 of the allocated TTI time length and offset information by at least one of upper layer signaling and physical layer signaling.

SELECTED DRAWING: Figure 1

Samsung Exhibit 1009, Page 309 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

(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2016-72843
(P2016-72843A)
(43)公開日　平成28年5月9日(2016.5.9)

(51)Int.Cl.		F I			テーマコード（参考）
H04W 28/06	(2009.01)	H04W	28/06		5K067
H04W 72/04	(2009.01)	H04W	72/04	133	
H04W 92/10	(2009.01)	H04W	72/04	131	
		H04W	72/04	134	
		H04W	92/10		

審査請求 未請求　請求項の数 15　ＯＬ　（全 13 頁）

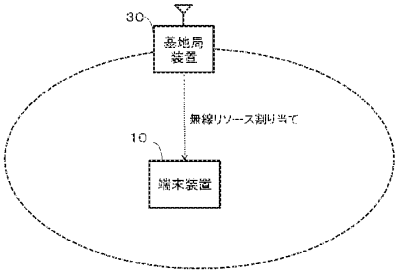
(21)出願番号　特願2014-201306 (P2014-201306)
(22)出願日　平成26年9月30日 (2014.9.30)

(71)出願人　000208891
ＫＤＤＩ株式会社
東京都新宿区西新宿二丁目３番２号
(74)代理人　100141519
弁理士　梶田　邦之
(72)発明者　大関　武雄
埼玉県ふじみ野市大原二丁目１番１５号
株式会社ＫＤＤＩ研究所内
(72)発明者　山本　俊明
埼玉県ふじみ野市大原二丁目１番１５号
株式会社ＫＤＤＩ研究所内
(72)発明者　末柄　恭宏
埼玉県ふじみ野市大原二丁目１番１５号
株式会社ＫＤＤＩ研究所内

Ｆターム(参考)　5K067 AA21 BB04 BB21 CC02 CC04
DD11 EE02 EE10 FF05 JJ22

(54)【発明の名称】基地局装置、通信方法、および通信システム

(57)【要約】
【課題】ＴＴＩの短縮化を可能にすること。
【解決手段】基地局装置３０は、１以上のＯＦＤＭシンボルを含むサブフレームを用いて、端末装置１０との間で無線通信可能な基地局装置であって、端末装置１０に使用させるべきＴＴＩの時間長と、当該ＴＴＩのサブフレームにおける開始位置を示すオフセット情報とを割り当てて、上位層シグナリングと物理層シグナリングのうちの少なくとも一方で、割り当てたＴＴＩの時間長とオフセット情報とを端末装置１０に通知する。
【選択図】図１



【特許請求の範囲】
【請求項１】
１以上のＯＦＤＭシンボルを含むサブフレームを用いて、端末装置との間で無線通信可能な基地局装置であって、
前記端末装置に使用させるべきＴＴＩの時間長と、当該ＴＴＩのサブフレームにおける開始位置を示すオフセット情報とを割り当てる割当制御部と、
前記割当制御部で割り当てたＴＴＩの時間長とオフセット情報とを前記端末装置に通知する通知制御部と、
を備える基地局装置。
【請求項２】
前記割当制御部は、割り当てる時間長および／またはオフセット情報を、シンボル数を単位として決定する
ことを特徴とする請求項１に記載の基地局装置。
【請求項３】
前記通知制御部は、上位層シグナリングと物理層シグナリングのうちの少なくとも一方で、前記端末装置へ通知する
ことを特徴とする請求項１または２に記載の基地局装置。
【請求項４】
前記通知制御部は、先ず、前記上位層シグナリングにて、前記端末装置に通知する
ことを特徴とする請求項３に記載の基地局装置。
【請求項５】
前記通知制御部は、前記上位層シグナリングがされた後に、必要に応じて、前記物理層シグナリングとして、前記端末装置に通知する
ことを特徴とする請求項４に記載の基地局装置。
【請求項６】
前記通知制御部は、前記上位層シグナリングにて過去に通知した時間長とオフセット情報のうちの少なくとも一方を変更する場合に、前記物理層シグナリングにて、変更にかかる情報を通知する
ことを特徴とする請求項５に記載の基地局装置。
【請求項７】
前記通知制御部は、当該端末装置が過去の割当情報に従うべきことを黙示的に示すために、前記上位層シグナリングと前記物理層シグナリングの少なくとも一方で、変更しない旨が示された情報を通知する、
ことを特徴とする請求項５に記載の基地局装置。
【請求項８】
前記通知制御部は、前記上位層シグナリング、前記物理層シグナリングのいずれかにおいて過去に通知した時間長とオフセット情報を変更しない場合に、他方のシグナリングにて、変更しない旨が示された情報を通知する
ことを特徴とする請求項７に記載の基地局装置。
【請求項９】
前記通知制御部は、当該端末装置が過去の割当情報に従うべきことを黙示的に示すために、前記上位層シグナリングと前記物理層シグナリングの双方で、変更しない旨が示された情報を通知する、
ことを特徴とする請求項７に記載の基地局装置。
【請求項１０】
前記通知制御部は、当該端末装置が過去の割当情報に従うべきことを黙示的に示すために、物理層シグナリングを前記端末装置へ通知しない、
ことを特徴とする請求項５のいずれかに記載の基地局装置。
【請求項１１】
前記通知制御部は、当該端末装置が過去の物理層シグナリングにて通知された割当情報

に従うべきことを黙示的に示すために、前記上位層シグナリングで割当情報を通知した後に、前記物理層シグナリングにて通知しない、
ことを特徴とする請求項１０に記載の基地局装置。
【請求項１２】
前記通知制御部において通知先となるべき端末装置への送信データに用いる符号化情報を１以上決定する符号化情報決定部、
をさらに備え、
前記割当制御部は、前記端末装置に使用させるべきＴＴＩの時間長とオフセット情報とが含まれた１組の割当情報を１以上決定し、
前記通知制御部は、前記割当制御部において決定された１組以上の割当情報と前記符号化情報決定部において決定された１以上の符号化情報と、をそれぞれ対応付けて通知することを特徴とする請求項１に記載の基地局装置。
【請求項１３】
前記符号化情報決定部において決定された１以上の符号化情報のうちのいずれかを用いて、当該端末装置に対する送信データを符号化する
ことを特徴とする請求項１２に記載の基地局装置。
【請求項１４】
１以上のＯＦＤＭシンボルを含むサブフレームを用いて、端末装置との間で無線通信可能な基地局装置に用いられる通信方法であって、
前記端末装置に使用させるべきＴＴＩの時間長と、当該ＴＴＩのサブフレームにおける開始位置を示すオフセット情報とを割り当てる割当制御ステップと、
前記割当制御ステップで割り当てたＴＴＩの時間長とオフセット情報とを前記端末装置に通知する通知制御ステップとを含み、
前記通知制御ステップにおいて、先ず、前記上位層シグナリングにて、前記端末装置に通知し、必要に応じて、前記物理層シグナリングとして前記端末装置へ通知する
ことを特徴とする通信方法。
【請求項１５】
端末装置と、１以上のＯＦＤＭシンボルを含むサブフレームを用いて、前記端末装置との間で無線通信可能な基地局装置と、を備える通信システムであって、
前記基地局装置は、
前記端末装置に使用させるべきＴＴＩの時間長と、当該ＴＴＩのサブフレームにおける開始位置を示すオフセット情報とを割り当てる割当制御部と、
前記割当制御部で割り当てたＴＴＩの時間長とオフセット情報とを前記端末装置に通知する通知制御部と
を備え、
前記端末装置は、
前記基地局装置から通知される、前記ＴＴＩの時間長と前記オフセット情報とに基づいて前記基地局装置との間の無線通信を制御する制御部
を備える通信システム。

【発明の詳細な説明】
【技術分野】
【０００１】
本発明は、無線通信システムの制御技術に関する。
【背景技術】
【０００２】
ＬＴＥ（Ｌｏｎｇ　Ｔｅｒｍ　Ｅｖｏｌｕｔｉｏｎ）などの無線通信システムにおいては、基地局装置が端末装置ごとに共有データチャネル上の無線リソースを動的に割り当ててスケジューリングを行っている。ＬＴＥのスケジューリングの最小時間単位であるＴＴ

Ｉ（Ｔｒａｎｓｍｉｓｓｉｏｎ Ｔｉｍｅ Ｉｎｔｅｒｖａｌ）は、１サブフレーム長であり、１ミリ秒（ｍｓ）で固定されている。他方、Ｗ－ＣＤＭＡにおけるスケジューリングの最小時間単位は、１スロット長であり、０．６７ｍｓと一意に固定されている。また、ＷｉＭＡＸは５ｍｓ毎にスケジューリングを行い、毎回端末装置ごとの送信時間長および周波数幅を通知している。

【０００３】

機械の制御やドライビングサポートなど、ミッションクリティカルなシチュエーションが要求される分野に無線通信を適用する場合では、低遅延な無線通信環境が望ましい。今後、ＬＴＥの無線区間においても、特にショートパケットの送受信時の遅延に顕著に影響を与える、無線区間のラウンドトリップタイム（Ｒｏｕｎｄ ｔｒｉｐ ｔｉｍｅ）の短縮化が必要であり、そのためにＴＴＩの更なる短縮化が期待されている。

【先行技術文献】

【非特許文献】

【０００４】

【非特許文献１】３ＧＰＰ ＴＳ３６．２１１ Ｖｅｒ．８．６．０ “Ｅｖｏｌｖｅｄ Ｕｎｉｖｅｒｓａｌ Ｔｅｒｒｅｓｔｒｉａｌ Ｒａｄｉｏ Ａｃｃｅｓｓ（Ｅ－ＵＴＲＡ）；Ｐｈｙｓｉｃａｌ Ｃｈａｎｎｅｌｓ ａｎｄ Ｍｏｄｕｌａｔｉｏｎ” ２００９年３月”

【発明の概要】

【発明が解決しようとする課題】

【０００５】

上述したように、ＬＴＥの無線区間のラウンドトリップタイムを更に短縮化するために、１ｍｓのサブフレーム長で固定されているＴＴＩを短縮することが期待される。一方で、既存の端末との互換性の維持も必要であり、同一システム帯域幅内に、異なるＴＴＩの物理層（ＰＤＳＣＨ／ＰＵＳＣＨ）を共存させることが求められる。しかしながら、その場合、現在のＬＴＥでは、受信側は、送信側がどのようなＴＴＩで送信を行ったのかが分からないという問題が発生する。

【０００６】

そこで、例えば、ＷｉＭＡＸのように、物理パケットのスケジューリング間隔毎に、毎回、ＵＥ毎の送信時間長（及び周波数幅）を通知するという解決手段が考えられる。しかしながら、ＷｉＭＡＸはスケジューリング周期が５ｍｓであるのに対し、ＬＴＥはスケジューリング周期が１ｍｓであるから、ＷｉＭＡＸの手法をそのまま適用すると、物理層のシグナリングのためのオーバーヘッド量が増大するという問題が発生する。

【０００７】

本発明はかかる課題に鑑みてなされたものであり、その目的は、ＴＴＩの短縮化を可能にする基地局装置、通信方法、および通信システムを提供することにある。

【課題を解決するための手段】

【０００８】

本発明のある態様は、基地局装置に関する。この基地局装置は、１以上のＯＦＤＭシンボルを含むサブフレームを用いて、端末装置との間で無線通信可能な基地局装置であって、前記端末装置に使用させるべきＴＴＩの時間長と、当該ＴＴＩのサブフレームにおける開始位置を示すオフセット情報とを割り当てる割当制御部と、前記割当制御部で割り当てたＴＴＩの時間長とオフセット情報とを前記端末装置に通知する通知制御部とを備える。

【０００９】

このような態様によると、１ｍｓのサブフレーム長で固定されているＴＴＩを短縮することができるため、ラウンドトリップタイムの更なる短縮化が実現できる。また、端末装置ごとにＴＴＩの動的制御が可能となり、異なるＴＴＩの物理層を共存させることが可能になる。

【００１０】

本発明の別の態様は、通信システムに関する。この通信システムは、端末装置と、１以

上のＯＦＤＭシンボルを含むサブフレームを用いて、前記端末装置との間で無線通信可能な基地局装置と、を備える通信システムであって、前記基地局装置は、前記端末装置に使用させるべきＴＴＩの時間長と、当該ＴＴＩのサブフレームにおける開始位置を示すオフセット情報とを割り当てる割当制御部と、前記割当制御部で割り当てたＴＴＩの時間長とオフセット情報とを前記端末装置に通知する通知制御部とを備え、前記端末装置は、前記基地局装置から通知される、前記ＴＴＩの時間長と前記オフセット情報とに基づいて前記基地局装置との間の無線通信を制御する制御部を備える。

【００１１】

このような態様によると、基地局装置は端末装置ごとに使用させるべきＴＴＩの時間長と、当該ＴＴＩのサブフレームにおける開始位置を示すオフセット情報とを割り当て、端末装置に通知し、端末装置は基地局装置から通知される、ＴＴＩの時間長とオフセット情報とに基づいてサブフレームを復調する。これにより、１ｍｓのサブフレーム長で固定されているＴＴＩを短縮して、低遅延な無線通信が実現できる。

【００１２】

なお、以上の構成要素の任意の組み合わせ、本発明の表現を方法、装置、システム、コンピュータプログラムなどの間で変換したものもまた、本発明の態様として有効である。

【発明の効果】

【００１３】

本発明によれば、ＴＴＩの短縮化を可能にする基地局装置、通信方法、および通信システムを提供できる。

【図面の簡単な説明】

【００１４】

【図１】本発明の一実施形態にかかる無線通信システムの構成例を示す図である。
【図２】図１の基地局装置の構成例を示す図である。
【図３】物理シグナリングに割当情報を含める例を示す図である。
【図４】図１の端末装置の構成例を示す図である。
【図５】端末装置が利用する選択ルールの例を示す図である。
【図６】実施例１にかかる無線通信システムの動作例を示すシーケンス図である。
【図７】実施例２において端末装置が利用する選択ルールの例を示す図である。
【図８】実施例３にかかる基地局装置の構成例を示す図である。
【図９】実施例３にかかる無線通信システムの動作例を示すシーケンス図である。

