

1) Family number: 56438036 (US2014133370A)

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Title: PUCCH RESOURCE DETERMINATION FOR EPDCCH

Abstract: Methods, systems, and devices are described for indexing control channel elements to determine uplink channel resources. Downlink control messages may be monitored in a set of downlink subframes. The monitoring may include monitoring physical downlink control channel (PDCCH) messages in at least one of the subframes and monitoring enhanced physical downlink control channel (EPDCCH) messages in at least one of the subframes. A downlink control message may be received in at least one subframe. The downlink control message may include an EPDCCH message. An index for enhanced control channel elements (ECCes) may be determined based at least in part on the set of downlink subframes. The determined index of the ECCes may be used to identify uplink control channel resources. The ECCes may be indexed in a manner that is specific to a cell in a wireless communication system, or which is configured for a particular mobile device.

Classifications:

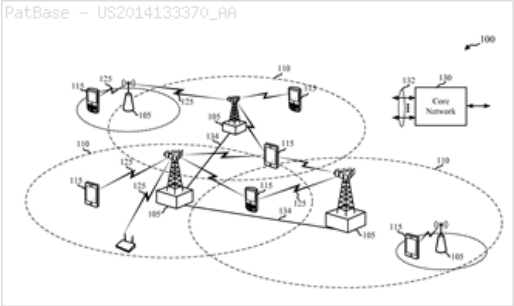
International (IPC 8-9): H04J3/00 H04L5/00 H04L5/14 H04W24/08 H04W72/04 (Advanced/Invention)

CPC: H04L5/0055 H04L5/14 H04W24/08 H04W72/042

US: 1/1 370/280 370/329

JP F-Term: 5K067 5K067/AA33 5K067/BB04 5K067/BB21 5K067/DD27 5K067/EE02 5K067/EE10 5K067/GG00 5K067/JJ22

JP F-Index: H04W72/04 H04W72/04/136



Family:

Publication number	Publication date	Application number	Application date
CN104782207 A	20150715	CN201380059026	20131015
CN104782207 B	20190430	CN201380059026	20131015
EP2921014 A1	20150923	EP20130786019	20131015
IN00979MN2015 A	20160527	IN2015MN00979	20150427
JP2016501461 T2	20160118	JP20150541779T	20131015
JP6125654 B2	20170510	JP20150541779T	20131015
KR101744916 B1	20170608	KR20157015440	20131015
KR20150084973 A	20150722	KR20157015440	20131015
US2014133370 AA	20140515	US20130964978	20130812
US9386576 BB	20160705	US20130964978	20130812
WO14077996 A1	20140522	WO2013US65027	20131015

Priority:

US20120726571P 20121114 US20130754078P 20130118 US20130964978 20130812
WO2013US65027 20131015

Probable Assignee: QUALCOMM INC

Assignee(s): (std): QUALCOMM INC ; QUALCOMM INCORPORATED

Inventor(s): (std): XU HAO ; GAAL PETER ; CHEN WANSHI ; CHEN WANGSHI

Agent(s): WEGNER HANS; HOLLAND AND HART LLP; KARREN J SCOTT

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

2) Family number: 67558170 (US2017339681A)

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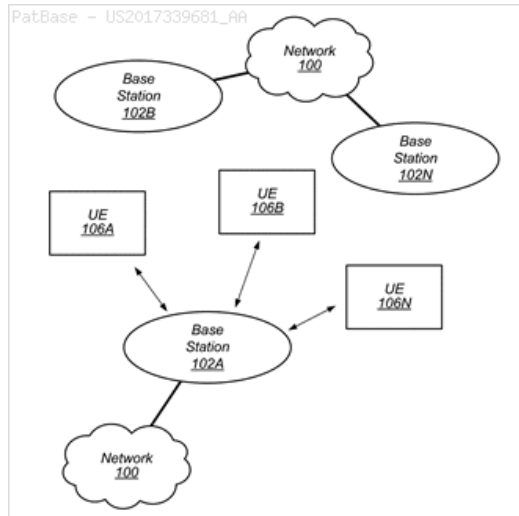
Title: CONTROL CHANNEL DESIGN FOR CATEGORY-A DEVICES

Abstract: A user equipment device (UE) may communicate according to a new device category satisfying specified QoS (quality of service) requirements while also satisfying specified link budget requirements, and additional optimization requirements. The UE may use physical channels and procedures (e.g. it may receive and decode control channels) in a manner compatible with and not infringing on the operation of other UEs operating in the same network, while allowing the network more flexibility to assign resources. Specifically, resources for EPDCCH on UE-specific SS and EPDCCH on common SS may be shared. That is, the resources for two search spaces may be overlaid partially or in full, giving the network more flexibility in allocating resources. Furthermore the DCI formats for MPDCCH may be extended to devices operating according to the new device category, which enables the coverage enhancement of MTC for these devices.