【発明を実施するための形態】

【００１５】

（本発明の概要）

本発明の実施例を説明する前に、まず、本発明の概要を述べる。本発明は、基地局装置が端末装置ごとの無線リソースを割り当てるスケジューリング技術に関する。

【００１６】

ＬＴＥの物理層は、時間、周波数を多重化して利用する方式であり、時間方向は１０ｍｓ周期の無線フレームという単位があり、この無線フレームを１０分割した１ｍｓのサブフレームという単位がある。サブフレームは０．５ｍｓの２つのスロットを有し、１スロットは６または７個のシンボルを含む。既存のＬＴＥシステムにおいては、スケジューリングの最小時間単位であるＴＴＩ（Ｔｒａｎｓｍｉｓｓｉｏｎ Ｔｉｍｅ Ｉｎｔｅｒｖａｌ）は、１サブフレーム長であり、１ｍｓで固定されている。このＴＴＩ単位で、ＦＥＣ（Ｆｏｒｗａｒｄ Ｅｒｒｏｒ Ｃｏｒｒｅｃｔｉｏｎ）による誤り訂正やハイブリッド自動再送要求（ＨＡＲＱ；Ｈｙｂｒｉｄ Ａｕｔｏｍａｔｉｃ Ｒｅｐｅａｔ Ｒｅｑｕｅｓｔ）などが行われている。

【００１７】

ＬＴＥの物理層では、下りリンクの送信開始から、上りリンクのＨＡＲＱ－ＡＣＫの送信開始までの時間は最短で４ｍｓである。このうち、下りリンクの１ＴＴＩの送信時間は１ｍｓであり、またハードウェアの変復調の処理時間を最大限短くしても０ｍｓにするこ

とは出来ないため、送信時間と変復調の処理時間で最低限２ｍｓの時間が必要である。即ち、下りリンクの送信開始から、上りリンクのＨＡＲＱ－ＡＣＫの送信開始までの時間は２ｍｓの短縮が限界である。ここで、仮に、１ｍｓのＴＴＩの短縮化（ＴＴＩ　ｓｈｏｒｔｅｎｉｎｇ）が下りリンクに適用できれば、合計３ｍｓの短縮が可能となる。同様に、上りリンクにもＴＴＩ　ｓｈｏｒｔｅｎｉｎｇを適用すれば、更なる時間短縮が可能になる。

【００１８】

そこで、本発明にかかるスケジューリングでは、従来サブフレーム長である１ｍｓに固定されていたＴＴＩを短縮可能にするために、基地局装置が、端末装置に使用させるべきＴＴＩの時間長と、当該ＴＴＩのサブフレームにおける開始位置を示すオフセット情報とを割り当て、割り当てたＴＴＩの時間長とオフセット情報とを端末装置に通知する。

【００１９】

このようにすることで、受信側は、送信側がどのようなＴＴＩで送信を行ったのかが把握でき、異なるＴＴＩの物理層を共存させることが可能になる。また、従来固定値であった１ｍｓのＴＴＩを短縮することで、ＬＴＥの無線区間のラウンドトリップタイムを更に短縮化することが可能になる。

【００２０】

（無線通信システムの構成例）

図１は、本発明の一実施形態にかかる無線通信システムの構成例を示す図である。無線通信システム１００は、端末装置１０と、基地局装置３０とを含む。基地局装置３０は、端末装置１０に対して物理層における共有データチャネル上の無線リソースを割り当てるスケジューリングを行っている。

【００２１】

上りリンク（端末装置１０から基地局装置３０へ向かう通信経路）においては、基地局装置３０は、下りリンクの制御チャネル（ＰＤＣＣＨ；Ｐｈｙｓｉｃａｌ　ｄｏｗｎｌｉｎｋ　ｃｏｎｔｒｏｌ　ｃｈａｎｎｅｌ）などを用いて、上りリンク共有データチャネル（ＰＵＳＣＨ；Ｐｈｙｓｉｃａｌ　ｕｐｌｉｎｋ　ｓｈａｒｅｄ　ｃｈａｎｎｅｌ）のための無線リソースの割り当て情報を端末装置１０に通知する。

【００２２】

下りリンク（基地局装置３０から端末装置１０へ向かう通信経路）においては、基地局装置３０は、下りリンクの制御チャネル（ＰＤＣＣＨ；Ｐｈｙｓｉｃａｌ　ｄｏｗｎｌｉｎｋ　ｃｏｎｔｒｏｌ　ｃｈａｎｎｅｌ）などを用いて、下りリンク共有データチャネル（ＰＤＳＣＨ；Ｐｈｙｓｉｃａｌ　ｄｏｗｎｌｉｎｋ　ｓｈａｒｅｄ　ｃｈａｎｎｅｌ）を構成する無線リソースの割り当て情報を端末装置１０に通知する。

【００２３】

本実施形態においては、デフォルト値１ｍｓとして設定されているＴＴＩの長さを短縮するために、基地局装置３０は、端末装置１０に使用させるべきＴＴＩの時間長と、当該ＴＴＩのサブフレームにおける開始位置を示すオフセット情報とを割り当て、割り当てたＴＴＩの時間長とオフセット情報とを端末装置１０に通知する。ここで、サブフレームの長さは固定であり、境界も不変であるとする。例えば、割り当てる時間長および／またはオフセット情報は、シンボル数を単位として決定し、これにより、サブフレームの先頭からいくつめのシンボルが、当該ＴＴＩの先頭になるかが決定されることとなる。下りリンクの場合は、割り当てる時間長として、ＰＤＳＣＨのサブフレーム内のＯＦＤＭシンボル数、オフセット情報として、ＰＤＳＣＨのサブフレーム内のスタートＯＦＤＭシンボル番号とすることができる。

【００２４】

また、基地局装置３０は、割り当てたＴＴＩの時間長とオフセット情報とを上位層シグナリングと物理層シグナリングのうちの少なくとも一方で、端末装置１０に通知することができる。例えば、先ず、上位層シグナリングにて、端末装置１０に通知し、上位層シグナリングがされた後に、必要に応じて、物理層シグナリングとして、端末装置１０に通知

してもよい。また、上位層シグナリングにて過去に通知した時間長とオフセット情報のうちの少なくとも一方を変更する場合に、物理層シグナリングにて、変更にかかる情報を通知してもよい。

【００２５】

（基地局装置３０の構成例）

図２は、図１の基地局装置３０の構成例を示す図である。基地局装置３０は、通信部３２と、制御部３４と、記憶部３６とを含む。

【００２６】

通信部３２は、記憶部３６に記憶された情報を制御部３４が使用しながら、自局の通信エリアに属する端末装置１０と、所定のアクセス方式を用いて無線通信を実行する。

【００２７】

制御部３４は、割当制御部３４２と、通知制御部３４４とを含む。割当制御部３４２は、端末装置１０に使用させるべきＴＴＩの時間長と、当該ＴＴＩのサブフレームにおける開始位置を示すオフセット情報とを割り当てる。割当制御部３４２は、割り当てる時間長および／またはオフセット情報を、シンボル数を単位として決定する。割当制御部３４２により割り当てられたＴＴＩの時間長とオフセット情報は、記憶部３６に記憶される。以下、割当制御部３４２が割り当てた、ＴＴＩの時間長とオフセット情報とを割当情報と呼ぶ。

【００２８】

通知制御部３４４は、割当制御部３４２で割り当てたＴＴＩの時間長とオフセット情報とを端末装置１０に通知する。ここで、通知制御部３４４は、上位層シグナリングと物理層シグナリングのうちの少なくとも一方で、端末装置１０へ通知するように制御する。例えば、通知制御部３４４は、先ず、上位層シグナリングにて、端末装置１０に通知し、上位層シグナリングがされた後に、必要に応じて、前記物理層シグナリングとして、端末装置１０に通知するようにしてもよい。

【００２９】

さらに、基地局装置３０は、当該端末装置が過去の割当情報に従うべきことを黙示的に示すために、上位層シグナリングと物理層シグナリングの少なくとも一方で、変更しない旨が示された情報を通知するようにしてもよい。また、上位層シグナリング、物理層シグナリングのいずれかにおいて過去に通知した時間長とオフセット情報を変更しない場合に、他方のシグナリングにて、変更しない旨が示された情報を通知してもよい。当該端末装置が過去の割当情報に従うべきことを黙示的に示すために、上位層シグナリングと物理層シグナリングの双方で、変更しない旨が示された情報を通知してもよい。当該端末装置が過去の割当情報に従うべきことを黙示的に示すために、物理層シグナリングを端末装置へ通知しないようにしてもよい。当該端末装置が過去の物理層シグナリングにて通知された割当情報に従うべきことを黙示的に示すために、上位層シグナリングで割当情報を通知した後に、物理層シグナリングにて通知しないようにすることもできる。

【００３０】

図３に、物理層シグナリングで割当情報を通知する際に用いられるフォーマットの一例を示す。図３には、ＰＤＣＣＨメッセージのＤＣＩフォーマット１に、割当情報を含める例を示す。ＰＤＣＣＨでは、割当てリソースの位置（Ｒｅｓｏｕｒｃｅ ｂｌｏｃｋ ａｓｓｉｇｎｍｅｎｔ）、変調方式（Ｍｏｄｕｌａｔｉｏｎ ａｎｄ ｃｏｄｉｎｇ ｓｃｈｅｍｅ）、送信電力用のコマンド（ＴＰＣ ｃｏｍｍａｎｄ ｆｏｒ ＰＵＣＣＨ）などを含むスケジューリング情報が通知される。本実施形態では、図３中の３００に示す“Ｓｔａｒｔ ＯＦＤＭ ｓｙｍｂｏｌ ｎｕｍｂｅｒ”および“Ｎｕｍｂｅｒ ｏｆ ＯＦＤＭ ｓｙｍｂｏｌ”を新たに追加する。“Ｎｕｍｂｅｒ ｏｆ ＯＦＤＭ ｓｙｍｂｏｌ”が端末装置に使用させるべきＴＴＩの時間長に対応し、“Ｓｔａｒｔ ＯＦＤＭ ｓｙｍｂｏｌ ｎｕｍｂｅｒ”が当該ＴＴＩのサブフレームにおける開始位置を示すオフセット情報に対応する。このように、物理層シグナリングに、ＯＦＤＭシンボルを単位として決定した割当情報を追加することができる。なお、“Ｓｔａｒｔ ＯＦＤＭ ｓｙｍｂ

Samsung Exhibit 1009, Page 316 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

ｏｌ ｎｕｍｂｅｒ”および“Ｎｕｍｂｅｒ ｏｆ ＯＦＤＭ ｓｙｍｂｏｌ”は、ＰＤＣＣＨメッセージのＤＣＩフォーマット１以外の制御シグナリングのＩＥ（Ｉｎｆｏｒｍａｔｉｏｎ Ｅｌｅｍｅｎｔ）として含めてもよい。

【００３１】

（端末装置の構成例）

図４は、図１の第１端末装置１０として用いられる端末装置の構成例を示す図である。端末装置は、通信部１２と、制御部１４と、記憶部１６と、ユーザインタフェース（ユーザＩＦ）１８とを備える。

【００３２】

通信部１２は、記憶部１６に記憶された情報を制御部１４が使用しながら、所定のアクセス方式を用いて基地局装置３０との間で無線により通信を行う。これらの通信処理は、公知の変復調技術、アンテナ技術が用いられてもよい。

【００３３】

記憶部１６は、基地局装置３０から送信されたデータを記憶し、また、基地局装置３０に対して送信すべき、ユーザＩＦ１８を通じて得たデータを記憶してもよい。ユーザＩＦ１８は、画面インタフェースと、操作ボタンやタッチパネルなどのユーザからの入力を受け付ける入力インタフェースと、カメラなどの画像撮像手段を含んでもよい。

【００３４】

制御部１４は、例えば、ＣＰＵにより構成され、通信部１２から受信された情報、または記憶部１６に記憶された情報を用いて、各部を統括的に制御する。

【００３５】

制御部１４は、基地局装置３０から通知される、ＴＴＩの時間長とオフセット情報とを、通信部１２により受信し、記憶部１６へ記憶させる。制御部１４は、記憶部１６に記憶したＴＴＩの時間長とオフセット情報とに基づいて、基地局装置３０との間の無線通信を制御する。例えば、下りリンクのデータを受信した場合は、ＴＴＩの時間長とオフセット情報とで指示されるサブフレーム内の無線リソースを復調する。上りリンクのデータを送信する場合は、ＴＴＩの時間長とオフセット情報とで指示されるサブフレーム内の無線リソースに送信すべきデータを格納して変調する。

【００３６】

また、ＴＴＩの時間長とオフセット情報とは、基地局装置３０からの上位層シグナリングと物理層シグナリングのうちの少なくとも一方で、端末装置１０へ通知される。制御部１４は、所定の選択ルールに従って、ＴＴＩの時間長とオフセット情報とを選択し、選択したＴＴＩの時間長とオフセット情報とで指定されるサブフレーム内の無線リソースを用いることができる。選択ルールは、予め決められ、記憶部１６に記憶されていてもよいし、上位層シグナリングまたは物理層シグナリングで動的に変更されるものであってもよい。

【００３７】

図５に、選択ルールの一例を示す。図５の選択ルールによれば、端末装置１０の制御部１４は、以下のように割当情報を選択する。

（１）割当情報が上位層シグナリングと物理層シグナリングの双方に有る場合は、物理層シグナリングで通知された割当情報に従う。

（２）割当情報が上位層シグナリングに有り、物理層シグナリングに無い場合は、上位層シグナリングで通知された割当情報に従う。

（３）割当情報が上位層シグナリングに無く、物理層シグナリングに有る場合は、物理層シグナリングで通知された割当情報に従う。

（４）割当情報が上位層シグナリングと物理層シグナリングの双方に無い場合は、ＬＴＥシステムの既存のスペック（ＴＴＩの時間長＝１ｍｓ、オフセット情報＝０）に従う。

ここで、割当情報が有るとは、ＴＴＩの時間長および／またはオフセット情報として値がセットされていることを示し、割当情報が無いとは、ＴＴＩの時間長およびオフセット情報として、例えばｎｕｌｌあるいは０ｘｆｆｆｆなどのデフォルト値がセットされてい

Samsung Exhibit 1009, Page 317 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

ることを示す。

【００３８】

次に、このように構成された無線通信システムの動作について、各実施例に従って説明する。なお、各実施例において、既出の構成、動作については、同じ符号を用いることによってその説明を簡略化する。以下、本明細書において同様である。

【００３９】

（実施例１）

本発明の実施例１について、図６を用いて説明する。図６は、実施例１の無線通信システムの動作例を示すシーケンス図である。なお、図６において、端末装置１０をｕ番目のユーザが用いる端末装置（ＵＥ）とし、ＵＥ　ｕと表すものとする。また、実施例１においては、端末装置１０は、図５に示した選択ルールを用いることとする。

【００４０】

先ず、基地局装置３０は、上位層シグナリング（例えば、ＲＲＣ　ｒｅｃｏｎｆｉｇｕｒａｔｉｏｎメッセージ）によって、以下のように、割当情報を通知する（Ｓ１０）。

・ＵＥ　ｕ宛ＰＤＳＣＨのＳｕｂｆｒａｍｅ内スタートＯＦＤＭシンボル番号：ｉ（ｕ）

・ＵＥ　ｕ宛ＰＤＳＣＨのＳｕｂｆｒａｍｅ内ＯＦＤＭシンボル数：ｎ（ｕ）

端末装置１０は、基地局装置３０から通知された割当情報を記憶部１６に記憶する。

【００４１】

Ｓ１０で通知された上位層シグナリング（例えば、ＲＲＣ　ｒｅｃｏｎｆｉｇｕｒａｔｉｏｎメッセージ）に応じてＲＲＣが再構成された後、基地局装置３０は、物理層シグナリング（ＰＤＣＣＨ）および物理層データ送信（ＰＤＳＣＨ）によって、以下のように、割当情報を含む情報などを端末装置１０に通知する（Ｓ１２）。

・ＰＤＳＣＨのＳｕｂｆｒａｍｅ内スタートＯＦＤＭシンボル番号：ｎｕｌｌ

・ＰＤＳＣＨのＳｕｂｆｒａｍｅ内ＯＦＤＭシンボル数：ｎｕｌｌ

・ＰＤＳＣＨ周波数ポジション情報：ｒ（ｕ，ｔ）

・ＰＤＳＣＨデータ

ＰＤＳＣＨ周波数ポジション情報において、ｕはユーザが用いる端末装置を指し、ｔはサブフレームを指す。ＰＤＣＣＨメッセージは、例えば、上記図３に示すようなフォーマットを用いることができる。

【００４２】

端末装置１０は、Ｓ１２のＰＤＣＣＨおよびＰＤＳＣＨを受信すると、ｉ（ｕ），ｎ（ｕ），ｒ（ｕ，ｔ）を用いてＰＤＳＣＨデータを復調する（Ｓ１４）。端末装置１０は、Ｓ１２のＰＤＣＣＨのＰＤＳＣＨのＳｕｂｆｒａｍｅ内スタートＯＦＤＭシンボル番号およびＰＤＳＣＨのＳｕｂｆｒａｍｅ内ＯＦＤＭシンボル数が共にｎｕｌｌであることから、図５に示した選択ルール（２）にしたがって、Ｓ１０の上位層シグナリングで通知されたｉ（ｕ），ｎ（ｕ）を選択してＰＳＤＳＣＨデータを復調する。

【００４３】

さらに、基地局装置３０は、物理層シグナリング（ＰＤＣＣＨ）および物理層データ送信（ＰＤＳＣＨ）によって、以下のように、割当情報を含む情報などを通知する（Ｓ１６）。

・ＰＤＳＣＨのＳｕｂｆｒａｍｅ内スタートＯＦＤＭシンボル番号：ｉ´（ｕ）

・ＰＤＳＣＨのＳｕｂｆｒａｍｅ内ＯＦＤＭシンボル数：ｎ´（ｕ）

・ＰＤＳＣＨ周波数ポジション情報：ｒ（ｕ，ｔ）

・ＰＤＳＣＨデータ

【００４４】

端末装置１０は、Ｓ１６のＰＤＣＣＨおよびＰＤＳＣＨを受信すると、ｉ´（ｕ），ｎ´（ｕ），ｒ（ｕ，ｔ）を用いてＰＤＳＣＨデータを復調する（Ｓ１８）。端末装置１０は、Ｓ１６のＰＤＣＣＨのＰＤＳＣＨのＳｕｂｆｒａｍｅ内スタートＯＦＤＭシンボル番号およびＰＤＳＣＨのＳｕｂｆｒａｍｅ内ＯＦＤＭシンボル数に値がセットされていることから、図５に示した選択ルール（１）にしたがって、Ｓ１６の物理層シグナリングで通

知されたｉ´（ｕ），ｎ´（ｕ）を選択してＰＳＤＳＣＨデータを復調する。

【００４５】

以上述べたように、実施例１によれば、１ｍｓのサブフレーム長で固定されているＴＴＩを短縮することができるため、ラウンドトリップタイムの更なる短縮化が実現できる。また、端末装置ごとにＴＴＩの動的制御が可能となり、異なるＴＴＩの物理層を共存させることが可能になる。

【００４６】

（実施例２）

本発明の実施例２について、図７を用いて説明する。本発明の実施例２は、実施例１の変形例である。実施例１と異なる部分は、基地局装置３０の通知制御部３４４の動作と、端末装置１０の制御部１４で用いる選択ルールにある。基地局装置３０の通知制御部３４４は、端末装置１０が過去の割当情報に従うべきことを黙示的に示すために、物理層シグナリングを端末装置１０へ通知しないようにする。このようにすることで、実施例１よりも、物理層シグナリングのオーバーヘッドを削減することが可能になる。

【００４７】

図７は、実施例２において端末装置１０が利用する選択ルールの例を示す図である。図７では、図５に示した選択ルールに、さらに以下の（５）、（６）のケースを追加する。（５）割当情報が上位層シグナリングに有り、物理層シグナリング自体が無い場合は、最終受信の物理層シグナリングで通知された割当情報に従う。最終受信の物理層シグナリングに割当情報が含まれていない場合は上位層シグナリングで通知された割当情報に従う。（６）割当情報が上位層シグナリングに無く、過去に受信した物理層シグナリングのいずれにも無い状態で、物理層シグナリング自体が無い場合は、ＬＴＥシステムの既存のスペック（ＴＴＩの時間長＝１ｍｓ、オフセット情報＝０）に従う。

【００４８】

例えば、ＷｉＭＡＸでは、物理パケットのスケジューリング間隔毎に、毎回、ＵＥ毎の送信時間長（及び周波数幅）を通知している。ＷｉＭＡＸはスケジューリング周期が５ｍｓであるのに対し、ＬＴＥはスケジューリング周期が１ｍｓであるから、ＷｉＭＡＸの手法をそのまま適用すると、物理層のオーバーヘッドが増大するという問題が発生する。実施例２によれば、実施例１に比べ、物理層シグナリングを削減できるため、この問題による影響を低減することが可能になる。

【００４９】

（実施例３）

本発明の実施例３について、図８および図９を用いて説明する。実施例３は、端末装置に使用させるべきＴＴＩの時間長とオフセット情報とを、端末を識別可能な制御情報、たとえば無線ネットワーク一時識別子（ＲＮＴＩ；Ｒａｄｉｏ　Ｎｅｔｗｏｒｋ　Ｔｅｍｐｏｒａｒｙ　ＩＤ）などに対応付けておき、基地局装置はＰＤＳＣＨデータに用いるＴＴＩの時間長とオフセット情報とに対応するＲＮＴＩでＰＤＣＣＨを符号化し、端末装置はＰＤＣＣＨの復調に成功したＲＮＴＩによってＴＴＩの時間長とオフセット情報を把握する手法である。図８は、実施例３にかかる基地局装置３０１の構成例を示す図である。図９は、実施例３にかかる無線通信システムの動作例を示すシーケンス図である。

【００５０】

図８に示す基地局装置３０１は、図２の基地局装置３０の構成に、符号化情報決定部３４６を加えたものである。符号化情報決定部３４６は、通知制御部３４４において通知先となるべき端末装置への送信データに用いる符号化情報を１以上決定する。符号化情報として、例えばＲＮＴＩを用いることができる。割当制御部３４２は、端末装置に使用させるべきＴＴＩの時間長とオフセット情報とが含まれた１組の割当情報を１以上決定する。通知制御部３４４は、割当制御部３４２において決定された１組以上の割当情報と符号化情報決定部３４６において決定された１以上の符号化情報と、をそれぞれ対応付けて上位層シグナリングで通知する。そして、下りリンクのデータの送信の際に、基地局装置３０１は、端末装置１０１に使用させるべきＴＴＩの時間長とオフセット情報に対応する符号

化情報で物理シグナリングをスクランブルして送信する。なお、ＲＮＴＩを用いたスクランブルについては、既存の技術が用いられてもよい。

【００５１】

実施例３の端末装置１０１は、図４の端末装置１０と構成は同じであるが、制御部１４の動作が異なる。制御部１４は、基地局装置３０１から通知される、各符号化情報に対応付けられた１以上の割当情報を、通信部１２により受信し、記憶部１６へ記憶させる。制御部１４は、下りリンクのデータを受信した場合は、各符号化情報で物理シグナリングのデスクランブルを行うブラインドデコーディングを行い、デスクランブルが成功した符号化情報に対応する割当情報に含まれるＴＴＩの時間長とオフセット情報とで指示されるサブフレーム内の無線リソースを復調する。ブラインドデコーディングは、たとえば、デコーディング結果のＣＲＣ判定によりエラーなしと判定されるまで、通知されたすべてのＲＮＴＩを順に用いてデコーディングを行うことなどを指す。

【００５２】

以下、図９のシーケンスを用いて、実施例３にかかる無線通信システムの具体的な動作を説明する。

先ず、基地局装置３０１は、上位層シグナリング（例えば、ＲＲＣ　ｒｅｃｏｎｆｉｇｕｒａｔｉｏｎメッセージ）によって、以下のように、各ＲＮＴＩに対応付けて複数の割当情報を通知する（Ｓ２０）。

＜ＲＮＴＩ　Ａ＞

ＵＥ　ｕ宛ＰＤＳＣＨのＳｕｂｆｒａｍｅ内スタートＯＦＤＭシンボル番号：ｉ（ｕ）

ＵＥ　ｕ宛ＰＤＳＣＨのＳｕｂｆｒａｍｅ内ＯＦＤＭシンボル数：ｎ（ｕ）

＜ＲＮＴＩ　Ｂ＞

ＵＥ　ｕ宛ＰＤＳＣＨのＳｕｂｆｒａｍｅ内スタートＯＦＤＭシンボル番号：ｉ´(ｕ)

ＵＥ　ｕ宛ＰＤＳＣＨのＳｕｂｆｒａｍｅ内ＯＦＤＭシンボル数：ｎ´（ｕ）

端末装置１０１は、基地局装置３０１から通知された割当情報を各ＲＮＴＩに対応付けて記憶部１６に記憶する。

【００５３】

Ｓ２０で通知された上位層シグナリング（例えば、ＲＲＣ　ｒｅｃｏｎｆｉｇｕｒａｔｉｏｎメッセージ）に応じてＲＲＣが再構成された後、基地局装置３０１は、以下に示すように、物理層シグナリング（ＰＤＣＣＨ）および物理層データ送信（ＰＤＳＣＨ）を、端末装置１０１に通知する（Ｓ２２）。

ＰＤＳＣＨ周波数ポジション情報：ｒ（ｕ，ｔ）（ＲＮＴＩ　Ａでｓｃｒａｍｂｌｉｎｇ）

ＰＤＳＣＨデータ

Ｓ２２では、ＰＤＣＣＨはＲＮＴＩ　Ａでスクランブリングされていることから、ＰＤＳＣＨには、ＲＮＴＩ　Ａに対応する割当情報ｉ（ｕ），ｎ（ｕ）が用いられている。

【００５４】

端末装置１０１は、Ｓ２２のＰＤＣＣＨおよびＰＤＳＣＨを受信すると、ＰＤＣＣＨをＲＮＴＩ　ＡとＲＮＴＩ　Ｂとのそれぞれでデスクランブリングする。そして、ＲＮＴＩ　ＡでＰＤＣＣＨのデスクランブリングが成功した場合、ＲＮＴＩ　Ａに対応付けられたｉ（ｕ），ｎ（ｕ），ｒ（ｕ，ｔ）を用いてＰＳＤＳＣＨデータを復調する（Ｓ２４）。

【００５５】

さらに、基地局装置３０１は、以下に示すように、物理層シグナリング（ＰＤＣＣＨ）および物理層データ送信（ＰＤＳＣＨ）を、端末装置１０１に通知する（Ｓ２６）。

ＰＤＳＣＨ周波数ポジション情報：ｒ（ｕ，ｔ）（ＲＮＴＩ　Ｂでｓｃｒａｍｂｌｉｎｇ）

ＰＤＳＣＨデータ

Ｓ２６では、ＰＤＣＣＨはＲＮＴＩ　Ｂでスクランブリングされていることから、ＰＤＳＣＨには、ＲＮＴＩ　Ｂに対応する割当情報ｉ´（ｕ），ｎ´（ｕ）が用いられている。

【００５６】
端末装置１０１は、Ｓ２６のＰＤＣＣＨおよびＰＤＳＣＨを受信すると、ＰＤＣＣＨをＲＮＴＩ Ａとの ＲＮＴＩ Ｂとのそれぞれでデスクランブリングする。そして、ＲＮＴＩ ＢでＰＤＣＣＨのデスクランブリングが成功した場合、ＲＮＴＩ Ｂに対応付けられたｉ´（ｕ），ｎ´（ｕ），ｒ（ｕ，ｔ）を用いてＰＳＤＳＣＨデータを復調する（Ｓ２８）。

【００５７】
以上述べたように、実施例３では、端末装置１０１に使用させるべきＴＴＩの時間長とオフセット情報とをＲＮＴＩに対応付けておき、基地局装置３０１はＰＤＳＣＨデータに用いるＴＴＩの時間長とオフセット情報とに対応するＲＮＴＩでＰＤＣＣＨを符号化する。端末装置１０１はＰＤＣＣＨの復調に成功したＲＮＴＩによってＴＴＩの時間長とオフセット情報を把握することができる。

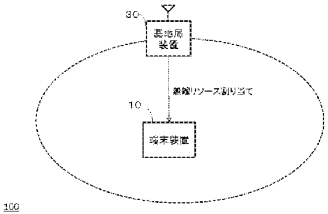
【００５８】
したがって、実施例３のようにしても、１ｍｓのサブフレーム長で固定されているＴＴＩを短縮することができるため、ラウンドトリップタイムの更なる短縮化が実現できる。また、端末装置ごとにＴＴＩの動的制御が可能となり、異なるＴＴＩの物理層を共存させることが可能になる。また、実施例３では、物理層シグナリング（ＰＤＣＣＨ）は、図３のようにパラメータを追加する必要が無く、既存のフォーマットが利用できるという利点がある。

【００５９】
以上、本発明を実施例をもとに説明した。本発明は上述した実施例並びに各実施例の内容に限定されるものではなく、本発明の要旨の範囲内において種々に変形して実施をすることが可能である。上記実施例は例示であり、各実施例を組み合わせるなどして、それらの各構成要素や各処理プロセスの組み合わせにいろいろな変形例が可能なこと、またそうした変形例も本発明の範囲にあることは当業者に理解されるところである。

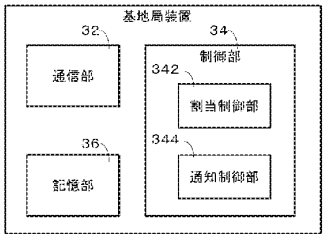
【符号の説明】

【００６０】
１００…無線通信システム、１０…端末装置、３０…基地局装置、１２…通信部、１４…制御部、１６…記憶部、１８…ユーザＩＦ、３２…通信部、３４…制御部、３４２…割当制御部、３４４…通知制御部、３４６…符号化情報決定部、３６…記憶部。

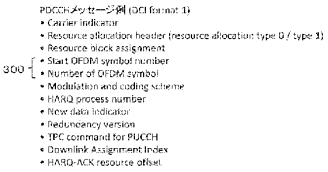
【図１】



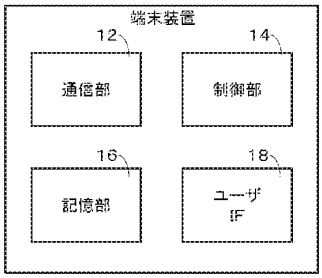
【図２】



【図３】



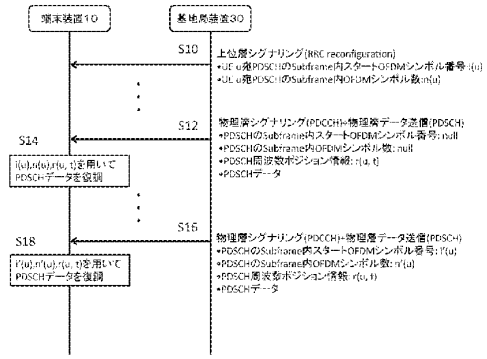
【図４】



【図５】

		上位層シグナリング	
		割当情報あり	割当情報なし
物理層シグナリング	割当情報あり	(1)物理層シグナリングに従う	(3)物理層シグナリングに従う
	割当情報なし	(2)上位層シグナリングに従う	(4)既存スペックに従う

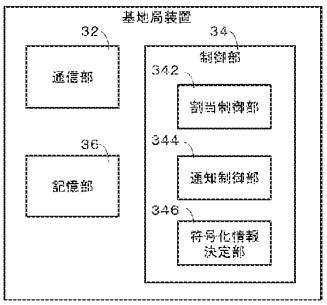
【図６】



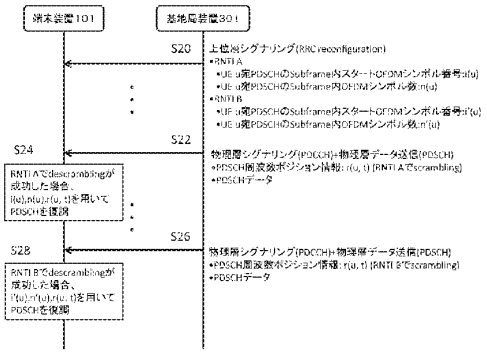
【図７】

		上位層シグナリング	
		割当情報あり	割当情報なし
物理層シグナリング	割当情報あり	(1)物理層シグナリングに従う	(3)物理層シグナリングに従う
	割当情報なし	(2)上位層シグナリングに従う	(4)既存スペックに従う
	シグナリングなし	(5)最終受信物理層シグナリングに従う（最終受信物理層シグナリングに割当情報が含まれていない場合は上位層シグナリングに従う）	(6)既存スペックに従う

【図８】



【図９】



Information Disclosure Statement Transmittal

Docket Number
1426-136.101

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

In Re Application Of:

Wei-Yu Chen

Application No.	15/663,674
Filing Date	July 28, 2017
Examiner	Pakee Fang
Art Unit	2642

Title of Invention

METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM

BASIS FOR FILING (Select 1, 2 or 3 below.)

37 CFR 1.97(b)

1) ☒ The Information Disclosure Statement submitted herewith is being filed within three months of the filing of a national application other than a continued prosecution application under 37 CFR 1.53 (d); within three months of the date of entry of the national stage as set forth in 37 CFR 1.491 in an international application; before the mailing of a first Office Action on the merits, or before the mailing of a first Office Action after the filing of a request for continued examination under 37 CFR 1.114.

37 CFR 1.97(c)

2) ☐ The Information Disclosure Statement submitted herewith is being filed after the period specified in 37 CFR 1.97(b), but before the mailing date of a Final Action under 37 CFR 1.113, a Notice of Allowance under 37 CFR 1.311, or an Action that otherwise closes prosecution in the application, and is accompanied by one of:

a) ☐ the statement specified in 37 CFR 1.97(e);

OR

b) ☐ the fee set forth in 37 CFR 1.17(p).

37 CFR 1.97(d)

3) ☐ The Information Disclosure Statement submitted herewith is being filed after the period specified in 37 CFR 1.97(c), and on or before payment of the issue fee, and is accompanied by the Statement as specified in 37 CFR 1.97(e) and the fee set forth in 37 CFR 1.17(p).

Samsung Exhibit 1009, Page 323 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

Information Disclosure Statement Transmittal

Docket Number
1426-136.101

STATEMENT UNDER 37 CFR 1.97(e) ACCOMPANYING INFORMATION DISCLOSURE STATEMENT

The Information Disclosure Statement submitted herewith is submitted under one of the following conditions, which satisfies the requirement under 37 CFR 1.97(e). (Select 4 or 5 below if applicable.)

4) [X] That each item of information contained in the Information Disclosure Statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the Information Disclosure Statement; or

5) [ ] That no item of information contained in the Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the Information Disclosure Statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the Information Disclosure Statement.

Remarks (Enter Remarks Below or Attach Document Containing Remarks)

Fee set forth in 37 CFR 1.17(p):

[XX] No additional fee is required.

[ ] A check in the amount of _____ is attached.

[ ] The Director is hereby authorized to charge and credit Deposit Account No. _____ as described below.

- [ ] Charge the amount of _____
- [ ] Credit any overpayment.
- [ ] Charge any additional fee required.

[ ] Payment by credit card. Form PTO-2038 is attached.

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.

Samsung Exhibit 1009, Page 324 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

Information Disclosure Statement Transmittal

Docket Number
1426-136.101

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 Transmittal Letter, 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 Transmittal Letter, 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 Transmittal Letter, accompanying documents and fee authorization (if appropriate) is 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 Trasmittal Letter 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	12-26-2018

Samsung Exhibit 1009, Page 325 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

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.
15/663,674	07/28/2017	Wei-Yu Chen	1426-136.101	8966

106622 7590 01/31/2019

Blue Capital Law Firm, P.C.
650 Town Center Drive, Suite 1530
Costa Mesa, CA 92626

EXAMINER	
FANG, PAKEE	

ART UNIT	PAPER NUMBER
2642	

NOTIFICATION DATE	DELIVERY MODE
01/31/2019	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

Office Action Summary	**Application No.** 15/663,674	**Applicant(s)** Chen et al.	
	Examiner PAKEE FANG	**Art Unit** 2642	**AIA Status** Yes

-- 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 12/24/2018.

☐ 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) 1-24 is/are pending in the application.

5a) Of the above claim(s) 8-15 and 21-24 is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-7 and 16-20 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 _____ 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: _____.

DETAILED ACTION

Response to Amendment

1. The amendment filed on 12/24/2018 has been entered and considered by Examiner.

Claims 1-24 are presented for examination. Claims 8-15 and 21-24 are withdrawn. This Action is made FINAL.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/24/2018 has been entered.

Information Disclosure Statement

3. The information disclosure statements (IDS) submitted are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the Examiner.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102 of this title, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 1-7 and 16-20** are rejected under 35 U.S.C. 103 as being unpatentable over Mujtaba et al. (US Pub. 20160366705 A1) in view Yoon et al. (US Pub. 20070268812 A1).

For claim 1, Mujtaba disclose (Figs. 1-7) a method of a UE (User Equipment) for performing random access procedure, comprising:

the UE receives a message from a network, wherein the message includes information of Msg3 [0076, 0080, 0063-65];

the UE transmits a preamble to the network (Step 502/602) [0060-61, 0070-73];

the UE receives a Msg2 from the network for responding the preamble (Step 504/604) [0062, 0074-79]; and

the UE performs a Msg3 transmission to the network according to the information of Msg3 [0076, 0080, 0063-65].

But Mujtaba doesn't explicitly teach the information can be information can be numerology for a message.

However, Yoon (Figs. 2-3) discloses a message can contain information of numerology [0054, 0060-62].

Since, all are analogous arts addressing data info use in a mobile device; Therefore, it would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to combine the teachings of Mujtaba and Yoon to ensure the information message send among the communication can be properly organize, thus, enhancing communication capabilities of the network.

For claim 16, Mujtaba disclose (Figs. 1-7) A User Equipment (UE), comprising: a control circuit; a processor installed in the control circuit; and a memory installed in the control circuit

and operatively coupled to the processor [0029, 0032, 0043, 0046-49]; wherein the processor is configured to execute a program code stored in the memory to:

receive a message from a network, wherein the message includes information of Msg3 [0076, 0080, 0063-65];

transmit a preamble to the network (Step 502/602) [0060-61, 0070-73];

receive a Msg2 from the network for responding the preamble (Step 504/604) [0062, 0074-79]; and

perform a Msg3 transmission to the network according to the information of Msg3 [0076, 0080, 0063-65].

But Mujtaba doesn't explicitly teach the information can be information can be numerology for a message.

However, Yoon (Figs. 2-3) discloses a message can contain information of numerology [0054, 0060-62].

Since, all are analogous arts addressing data info use in a mobile device; Therefore, it would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to combine the teachings of Mujtaba and Yoon to ensure the information message send among the communication can be properly organize, thus, enhancing communication capabilities of the network.

For claims 2 and 17, Mujtaba, as modified by Yoon, disclose (Figs. 1-7) the UE selects the Numerology of Msg3 based on a PRACH (Physical Random Access Channel) resource set of

the preamble or preamble set of the preamble, if there are multiple Numerology of Msg3 in the message [0076, 0080, 0063-65].

For claims 3 and 18, Mujtaba, as modified by Yoon, disclose (Figs. 1-7) the UE selects the Numerology of Msg3 based on random access purpose, if there are multiple Numerology in the message [0076, 0080, 0063-65].

For claims 4 and 19, Mujtaba, as modified by Yoon, disclose (Figs. 1-7) the UE selects the Numerology of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple Numerology of Msg3 in the message [0084-85].

For claim 5, Mujtaba, as modified by Yoon, disclose (Figs. 1-7) the message is a downlink control signal [0075, 0058, 0095].

For claim 6, Mujtaba, as modified by Yoon, disclose (Figs. 1-7) the message is a RRC (Radio Resource Control) message [0075, 0058, 0095].

For claims 7 and 20, Mujtaba, as modified by Yoon, disclose (Figs. 1-7) the UE selects the Numerology of Msg3 based on a random access configuration of the preamble transmission, if there are multiple Numerology of Msg3 in the message [0076, 0080, 0061-65, 0058].

Response to Arguments

6. Applicant's arguments with respect to claims **1-7 and 16-20** have been considered but are moot in view of the new ground(s) of rejection.

In view of amendment, the reference Yoon has been used for new ground of rejections.

Inquiries

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to PAKEE FANG whose telephone number is (571)270-3633. The Examiner can normally be reached on Mon-Fri 9:00AM-5:00PM. If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, PÉREZ-GUTIÉRREZ RAFAEL can be reached on 571-272-7915**.** 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.

/PAKEE FANG/
Primary Examiner, Art Unit 2642

Notice of References Cited	Application/Control No. 15/663,674	Applicant(s)/Patent Under Reexamination Chen et al.	
	Examiner PAKEE FANG	Art Unit 2642	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-20070268812-A1	11-2007	Yoon; Young C.	H04L1/0006	370/203
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

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.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/663,674	Chen et al.
	Examiner	Art Unit
	PAKEE FANG	2642

CPC - Searched*		
Symbol	Date	Examiner
H04W74/0833, H04W48/16, H04W72/1284, H04W74/006, H04L1/1607	5/23/2018	PF

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
455	combined text	5/23/2018	PF

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
East search, Google, inventors	5/23/2018	PF
updated search	09/24/2018	PF
updated search	01/24/2019	PF

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

Samsung Exhibit 1009, Page 334 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/663,674	Chen et al.
	Examiner	**Art Unit**
	PAKEE FANG	2642

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/29/2018	05/23/2018	09/24/2018	01/24/2019					
	1	÷	✓	✓	✓					
	2	÷	✓	✓	✓					
	3	÷	✓	✓	✓					
	4	÷	✓	✓	✓					
	5	÷	✓	✓	✓					
	6	÷	✓	✓	✓					
	7	÷	✓	✓	✓					
	8	÷	N	N	N					
	9	÷	N	N	N					
	10	÷	N	N	N					
	11	÷	N	N	N					
	12	÷	N	N	N					
	13	÷	N	N	N					
	14	÷	N	N	N					
	15	÷	N	N	N					
	16	÷	✓	✓	✓					
	17	÷	✓	✓	✓					
	18	÷	✓	✓	✓					
	19	÷	✓	✓	✓					
	20	÷	✓	✓	✓					
	21	÷	N	N	N					
	22	÷	N	N	N					
	23	÷	N	N	N					
	24	÷	N	N	N					

Samsung Exhibit 1009, Page 335 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

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	15663674
Filing Date	2017-07-28
First Named Inventor	Wei-Yu Chen
Art Unit	2642
Examiner Name	Pakee Fang
Attorney Docket Number	1426-136.101

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	20160073431		2016-03-10	Sungjun PARK et al.	

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	2680651	EP		2014-01-01	Yan Kun et al.		☐

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]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /P.F/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	15663674
	Filing Date	2017-07-28
	First Named Inventor	Wei-Yu Chen
	Art Unit	2642
	Examiner Name	Pakee Fang
	Attorney Docket Number	1426-136.101

	1	NOKIA et al., "Scheduling Framework and Requirements", vol. RAN WG2, no. Nanjing, China; R2-163445 (May 23, 2016)	☐
	2	Office Action from Taiwan Intellectual Property Office in corresponding TW Application No. 106125537, dated September 25, 2018.	☒

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/PAKEE FANG/	Date Considered	01/24/2019

*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. /P.F/

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	95587	(H04W74/0833, H04W48/16, H04W72/1284, H04W74/006, H04L1/1607).CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:43
L2	6513	L1 and (preamble heading) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:43
L3	1554	L2 and ((Transmission adj2 Time adj2 Interval) TTI)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:43
L4	128	L3 and ((Transmission adj2 Time adj2 Interval) TTI) with (first second new third fourth) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:43
L5	82	@ay<"2017" and L4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:43
L6	3	L5 and Numerology	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:43
L7	2	"20160366705".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:44
L8	0	7 and Numerology	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:47
L9	7	1 and Numerology with (message) same (preamble)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:01
L10	1	@ay<"2017" and 9	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:01

Samsung Exhibit 1009, Page 338 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

L11	3	"20180035470".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:15
L12	0	("455" "370").clas. and Numerology with (message) same (preamble)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:17
L13	7	Numerology with (message) same (preamble)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:18
L14	1	@ay<"2017" and 13	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:18
L15	0	("455" "370").clas. and Numerology with (message)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:18
L16	16	("455" "370").clas. and Numerology same (preamble)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:18
L17	15	@ay<"2017" and 16	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:18
L18	525	("455" "370").clas. and Numerology	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 17:59
S1	2	"20180035470".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:17
S2	2	S1 and (frame msg$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:26
S3	82131	(H04W74/0833, H04W48/16, H04W72/1284, H04W74/006, H04L1/1607).CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:29
S4	5501	S3 and (preamble heading) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:33

Samsung Exhibit 1009, Page 339 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

S5	1227	S4 and ((Transmission adj2 Time adj2 Interval) TTI)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:35
S6	78	S5 and ((Transmission adj2 Time adj2 Interval) TTI) with (first second new third fourth) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:37
S7	66	@ay<"2017" and S6	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 17:41

1/24/2019 6:32:32 PM
C:\Users\pfang\Documents\EAST\Workspaces\15663674.wsp

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	15663674
Filing Date	2017-07-28
First Named Inventor	Chen, Wei-Yu
Art Unit	2642
Examiner Name	Pakee Fang
Attorney Docket Number	1426-136.101

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					

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	2014-511080	JP		2014-05-01	Kun Yan		☐
	2	2016-072843	JP		2016-05-09	OZEKI TAKEO		☐

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. /P.F/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	15663674
Filing Date	2017-07-28
First Named Inventor	Chen, Wei-Yu
Art Unit	2642
Examiner Name	Pakee Fang
Attorney Docket Number	1426-136.101

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	Office Action from Japan Patent Office in corresponding JP Application No. 2017-146452, dated November 27, 2018	☒
	2		☐

If you wish to add additional non-patent literature document citation information please click the Add button

EXAMINER SIGNATURE

Examiner Signature	/PAKEE FANG/	Date Considered	01/24/2019

*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. /P.F/

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	15/663,674
Confirmation No.	:	8966
Applicant	:	Wei-Yu Chen and Li-Chi Tseng
Filed	:	July 28, 2017
Title	:	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM
TC/A.U.	:	2642
Examiner	:	Pakee Fang
Docket No.	:	1426-136.101 (1050153-US)
Customer No.	:	106622

RESPONSE 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 January 31, 2019, having a three-month period for filing a response to **April 30, 2019**, Applicants respectfully submit the following amendments and remarks:

Amendments to Claims begin on page 2.
Remarks begin on page 6.

Samsung Exhibit 1009, Page 343 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

IN THE CLAIMS:

1. (Currently Amended) A method of a UE (User Equipment) for performing random access procedure, comprising:

the UE receives a message from a network, wherein the message includes numerology of Msg3, wherein the message is a dedicated message;

the UE transmits a preamble to the network for a random access procedure;

the UE receives a Msg2 from the network for responding the preamble; and

the UE performs a Msg3 transmission to the network according to the numerology of Msg3.

2. (Previously Presented) The method of claim 1, further comprising:

the UE selects the numerology of Msg3 based on a PRACH (Physical Random Access Channel) resource set of the preamble or preamble set of the preamble, if there are multiple numerologies of Msg3 in the message.

3. (Previously Presented) The method of claim 1, further comprising:

the UE selects the numerology of Msg3 based on random access purpose, if there are multiple TTI information in the message.

4. (Previously Presented) The method of claim 1, further comprising:

the UE selects the numerology of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple numerologies of Msg3 in the message.

5. (Original) The method of claim 1, wherein the message is a downlink control signal.

6. (Original) The method of claim 1, wherein the message is a RRC (Radio Resource Control) message.

7. (Previously Presented) The method of claim 1, further comprising:

Samsung Exhibit 1009, Page 344 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

the UE selects the numerology of Msg3 based on a random access configuration of the preamble transmission, if there are multiple-numerologies of Msg3 in the message.

8. (Withdrawn) A method of a UE (User Equipment) for performing random access procedure, comprising:

the UE transmits a preamble to a network;

the UE receives a Msg2 from the network in response to the preamble, wherein the Msg2 contains a TTI (Transmission Time Interval) information of Msg3; and

the UE performs a Msg3 transmission to the network according to the TTI information.

9. (Withdrawn) The method of claim 8, further comprising:

the UE selects the TTI information of Msg3 based on random access purpose, if there are multiple TTI information of Msg3 in the Msg2.

10. (Withdrawn) The method of claim 8, further comprising:

the UE selects the TTI information of Msg3 based on a PRACH (Physical Random Access Channel) resource set of the preamble transmission or a preamble set of the preamble transmission, if there are multiple TTI information of Msg3 in the Msg2.

11. (Withdrawn) The method of claim 8, further comprising:

the UE selects the TTI information of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple TTI information of Msg3 in the Msg2.

12. (Withdrawn) The method of claim 8, wherein the TTI information of Msg3 is included in a RAR (Random Access Response) for responding the preamble.

13. (Withdrawn) The method of claim 8, wherein the TTI information of Msg3 is included in a common field for multiple RARs in the Msg2.

14. (Withdrawn) The method of claim 8, wherein the TTI information of Msg3 includes a TTI duration of Msg3.

15. (Withdrawn) The method of claim 8, wherein the TTI information of Msg3 includes a start timing offset of Msg3.

16. (Currently Amended) A User Equipment (UE), comprising:

a control circuit;

a processor installed in the control circuit; and

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:

receive a message from a network, wherein the message includes numerology of Msg3, wherein the message is a dedicated message;

transmit a preamble to the network for a random access procedure;

receive a Msg2 from the network for responding the preamble; and

perform a Msg3 transmission to the network according to the numerology of Msg3.

17. (Previously Presented) The UE of claim 16, wherein the processor is further configured to execute the program code stored in the memory to:

select the numerology of Msg3 based on a PRACH (Physical Random Access Channel) resource set of the preamble or preamble set of the preamble, if there are multiple numerologies of Msg3 in the message.

18. (Previously Presented) The UE of claim 16, wherein the processor is further configured to execute the program code stored in the memory to:

select the numerology of Msg3 based on random access purpose, if there are multiple TTI information in the message.

19. (Previously Presented) The UE of claim 16, wherein the processor is further configured to execute the program code stored in the memory to:

select the numerology of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple numerologies of Msg3 in the message.

20. (Previously Presented) The UE of claim 16, wherein the processor is further configured to execute the program code stored in the memory to:

select the numerology of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple numerologies of Msg3 in the message.

21. (Withdrawn) A User Equipment (UE), comprising:

a control circuit;

a processor installed in the control circuit; and

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:

transmit a preamble to a network;

receive a Msg2 from the network in response to the preamble, wherein the Msg2 contains a TTI (Transmission Time Interval) information of Msg3; and

perform a Msg3 transmission to the network according to the TTI information of Msg3.

22. (Withdrawn) The UE of claim 21, wherein the processor is further configured to execute the program code stored in the memory to:

the UE selects the TTI information of Msg3 based on random access purpose, if there are multiple TTI information of Msg3 in the Msg2.

23. (Withdrawn) The UE of claim 21, wherein the processor is further configured to execute the program code stored in the memory to:

the UE selects the TTI information of Msg3 based on a PRACH (Physical Random Access Channel) resource set of the preamble or a preamble set of the preamble transmission, if there are multiple TTI information of Msg3 in the Msg2.

24. (Withdrawn) The UE of claim 21, wherein the processor is further configured to execute the program code stored in the memory to:

the UE selects the TTI information of Msg3 based on highest priority of logical channel having available data, if there are multiple TTI information of Msg3 in the Msg2.

REMARKS

Claims 1-7 and 16-20 are pending in the application. In the Office Action, claims 1-7 and 16-20 stand rejected under 35 U.S.C. § 103 as being unpatentable over Mujtaba (U.S. Patent Publication No. 2016/0366705) in view of Yoon (U.S. Patent Publication No. 2007/0268812). *See* Office Action, ¶ 5. Claims 1 and 16 have been amended. No new matter has been added. Applicants respectfully request reconsideration of the claims as amended.

Claims 1 and 16 recite the UE "receives [or receive] a message from a network, wherein the message includes numerology of Msg3, wherein the message is a dedicated message." Applicants respectfully submit that the combination of Mujtaba and Yoon fails to disclose the noted limitations.

The Office Action admits that "Mujtaba doesn't explicitly teach the information numerology for a message." *See* Office Action, Page 3. Nevertheless, the Office Action cites to Yoon in rejecting the claims.

Applicants respectfully disagree. First, Applicants respectfully submit that the combination of Mujtaba and Yoon fails to disclose that "the message is a dedicated message" as recited in the claims.

Second, Applicants respectfully submit that combining Mujtaba and Yoon to arrive at the claimed invention is improper. MPEP § 2143.01(V) states that "[i]f proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)". MPEP § 2143.01(VI) states that "[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959)".

Although Paragraphs [0054], [0061], and [0062] of Yoon mention "numerology", the numerology disclosed in Yoon is related to OFDM symbol design and is addressed in length of cyclic prefix. *See* Yoon, Paragraphs [0036]-[0052]. However, Yoon focuses on efficient transmission based on selecting variable duration of cyclic prefix for different environments (ex: indoor environment or outdoor environment). Yoon fails to teach or disclose any features related random access procedure. Under the circumstances, Applicants respectfully submit that

Samsung Exhibit 1009, Page 348 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

combining the Msg3 for different link budgets discussed in Mujtaba with the numerology for different environments disclosed in Yoon is improper because such combination would frustrate the principle of operation of Mujtaba.

As such, Applicants respectfully submit that a person of ordinary skill in the art would not have a reason to combine Mujtaba and Yoon to arrive at the claimed invention.

For the reasons discussed above, Applicants respectfully submit that claims 1-7 and 16-20 are patentable over the combination of Mujtaba and/or Yoon.

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: April 25, 2019

/Sang N. Dang/
Reg. No. 51,186
Tel.: (714) 839-3800

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Wei-Yu Chen and Li-Chih Tseng	
Title:	METHOD AND APPARATUS FOR IMPROVING Msg3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM	
Serial No.:	15/663,674	Filed: July 28, 2017
Examiner:	Pakee Fang	Group Art Unit: 8966
Attorney Docket No.:	1426-136.101 (1050153-US)	

CERTIFICATE OF EFS-WEB TRANSMISSION
UNDER 37 CFR § 1.8

I hereby certify that the enclosed 2 Page Amendment Transmittal Sheet; and 7 Page Amendment are being transmitted to the United States Patent and Trademark Office via EFS-Web on April 25, 2019.

Date: April 25, 2019 /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:	35833510
Application Number:	15663674
International Application Number:	
Confirmation Number:	8966
Title of Invention:	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM
First Named Inventor/Applicant Name:	Wei-Yu Chen
Customer Number:	106622
Filer:	Sang N. Dang/Sandy Kim
Filer Authorized By:	Sang N. Dang
Attorney Docket Number:	1426-136.101
Receipt Date:	25-APR-2019
Filing Date:	28-JUL-2017
Time Stamp:	15:41:44
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		1426-136-101--ROAof01312019asFiled04252019.pdf	146747 a1b4d01d6eb87b00b49a1ed29901d8f3d62fdba8	yes	10

	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	7
	Applicant Arguments/Remarks Made in an Amendment	8	9
	Miscellaneous Incoming Letter	10	10
Warnings:			
Information:			
	Total Files Size (in bytes):	146747	

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
1426-136.101

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

Title of Invention

METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM

First Named Inventor	Wei-Yu Chen
Application No.	15/663,674
Filing Date	July 28, 2017
Examiner	Pakee Fang
Art Unit	2642

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	24	- 24 =		x ☐ =	
Total Indep. Claims	4	- 4 =		x =	
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

Samsung Exhibit 1009, Page 353 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

Amendment Transmittal Letter

Docket Number
1426-136.101

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	04/25/2019

Samsung Exhibit 1009, Page 354 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

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 Substitute for Form PTO-875	Application or Docket Number 15/663,674	Filing Date 07/28/2017	☐ 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 $80 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $420 =	
☐ 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	04/25/2019	(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))	* 22	Minus	** 24	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 4	= 0		x $460 =	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 $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ 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.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/MINNIE A JACKSON/
*** 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.	

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/663,674	07/28/2017	Wei-Yu Chen	1426-136.101	8966

106622 7590 05/08/2019

Blue Capital Law Firm, P.C.
650 Town Center Drive, Suite 1530
Costa Mesa, CA 92626

EXAMINER	
FANG, PAKEE	

ART UNIT	PAPER NUMBER
2642	

NOTIFICATION DATE	DELIVERY MODE
05/08/2019	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

Office Action Summary	**Application No.** 15/663,674	**Applicant(s)** Chen et al.	
	Examiner PAKEE FANG	**Art Unit** 2642	**AIA (FITF) Status** Yes

-- 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 04/25/2018.

☐ 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) 1-24 is/are pending in the application.

5a) Of the above claim(s) 8-15 and 21-24 is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-7 and 16-20 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 _____ 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: _____.

DETAILED ACTION

Response to Amendment

1. The amendment filed on 04/25/2018 has been entered and considered by Examiner.

Claims 1-24 are presented for examination. Claims 8-15 and 21-24 are withdrawn. This Action is made FINAL.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102 of this title, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1-7 and 16-20** are rejected under 35 U.S.C. 103 as being unpatentable over Mujtaba et al. (US Pub. 20160366705 A1) in view Yoon et al. (US Pub. 20070268812 A1) in further view of Wu (US Pub. 20170111933 A1).

For claim 1, Mujtaba disclose (Figs. 1-7) a method of a UE (User Equipment) for performing random access procedure, comprising:

the UE receives a message from a network, wherein the message includes information of Msg3 [0076, 0080, 0063-65],

the UE transmits a preamble to the network for a random access procedure (Step 502/602) [0006, 0060-61, 0070-73];

the UE receives a Msg2 from the network for responding the preamble (Step 504/604) [0062, 0074-79]; and

the UE performs a Msg3 transmission to the network according to the information of Msg3 [0076, 0080, 0063-65].

But Mujtaba doesn't explicitly teach the information can be information can be numerology for a message.

However, Yoon (Figs. 2-3) discloses a message can contain information of numerology [0054, 0060-62].

Since, all are analogous arts addressing data info use in a mobile device; Therefore, it would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to combine the teachings of Mujtaba and Yoon to ensure the information message send among the communication can be properly organize, thus, enhancing communication capabilities of the network.

But Mujtaa and Yoon doesn't explicitly teach wherein the message is a dedicated message;

However, Wu discloses the UE receives a message from a network, wherein the message includes information of Msg3 [0052, 0036], wherein the message is a dedicated message [0052, 0036];

Since, all are analogous arts addressing data info use in a mobile device; Therefore, it would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to combine the teachings of Mujtaba, Yoon, and Wu to ensure the security of the data is protected, thus, improving data integrity.

For claim 16, Mujtaba disclose (Figs. 1-7) A User Equipment (UE), comprising: a control circuit; a processor installed in the control circuit; and a memory installed in the control circuit and operatively coupled to the processor [0029, 0032, 0043, 0046-49]; wherein the processor is configured to execute a program code stored in the memory to:

receive a message from a network, wherein the message includes information of Msg3 [0076, 0080, 0063-65];

transmit a preamble to the network for a random access procedure (Step 502/602) [0006, 0060-61, 0070-73];

receive a Msg2 from the network for responding the preamble (Step 504/604) [0062, 0074-79]; and

perform a Msg3 transmission to the network according to the information of Msg3 [0076, 0080, 0063-65].

But Mujtaba doesn't explicitly teach the information can be information can be numerology for a message.

However, Yoon (Figs. 2-3) discloses a message can contain information of numerology [0054, 0060-62].

Since, all are analogous arts addressing data info use in a mobile device; Therefore, it would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to combine the teachings of Mujtaba and Yoon to ensure the information message send among the communication can be properly organize, thus, enhancing communication capabilities of the network.

But Mujtaa and Yoon doesn't explicitly teach wherein the message is a dedicated message;

However, Wu discloses the UE receives a message from a network, wherein the message includes information of Msg3 [0052, 0036], wherein the message is a dedicated message [0052, 0036];

Since, all are analogous arts addressing data info use in a mobile device; Therefore, it would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to combine the teachings of Mujtaba, Yoon, and Wu to ensure the security of the data is protected, thus, improving data integrity.

For claims 2 and 17, Mujtaba, as modified by Yoon and Li, disclose (Figs. 1-7) the UE selects the Numerology of Msg3 based on a PRACH (Physical Random Access Channel) resource set of the preamble or preamble set of the preamble, if there are multiple Numerology of Msg3 in the message [0076, 0080, 0063-65].

For claims 3 and 18, Mujtaba, as modified by Yoon and Li, disclose (Figs. 1-7) the UE selects the Numerology of Msg3 based on random access purpose, if there are multiple Numerology in the message [0076, 0080, 0063-65].

For claims 4 and 19, Mujtaba, as modified by Yoon and Li, disclose (Figs. 1-7) the UE selects the Numerology of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple Numerology of Msg3 in the message [0084-85].

For claim 5, Mujtaba, as modified by Yoon and Li, disclose (Figs. 1-7) the message is a downlink control signal [0075, 0058, 0095].

For claim 6, Mujtaba, as modified by Yoon and Li, disclose (Figs. 1-7) the message is a RRC (Radio Resource Control) message [0075, 0058, 0095].

For claims 7 and 20, Mujtaba, as modified by Yoon and Li, disclose (Figs. 1-7) the UE selects the Numerology of Msg3 based on a random access configuration of the preamble transmission, if there are multiple Numerology of Msg3 in the message [0076, 0080, 0061-65, 0058].

Response to Arguments

4. Applicant's arguments with respect to claims **1-7 and 16-20** have been considered but are moot in view of the new ground(s) of rejection.

In view of amendment, the reference Li has been used for new ground of rejections.

Conclusion

5. 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 date of this final action.

Inquiries

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to PAKEE FANG whose telephone number is (571)270-3633. The Examiner can normally be reached on Mon-Fri 9:00AM-5:00PM. If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, PÉREZ-GUTIÉRREZ RAFAEL can be reached on 571-272-7915. 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.

/PAKEE FANG/
Primary Examiner, Art Unit 2642

Notice of References Cited	Application/Control No. 15/663,674	Applicant(s)/Patent Under Reexamination Chen et al.	
	Examiner PAKEE FANG	Art Unit 2642	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-20170111933-A1	04-2017	Wu; Chih-Hsiang	H04W74/006	1/1
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

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.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/663,674	Chen et al.
	Examiner	Art Unit
	PAKEE FANG	2642

CPC - Searched*		
Symbol	Date	Examiner
H04W74/0833, H04W48/16, H04W72/1284, H04W74/006, H04L1/1607	5/23/2018	PF

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
455	combined text	5/23/2018	PF

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
East search, Google, inventors	5/23/2018	PF
updated search	09/24/2018	PF
updated search	01/24/2019	PF
updated search	05/02/2019	PF

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/663,674	Chen et al.
	Examiner	**Art Unit**
	PAKEE FANG	2642

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/29/2018	05/23/2018	09/24/2018	01/24/2019	05/02/2019				
	1	÷	✓	✓	✓	✓				
	2	÷	✓	✓	✓	✓				
	3	÷	✓	✓	✓	✓				
	4	÷	✓	✓	✓	✓				
	5	÷	✓	✓	✓	✓				
	6	÷	✓	✓	✓	✓				
	7	÷	✓	✓	✓	✓				
	8	÷	N	N	N	N				
	9	÷	N	N	N	N				
	10	÷	N	N	N	N				
	11	÷	N	N	N	N				
	12	÷	N	N	N	N				
	13	÷	N	N	N	N				
	14	÷	N	N	N	N				
	15	÷	N	N	N	N				
	16	÷	✓	✓	✓	✓				
	17	÷	✓	✓	✓	✓				
	18	÷	✓	✓	✓	✓				
	19	÷	✓	✓	✓	✓				
	20	÷	✓	✓	✓	✓				
	21	÷	N	N	N	N				
	22	÷	N	N	N	N				
	23	÷	N	N	N	N				
	24	÷	N	N	N	N				

Samsung Exhibit 1009, Page 367 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L6	7	(US-20170339546-$ or US-20170019931-$ or US-20160366705-$ or US-20150365977-$ or US-20090316811-$ or US-20140334448-$ or US-20070268812-$).did.	US-PGPUB	OR	ON	2019/05/02 15:32
L7	0	6 and (dedicat$4) near4 (messag4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/05/02 15:33
L8	17	("455" "370").clas. and Numerology same (preamble)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/05/02 15:33
L9	15	@ay<"2017" and L8	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/05/02 15:33
L10	100841	(H04W74/0833, H04W48/16, H04W72/1284, H04W74/006, H04L1/1607).CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/05/02 15:33
L11	6926	L10 and (preamble heading) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/05/02 15:33
L12	1690	L11 and ((Transmission adj2 Time adj2 Interval) TTI)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/05/02 15:33
L13	160	L12 and ((Transmission adj2 Time adj2 Interval) TTI) with (first second new third fourth) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/05/02 15:33
L14	91	@ay<"2017" and L13	US-PGPUB;	OR	ON	2019/05/02

Samsung Exhibit 1009, Page 368 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			15:33
L15	0	14 and (dedicat$4) near4 (messag4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/05/02 15:36
L16	0	13 and (dedicat$4) near4 (messag4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/05/02 15:36
L17	0	12 and (dedicat$4) near4 (messag4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/05/02 15:36
L18	11	14 and (dedicat$4) near4 (messag$14)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/05/02 15:37
L19	1	"20180227958" and (dedicat$4) near4 (messag$14)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/05/02 15:50
L20	1	"20180227958" and (dedicat$4) same (RAR)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/05/02 15:50
S1	2	"20180035470".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:17
S2	2	S1 and (frame msg$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:26
S3	82131	(H04W74/0833, H04W48/16, H04W72/1284, H04W74/006, H04L1/1607).CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:29
S4	5501	S3 and (preamble heading) with	US-PGPUB;	OR	ON	2018/05/21

Samsung Exhibit 1009, Page 369 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

		(frame message msg sub$1frame band sub$1band packet)	USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			16:33
S5	1227	S4 and ((Transmission adj2 Time adj2 Interval) TTI)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:35
S6	78	S5 and ((Transmission adj2 Time adj2 Interval) TTI) with (first second new third fourth) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:37
S7	66	@ay<"2017" and S6	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 17:41
S8	95587	(H04W74/0833, H04W48/16, H04W72/1284, H04W74/006, H04L1/1607).CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:43
S9	6513	S8 and (preamble heading) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:43
S10	1554	S9 and ((Transmission adj2 Time adj2 Interval) TTI)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:43
S11	128	S10 and ((Transmission adj2 Time adj2 Interval) TTI) with (first second new third fourth) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:43
S12	82	@ay<"2017" and S11	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:43
S13	3	S12 and Numerology	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:43
S14	2	"20160366705".pn.	US-PGPUB;	OR	ON	2019/01/24

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			15:44
S15	0	S14 and Numerology	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:47
S16	7	S8 and Numerology with (message) same (preamble)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:01
S17	1	@ay<"2017" and S16	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:01
S18	3	"20180035470".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:15
S19	0	("455" "370").clas. and Numerology with (message) same (preamble)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:17
S20	7	Numerology with (message) same (preamble)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:18
S21	1	@ay<"2017" and S20	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:18
S22	0	("455" "370").clas. and Numerology with (message)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:18
S23	16	("455" "370").clas. and Numerology same (preamble)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:18
S24	15	@ay<"2017" and S23	US-PGPUB;	OR	ON	2019/01/24

Samsung Exhibit 1009, Page 371 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			16:18
S25	525	("455" "370").clas. and Numerology	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 17:59
S26	8	("20150099528" "20170280400")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/28 10:05
S27	5	("20150099528" "20170280400").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/28 10:05

5/2/2019 4:31:44 PM
C:\Users\pfang\Documents\EAST\Workspaces\15663674.wsp

Samsung Exhibit 1009, Page 372 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

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 Substitute for Form PTO-875	Application or Docket Number 15/663,674	Filing Date 07/28/2017	☐ 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 $80 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $420 =	
☐ 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

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	08/08/2019	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 24	Minus	** 20	= 4		x $100 =	400
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 3	= 1		x $460 =	460
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	860

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ 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.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/MONICA D FRANCIS/
*** 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.	

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.

Doc code: RCEX
Doc description: Request for Continued Examination (RCE)

PTO/SB/30EFS (02-18)
Approved for use through 11/30/2020. 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.

REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL
(Submitted Only via EFS-Web)

Application Number	15/663,674	Filing Date	2017-07-28	Docket Number (if applicable)	1426-136.101	Art Unit	2642
First Named Inventor	Wei-Yu Chen			Examiner Name	Pakee Fang		

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. The Instruction Sheet for this form is located at WWW.USPTO.GOV

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).

☐ 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.

- ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____
- ☐ Other _____

☒ Enclosed

- ☒ Amendment/Reply
- ☐ Information Disclosure Statement (IDS)
- ☐ Affidavit(s)/ Declaration(s)
- ☐ Other _____

MISCELLANEOUS

☐ 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 CFR 1.17(i) required)

☐ Other _____

FEES

☐ **The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**
The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No _____

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

☒ Patent Practitioner Signature

☐ Applicant Signature

PTO/SB/30EFS (02-18)
Approved for use through 11/30/2020. 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.

Signature of Registered U.S. Patent Practitioner			
Signature	/Sang N. Dang/	Date (YYYY-MM-DD)	2019-08-08
Name	Sang N. Dang	Registration Number	51186

This collection of information is required by 37 CFR 1.114. 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.

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

Amendment Transmittal Letter

Docket Number
1426-136.101

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

Title of Invention

METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM

First Named Inventor	Wei-Yu Chen
Application No.	15/663,674
Filing Date	July 28, 2017
Examiner	Pakee Fang
Art Unit	2642

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	24	- 24 =		x ☐ =	
Total Indep. Claims	4	- 4 =		x =	
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

Samsung Exhibit 1009, Page 376 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

Amendment Transmittal Letter

Docket Number
1426-136.101

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	08-08-2019

Samsung Exhibit 1009, Page 377 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	15/663,674
Confirmation No.	:	8966
Applicant	:	Wei-Yu Chen and Li-Chi Tseng
Filed	:	July 28, 2017
Title	:	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM
TC/A.U.	:	2642
Examiner	:	Pakee Fang
Docket No.	:	1426-136.101 (1050153-US)
Customer No.	:	106622

RESPONSE 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 May 8, 2019, having a three-month period for filing a response to **August 8, 2019**, Applicants respectfully submit the following amendments and remarks along with a RCE.

Amendments to Claims begin on page 2.
Remarks begin on page 6.

Samsung Exhibit 1009, Page 378 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

IN THE CLAIMS:

1. (Currently Amended) A method of a UE (User Equipment) for performing random access procedure, comprising:

the UE receives a message from a network, wherein the message includes numerology of Msg3 of a PRACH (Physical Random Access Channel) process, wherein the message is a dedicated message;

the UE transmits a preamble to the network for a random access procedure;

the UE receives a Msg2 from the network for responding the preamble; and

the UE performs a Msg3 transmission to the network according to the numerology of Msg3 of the PRACH process.

2. (Currently Amended) The method of claim 1, further comprising:

the UE selects the numerology of Msg3 based on a PRACH ~~(Physical Random Access Channel)~~ resource set of the preamble or preamble set of the preamble, if there are multiple numerologies of Msg3 in the message.

3. (Previously Presented) The method of claim 1, further comprising:

the UE selects the numerology of Msg3 based on random access purpose, if there are multiple TTI information in the message.

4. (Previously Presented) The method of claim 1, further comprising:

the UE selects the numerology of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple numerologies of Msg3 in the message.

5. (Original) The method of claim 1, wherein the message is a downlink control signal.

6. (Original) The method of claim 1, wherein the message is a RRC (Radio Resource Control) message.

7. (Previously Presented) The method of claim 1, further comprising:

the UE selects the numerology of Msg3 based on a random access configuration of the preamble transmission, if there are multiple-numerologies of Msg3 in the message.

8. (Withdrawn) A method of a UE (User Equipment) for performing random access procedure, comprising:

the UE transmits a preamble to a network;

the UE receives a Msg2 from the network in response to the preamble, wherein the Msg2 contains a TTI (Transmission Time Interval) information of Msg3; and

the UE performs a Msg3 transmission to the network according to the TTI information.

9. (Withdrawn) The method of claim 8, further comprising:

the UE selects the TTI information of Msg3 based on random access purpose, if there are multiple TTI information of Msg3 in the Msg2.

10. (Withdrawn) The method of claim 8, further comprising:

the UE selects the TTI information of Msg3 based on a PRACH (Physical Random Access Channel) resource set of the preamble transmission or a preamble set of the preamble transmission, if there are multiple TTI information of Msg3 in the Msg2.

11. (Withdrawn) The method of claim 8, further comprising:

the UE selects the TTI information of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple TTI information of Msg3 in the Msg2.

12. (Withdrawn) The method of claim 8, wherein the TTI information of Msg3 is included in a RAR (Random Access Response) for responding the preamble.

13. (Withdrawn) The method of claim 8, wherein the TTI information of Msg3 is included in a common field for multiple RARs in the Msg2.

14. (Withdrawn) The method of claim 8, wherein the TTI information of Msg3 includes a TTI duration of Msg3.

15. (Withdrawn) The method of claim 8, wherein the TTI information of Msg3 includes a start timing offset of Msg3.

16. (Currently Amended) A User Equipment (UE), comprising:

a control circuit;

a processor installed in the control circuit; and

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:

receive a message from a network, wherein the message includes numerology of Msg3 of a PRACH (Physical Random Access Channel) process, wherein the message is a dedicated message;

transmit a preamble to the network for a random access procedure;

receive a Msg2 from the network for responding the preamble; and

perform a Msg3 transmission to the network according to the numerology of Msg3 of the PRACH process.

17. (Currently Amended) The UE of claim 16, wherein the processor is further configured to execute the program code stored in the memory to:

select the numerology of Msg3 based on a PRACH ~~(Physical Random Access Channel)~~ resource set of the preamble or preamble set of the preamble, if there are multiple numerologies of Msg3 in the message.

18. (Previously Presented) The UE of claim 16, wherein the processor is further configured to execute the program code stored in the memory to:

select the numerology of Msg3 based on random access purpose, if there are multiple TTI information in the message.

19. (Previously Presented) The UE of claim 16, wherein the processor is further configured to execute the program code stored in the memory to:

select the numerology of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple numerologies of Msg3 in the message.

20. (Previously Presented) The UE of claim 16, wherein the processor is further configured to execute the program code stored in the memory to:

select the numerology of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple numerologies of Msg3 in the message.

21. (Withdrawn) A User Equipment (UE), comprising:

a control circuit;

a processor installed in the control circuit; and

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:

transmit a preamble to a network;

receive a Msg2 from the network in response to the preamble, wherein the Msg2 contains a TTI (Transmission Time Interval) information of Msg3; and

perform a Msg3 transmission to the network according to the TTI information of Msg3.

22. (Withdrawn) The UE of claim 21, wherein the processor is further configured to execute the program code stored in the memory to:

the UE selects the TTI information of Msg3 based on random access purpose, if there are multiple TTI information of Msg3 in the Msg2.

23. (Withdrawn) The UE of claim 21, wherein the processor is further configured to execute the program code stored in the memory to:

the UE selects the TTI information of Msg3 based on a PRACH (Physical Random Access Channel) resource set of the preamble or a preamble set of the preamble transmission, if there are multiple TTI information of Msg3 in the Msg2.

24. (Withdrawn) The UE of claim 21, wherein the processor is further configured to execute the program code stored in the memory to:

the UE selects the TTI information of Msg3 based on highest priority of logical channel having available data, if there are multiple TTI information of Msg3 in the Msg2.

REMARKS

Claims 1-7 and 16-20 are pending in the application. In the Office Action, claims 1-7 and 16-20 stand rejected under 35 U.S.C. § 103 as being unpatentable over Mujtaba (U.S. Patent Publication No. 2016/0366705) in view of Yoon (U.S. Patent Publication No. 2007/0268812) and further in view of Wu (U.S. Patent Publication No. 2017/0111933). *See* Office Action, ¶ 3.

Claims 1, 2, 16, and 17 have been amended. No new matter has been added. Applicants respectfully request reconsideration of the claims as amended.

Claims 1 and 16 recite "receive a message from a network, wherein the message includes numerology of Msg3 of a PRACH (Physical Random Access Channel) process, wherein the message is a dedicated message", "transmit a preamble to the network for a random access procedure", and "perform a Msg3 transmission to the network according to the numerology of Msg3 of the PRACH process." Applicants respectfully submit that the combination of Mujtaba, Yoon, and/or Wu fails to disclose the noted limitations.

First, Applicants respectfully submit that none of the cited prior art references discloses UE receives numerology for transmitting Msg3 of a PRACH process as recited in the claims.

Furthermore, although the Office Action admits that "Mujtaba doesn't explicitly teach the information numerology for a message", the Office Action nevertheless cites to Yoon in rejecting the claims. *See* Office Action, Page 3. Applicants respectfully disagree.

In particular, Paragraph [0060] of Yoon states:

> [0060] As discussed, in transmitting an indication to the AT from the BS (or the network) to either use the indoor or outdoor numerology, a super frame preamble can be used, The super frame consists of 25 physical frames and a preamble. Each physical frame consists of 8 OFOM symbols (e.g., 8.times.113.93 us (6.51 us CP) 911.44 us). Moreover, the preamble contains 8 OFDM symbols. Furthermore, a first RL physical frame is elongated top align FL and RL transmissions. FIG. 2 is an exemplary diagram illustrating a super frame structure in FL and RL. FIG. 3 is another exemplary diagram illustrating a super frame structure in FL and RL.

Applicants respectfully submit that although Yoon shows ways of frame construction for either indoor or outdoor numerology, Yoon fails to disclose providing numerology information to the UE for a Msg3 in a PRACH process.

Samsung Exhibit 1009, Page 383 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

In addition, Applicants respectfully submit that combining Mujtaba and Yoon to arrive at the claimed invention is improper. MPEP § 2143.01(V) states that "[i]f proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)". Furthermore, MPEP § 2143.01(VI) states that "[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959)".

Mujtaba teaches and discusses that (1) a low MCS grant could be provided for a link budget constrained wireless device, and (2) the BS may determine that the link budget constrained wireless device should implement TTI-B. *See e.g.*, Mujtaba, FIG. 5. In contrast, although Paragraphs [0054], [0061], and [0062] of Yoon mention "numerology", the numerology disclosed in Yoon is related to OFDM symbol design and is addressed in length of cyclic prefix. *See* Yoon, Paragraphs [0036]-[0052]. Furthermore, Yoon focuses on efficient transmission based on selecting variable duration of cyclic prefix for different environments (ex: indoor environment or outdoor environment). However, Yoon fails to teach or disclose any features related to random access procedure or to providing numerology information to the UE for a MSG in a PRACH process. Under the circumstances, Applicants respectfully submit that combining the Msg3 for different link budgets discussed in Mujtaba with the numerology for different environments disclosed in Yoon is improper because such combination would frustrate the principle of operation of Mujtaba. As such, Applicants respectfully submit that a person of ordinary skill in the art would not have a reason to combine Mujtaba and Yoon to arrive at the claimed invention.

For the reasons discussed above, Applicants respectfully submit that claims 1-7 and 16-20 are patentable over any combination of Mujtaba, Yoon, and/or Wu.

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.

Samsung Exhibit 1009, Page 384 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

Respectfully submitted,

Sang N. Dang

BLUE CAPITAL LAW FIRM, P.C.

Dated: August 8, 2019

/Sang N. Dang/

Reg. No. 51,186

Tel.: (714) 839-3800

Samsung Exhibit 1009, Page 385 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants:	Wei-Yu Chen and Li-Chih Tseng	
Title:	METHOD AND APPARATUS FOR IMPROVING Msg3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM	
Serial No.:	15/663,674	Filed: July 28, 2017
Examiner:	Pakee Fang	Group Art Unit: 8966
Attorney Docket No.:	1426-136.101 (1050153-US)	

CERTIFICATE OF EFS-WEB TRANSMISSION
UNDER 37 CFR § 1.8

I hereby certify that the enclosed 2 Page Request for Continued Examination; 2 Page Amendment Transmittal Sheet; and 8 Page Amendment are being transmitted to the United States Patent and Trademark Office via EFS-Web on August 8, 2019.

Date: August 8, 2019 /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:	15663674
Filing Date:	28-Jul-2017
Title of Invention:	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM
First Named Inventor/Applicant Name:	Wei-Yu Chen
Filer:	Sang N. Dang/Sandy Kim
Attorney Docket Number:	1426-136.101

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($)
Miscellaneous:				
RCE- 2ND AND SUBSEQUENT REQUEST	1820	1	1900	1900
		Total in USD ($)		**1900**

Electronic Acknowledgement Receipt	
EFS ID:	36820632
Application Number:	15663674
International Application Number:	
Confirmation Number:	8966
Title of Invention:	METHOD AND APPARATUS FOR IMPROVING MSG3 TRANSMISSION OF RANDOM ACCESS PROCEDURE IN A WIRELESS COMMUNICATION SYSTEM
First Named Inventor/Applicant Name:	Wei-Yu Chen
Customer Number:	106622
Filer:	Sang N. Dang/Sandy Kim
Filer Authorized By:	Sang N. Dang
Attorney Docket Number:	1426-136.101
Receipt Date:	08-AUG-2019
Filing Date:	28-JUL-2017
Time Stamp:	13:21:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1900
RAM confirmation Number	E201988D22311245
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		1426-136-101--RFOAwRCEasFiled08082019.pdf	241456 f774a352107f70fa3ef6ea1fb03239617a954b15	yes	13

Multipart Description/PDF files in .zip description

Document Description	Start	End
Request for Continued Examination (RCE)	1	2
Transmittal Letter	3	4
Amendment Submitted/Entered with Filing of CPA/RCE	5	5
Claims	6	9
Applicant Arguments/Remarks Made in an Amendment	10	12
Miscellaneous Incoming Letter	13	13

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30769 da82a30515de39ca69a7446937755c9f7e37c7ce	no	2

Warnings:

Information:

Total Files Size (in bytes):	272225

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.
15/663,674	07/28/2017	Wei-Yu Chen	1426-136.101	8966

106622 7590 08/28/2019

Blue Capital Law Firm, P.C.
650 Town Center Drive, Suite 1530
Costa Mesa, CA 92626

EXAMINER	
FANG, PAKEE	

ART UNIT	PAPER NUMBER
2642	

NOTIFICATION DATE	DELIVERY MODE
08/28/2019	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

Office Action Summary	**Application No.** 15/663,674	**Applicant(s)** Chen et al.	
	Examiner PAKEE FANG	**Art Unit** 2642	**AIA (FITF) Status** Yes

-- 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 08/08/2019.

☐ 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) 1-24 is/are pending in the application.

5a) Of the above claim(s) 8-15 and 21-24 is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-7 and 16-20 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 _____ 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: _____.

DETAILED ACTION

Response to Amendment

1. The amendment filed on 08/08/2019 has been entered and considered by Examiner.

Claims 1-24 are presented for examination. Claims 8-15 and 21-24 are withdrawn.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08/08/2019 has been entered.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

> A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102 of this title, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 1-7 and 16-20** are rejected under 35 U.S.C. 103 as being unpatentable over Mujtaba et al. (US Pub. 20160366705 A1) in view Yoon et al. (US Pub. 20070268812 A1) in further view of Wu (US Pub. 20170111933 A1).

For claim 1, Mujtaba disclose (Figs. 1-7) a method of a UE (User Equipment) for performing random access procedure, comprising:

the UE receives a message from a network, wherein the message includes information of Msg3 of a PRACH (Physical Random Access Channel) process [0076, 0080, 0063-65],

the UE transmits a preamble to the network for a random access procedure (Step 502/602) [0006, 0060-61, 0070-73];

the UE receives a Msg2 from the network for responding the preamble (Step 504/604) [0062, 0074-79]; and

the UE performs a Msg3 transmission to the network according to the information of Msg3 of the PRACH process [0076, 0080, 0063-65].

But Mujtaba doesn't explicitly teach the information can be information can be numerology for a message.

However, Yoon (Figs. 2-3) discloses a message can contain information of numerology [0054, 0060-62].

Since, all are analogous arts addressing data info use in a mobile device; Therefore, it would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to combine the teachings of Mujtaba and Yoon to ensure the information message send among the communication can be properly organize, thus, enhancing communication capabilities of the network.

But Mujtaa and Yoon doesn't explicitly teach wherein the message is a dedicated message;

However, Wu discloses the UE receives a message from a network, wherein the message includes information of Msg3 [0052, 0036], wherein the message is a dedicated message [0052, 0036];

Since, all are analogous arts addressing data info use in a mobile device; Therefore, it would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to combine the teachings of Mujtaba, Yoon, and Wu to ensure the security of the data is protected, thus, improving data integrity.

For claim 16, Mujtaba disclose (Figs. 1-7) A User Equipment (UE), comprising: a control circuit; a processor installed in the control circuit; and a memory installed in the control circuit and operatively coupled to the processor [0029, 0032, 0043, 0046-49]; wherein the processor is configured to execute a program code stored in the memory to:

receive a message from a network, wherein the message includes information of Msg3 of a PRACH (Physical Random Access Channel) process [0076, 0080, 0063-65];

transmit a preamble to the network for a random access procedure (Step 502/602) [0006, 0060-61, 0070-73];

receive a Msg2 from the network for responding the preamble (Step 504/604) [0062, 0074-79]; and

perform a Msg3 transmission to the network according to the information of Msg3 of the PRACH process [0076, 0080, 0063-65].

But Mujtaba doesn't explicitly teach the information can be information can be numerology for a message.

However, Yoon (Figs. 2-3) discloses a message can contain information of numerology [0054, 0060-62].

Since, all are analogous arts addressing data info use in a mobile device; Therefore, it would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to combine the teachings of Mujtaba and Yoon to ensure the information message send among the communication can be properly organize, thus, enhancing communication capabilities of the network.

But Mujtaa and Yoon doesn't explicitly teach wherein the message is a dedicated message;

However, Wu discloses the UE receives a message from a network, wherein the message includes information of Msg3 [0052, 0036], wherein the message is a dedicated message [0052, 0036];

Since, all are analogous arts addressing data info use in a mobile device; Therefore, it would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to combine the teachings of Mujtaba, Yoon, and Wu to ensure the security of the data is protected, thus, improving data integrity.

For claims 2 and 17, Mujtaba, as modified by Yoon and Li, disclose (Figs. 1-7) the UE selects the Numerology of Msg3 based on a PRACH resource set of the preamble or preamble set of the preamble, if there are multiple Numerology of Msg3 in the message [0076, 0080, 0063-65].

For claims 3 and 18, Mujtaba, as modified by Yoon and Li, disclose (Figs. 1-7) the UE selects the Numerology of Msg3 based on random access purpose, if there are multiple Numerology in the message [0076, 0080, 0063-65].

For claims 4 and 19, Mujtaba, as modified by Yoon and Li, disclose (Figs. 1-7) the UE selects the Numerology of Msg3 based on highest priority of logical channel having data available for transmission, if there are multiple Numerology of Msg3 in the message [0084-85].

For claim 5, Mujtaba, as modified by Yoon and Li, disclose (Figs. 1-7) the message is a downlink control signal [0075, 0058, 0095].

For claim 6, Mujtaba, as modified by Yoon and Li, disclose (Figs. 1-7) the message is a RRC (Radio Resource Control) message [0075, 0058, 0095].

For claims 7 and 20, Mujtaba, as modified by Yoon and Li, disclose (Figs. 1-7) the UE selects the Numerology of Msg3 based on a random access configuration of the preamble transmission, if there are multiple Numerology of Msg3 in the message [0076, 0080, 0061-65, 0058].

Response to Arguments

5. Applicant's arguments filed 08/08/2019 have been fully considered but they are not persuasive.

6. With regard to the references failing to teach every element recited in the independent claims; the Examiner respectfully disagrees with the arguments by the Applicant. Even though, the Examiner acknowledges Applicant's invention may possess some novel features, the claims

are written too broad that can be read on the current cited prior art(s). Further actions must be taken to explicitly claim those novel features of the current application.

With regards to the argument for the limitation "*…the UE receives a message from a network, wherein the message includes information of Msg3 of a PRACH (Physical Random Access Channel) process…*", the Examiner asserts that Mujtaba discloses "*… The **Msg3** parameter(s)/characteristic(s) selected **based on the PRACH** being received from a link budget constrained wireless device may also include a MCS allocation…*" [0076]. See paragraphs [0080, 0063-65] for more details.

ARGUMENT DOES NOT REPLACE EVIDENCE WHERE EVIDENCE IS NECESSARY

The arguments made by the counsel cannot take the place of evidence in the record. The Applicant representative's arguments for the obvious reason to combine the implicit and explicit teaching of the cited reference(s) failed to provide factual support to sustain the ground of arguments. The mere statement of disagreement of the prior art made by the Applicant's representative cannot be served as evidence for support. Please see the following case law for detail:

In re Schulze, 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965); In re Geisler, 116 F.3d 1465,43 USPQ2d 1362 (Fed. Cir. 1997) ("An assertion of what seems to follow from common experience is just attorney argument and not the kind of **factual evidence that is required to rebut a prima facie case of obviousness**."). See MPEP § 716.01(c) for examples of

attorney statements which are not evidence and which must be supported by an appropriate affidavit or declaration.

ARGUING AGAINST REFERENCES INDIVIDUALLY

One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck and Co., Inc., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

All limitations, elements, and arguments cited by the Applicant had indeed been disclosed by the reference prior art(s) or addressed by the Examiner. The concurrent Office Action furthermore elaborates the explicit and implicit teaching of the disclosed reference(s). Any rationale and citation applied in the previous Office Action not challenge by the Applicant will be treated as the Applicant's admittance in the subject matter.

Inquiries

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to PAKEE FANG whose telephone number is (571)270-3633. The Examiner can normally be reached on Mon-Fri 9:00AM-5:00PM. If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, PÉREZ-GUTIÉRREZ RAFAEL can be reached on 571-272-7915. 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.

/PAKEE FANG/
Primary Examiner, Art Unit 2642

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/663,674	Chen et al.
	Examiner	Art Unit
	PAKEE FANG	2642

CPC - Searched*		
Symbol	Date	Examiner
H04W74/0833, H04W48/16, H04W72/1284, H04W74/006, H04L1/1607	5/23/2018	PF

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner
455	combined text	5/23/2018	PF

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
East search, Google, inventors	5/23/2018	PF
updated search	09/24/2018	PF
updated search	01/24/2019	PF
updated search	05/02/2019	PF
updated search	08/22/2019	PF

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/663,674	Chen et al.
	Examiner	**Art Unit**
	PAKEE FANG	2642

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	01/29/2018	05/23/2018	09/24/2018	01/24/2019	05/02/2019	08/22/2019			
	1	÷	✓	✓	✓	✓	✓			
	2	÷	✓	✓	✓	✓	✓			
	3	÷	✓	✓	✓	✓	✓			
	4	÷	✓	✓	✓	✓	✓			
	5	÷	✓	✓	✓	✓	✓			
	6	÷	✓	✓	✓	✓	✓			
	7	÷	✓	✓	✓	✓	✓			
	8	÷	N	N	N	N	N			
	9	÷	N	N	N	N	N			
	10	÷	N	N	N	N	N			
	11	÷	N	N	N	N	N			
	12	÷	N	N	N	N	N			
	13	÷	N	N	N	N	N			
	14	÷	N	N	N	N	N			
	15	÷	N	N	N	N	N			
	16	÷	✓	✓	✓	✓	✓			
	17	÷	✓	✓	✓	✓	✓			
	18	÷	✓	✓	✓	✓	✓			
	19	÷	✓	✓	✓	✓	✓			
	20	÷	✓	✓	✓	✓	✓			
	21	÷	N	N	N	N	N			
	22	÷	N	N	N	N	N			
	23	÷	N	N	N	N	N			
	24	÷	N	N	N	N	N			

Samsung Exhibit 1009, Page 403 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	2	"20180035470".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:17
S2	2	S1 and (frame msg$1)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:26
S3	82131	(H04W74/0833, H04W48/16, H04W72/1284, H04W74/006, H04L1/1607).CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:29
S4	5501	S3 and (preamble heading) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:33
S5	1227	S4 and ((Transmission adj2 Time adj2 Interval) TTI)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:35
S6	78	S5 and ((Transmission adj2 Time adj2 Interval) TTI) with (first second new third fourth) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 16:37
S7	66	@ay< "2017" and S6	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/05/21 17:41
S8	95587	(H04W74/0833, H04W48/16, H04W72/1284, H04W74/006, H04L1/1607).CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:43
S9	6513	S8 and (preamble heading) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:43
S10	1554	S9 and ((Transmission adj2 Time adj2 Interval) TTI)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:43

Samsung Exhibit 1009, Page 404 of 409
Samsung Electronics Co., Ltd. v. Asus Technology Licensing Inc.
IPR2024-01036

S11	128	S10 and ((Transmission adj2 Time adj2 Interval) TTI) with (first second new third fourth) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:43
S12	82	@ay<"2017" and S11	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:43
S13	3	S12 and Numerology	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:43
S14	2	"20160366705".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:44
S15	0	S14 and Numerology	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 15:47
S16	7	S8 and Numerology with (message) same (preamble)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:01
S17	1	@ay<"2017" and S16	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:01
S18	3	"20180035470".pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:15
S19	0	("455" "370").clas. and Numerology with (message) same (preamble)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:17
S20	7	Numerology with (message) same (preamble)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:18
S21	1	@ay<"2017" and S20	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:18
S22	0	("455" "370").clas. and Numerology with (message)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:18

S23	16	("455" "370").clas. and Numerology same (preamble)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:18
S24	15	@ay<"2017" and S23	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 16:18
S25	525	("455" "370").clas. and Numerology	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/24 17:59
S26	8	("20150099528" "20170280400")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/28 10:05
S27	5	("20150099528" "20170280400").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/01/28 10:05
S28	17	("455" "370").clas. and Numerology same (preamble)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/22 12:57
S29	15	@ay<"2017" and S28	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/22 12:57
S30	105989	(H04W74/0833, H04W48/16, H04W72/1284, H04W74/006, H04L1/1607).CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/22 12:57
S31	7450	S30 and (preamble heading) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/22 12:57
S32	1868	S31 and ((Transmission adj2 Time adj2 Interval) TTI)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/22 12:57
S33	190	S32 and ((Transmission adj2 Time adj2 Interval) TTI) with (first second new third fourth) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/22 12:57
S34	94	@ay<"2017" and S33	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/22 12:57

S35	105989	(H04W74/0833, H04W48/16, H04W72/1284, H04W74/006, H04L1/1607).CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/22 15:31
S36	7450	S35 and (preamble heading) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/22 15:31
S37	1868	S36 and ((Transmission adj2 Time adj2 Interval) TTI)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/22 15:31
S38	190	S37 and ((Transmission adj2 Time adj2 Interval) TTI) with (first second new third fourth) with (frame message msg sub$1frame band sub$1band packet)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/22 15:31
S39	94	@ay<"2017" and S38	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/22 15:31

8/22/2019 3:40:03 PM
C:\Users\pfang\Documents\EAST\Workspaces\15663674.wsp

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.
15/663,674	07/28/2017	Wei-Yu Chen	1426-136.101	8966

106622 7590 04/09/2020

Blue Capital Law Firm, P.C.
650 Town Center Drive, Suite 1530
Costa Mesa, CA 92626

EXAMINER	
FANG, PAKEE	

ART UNIT	PAPER NUMBER
2642	

NOTIFICATION DATE	DELIVERY MODE
04/09/2020	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

Notice of Abandonment	Application No.	Applicant(s)
	15/663,674	Chen et al.
	Examiner	Art Unit
	PAKEE FANG	2642

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

This application is abandoned in view of:

1. ☑ Applicant's failure to timely file a proper reply to the Office letter mailed on 28 August 2019.
   (a) ☐ A reply was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply (including a total extension of time of _____ month(s)) which expired on _____.
   (b) ☐ A proposed reply was received on _____, but it does not constitute a proper reply under 37 CFR 1.113 to the final rejection. (A proper reply under 37 CFR 1.113 to a final rejection consists only of:(1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) if this is utility or plant application, a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. Note that RCEs are not permitted in design applications.)
   (c) ☐ A reply was received on _____ but it does not constitute a proper reply, or a bona fide attempt at a proper reply, to the non-final rejection. See 37 CFR 1.85(a) and 1.111. (See explanation in box 7 below).
   (d) ☑ No reply has been received.

2. ☐ Applicant's failure to timely pay the required issue fee and publication fee, if applicable, within the statutory period of three months from the mailing date of the Notice of Allowance (PTOL-85).
   (a) ☐ The issue fee and publication fee, if applicable, was received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the statutory period for payment of the issue fee (and publication fee) set in the Notice of Allowance (PTOL-85).
   (b) ☐ The submitted fee of $ _____ is insufficient. A balance of $ _____ is due.
   The issue fee required by 37CFR 1.18 is $ _____ . The publication fee, if required by 37 CFR 1.18(d), is $ _____ .
   (c) ☐ The issue fee and publication fee, if applicable, has not been received.

3. ☐ Applicant's failure to timely file corrected drawings as required by, and within the three-month period set in, the Notice of Allowability (PTO-37).
   (a) ☐ Proposed corrected drawings were received on _____ (with a Certificate of Mailing or Transmission dated _____), which is after the expiration of the period for reply.
   (b) ☐ No corrected drawings have been received.

4. ☐ The letter of express abandonment which is signed by the attorney or agent of record or other party authorized under 37 CFR 1.33 (b). See 37 CFR 1.138(b).

5. ☐ The letter of express abandonment which is signed by an attorney or agent (acting in a representative capacity under 37 CFR 1.34) upon the filing of a continuing application.

6. ☐ The decision by the Patent Trial and Appeal Board rendered on _____ and because the period for seeking court review of the decision has expired and there are no allowed claims.

7. ☐ The dismissal of the appeal in an application having no allowed claims. (When an appeal is dismissed in an application having no allowed claims the application stands abandoned. See MPEP 1215.04 subsections I-V for an explanation of the reasons why an appeal is dismissed.)

8. ☑ The reason(s) below:

   Applicant's representative indicated the case is abandoned.

/PAKEE FANG/ Primary Examiner, Art Unit 2642	

Petitions to revive under 37 CFR 1.137, or requests to withdraw the holding of abandonment under 37 CFR 1.181, should be promptly filed to minimize any negative effects on patent term.