Classifications:

International (IPC 8-9): H04B7/0452 H04W72/04 (Advanced/Invention)

CPC: H04L5/0053 H04L5/0092 H04L1/0038 H04L1/0045
US: 1/1 370/329



Family:

Publication number	Publication date	Application number	Application date
US2017339681 AA	20171123	US20170598470	20170518

Priority:

US20160339726P 20160520 US20170598470 20170518

Probable Assignee: APPLE INC

Assignee(s): (std): APPLE INC

Inventor(s): (std): SMAINI LYDI ; TABET TARIK ; HUSSAIN AWAIS M ; ELSAYED MOUSTAFA M

3) Family number: 56957200 (US2016142898A)

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Title: DISCOVERY SIGNAL GENERATION AND RECEPTION

Abstract: Physical layer processing and procedures for device-to-device (D2D) discovery signal generation and transmission and scheduling of D2D discovery signals are described. Detection and measurement of a D2D discovery signal, D2D signal identity management, and monitoring by a wireless transmit/receive unit (WTRU) of PDCCH for D2D discovery scheduling is described, as is a WTRU that may be configured with a D2D-specific transmission/reception opportunity pattern. The discovery signal may carry a payload for explicit information about user and/or service identity, and may be mapped to physical resources in such a way as to decouple transmission/reception of the discovery signal from downlink operations. A WTRU may measure a D2D discovery signal quality and report to the network.

Classifications:

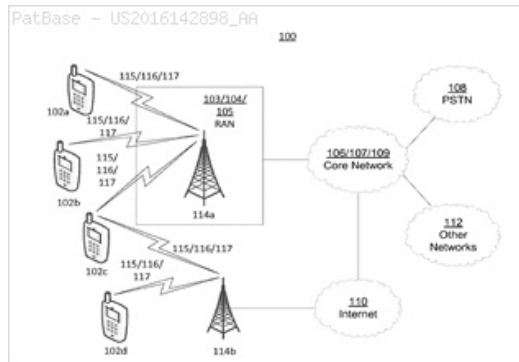
International (IPC 8-9): H04L29/02 H04L5/00 H04L5/06 H04W H04W48/08 H04W48/16 H04W72/04 H04W72/12 H04W74/04 H04W76/02 H04W76/14 H04W8/00 H04W92/18 (Advanced/Invention); H04W (Subclass/Invention)

CPC: H04L5/0012 H04L5/0044 H04L5/0048 H04W48/16 H04W72/1226 H04W76/023 H04W8/005 H04W76/14 H04W72/0413 H04W72/0446

US: 1/1 370/329

JP F-Term: 5K067/AA03 5K067/AA14 5K067/AA25 5K067/EE02 5K067/EE12 5K067/EE25 5K067/EE10 5K067/EE22 5K067/EE71 5K067/GG06 5K067/GG11

JP F-Index: H04W48/08 H04W72/04/131 H04W72/12 H04W8/00/110 H04W92/18 H04W74/04



Family:

Publication number	Publication date	Application number	Application date
CN104938021 A	20150923	CN201480005013	20140116
CN104938021 B	20190108	CN201480005013	20140116
CN109890025 A	20190614	CN201811515704	20140116
EP2946630 A1	20151125	EP20140703987	20140116
HK1211407 A1	20160520	HK20150112128	20151209
JP2016509799 T2	20160331	JP20150553818T	20140116
JP2017118591 A2	20170629	JP20170035371	20170227
JP6101822 B2	20170322	JP20150553818T	20140116
JP6412966 B2	20181024	JP20170035371	20170227
KR101821027 B1	20180122	KR20157022050	20140116
KR20150110616 A	20151002	KR20157022050	20140116
RU2015134358 A	20170222	RU20150134358	20140116
RU2629430 C2	20170829	RU20150134358	20140116
TW201446066 A	20141201	TW20140101627	20140116
TWI641283 B	20181111	TW20140101627	20140116

US2016142898 AA	20160519	US20140765201	20140116
US2019191290 AA	20190620	US20190282421	20190222
US10264437 BB	20190416	US20140765201	20140116
WO14113537 A1	20140724	WO2014US11794	20140116

Priority:

US20130753389P	20130116	US20130753173P	20130116	US20130807476P	20130402
US20130821038P	20130508	US20130882574P	20130925	US20130897738P	20131030
CN201480005013	20140116	JP20150553818T	20140116	WO2014US11794	20140116
US20140765201	20140116	US20150765201	20150731	JP20170035371	20170227
US20190282421	20190222				

Probable Assignee: INTERDIGITAL PATENT HOLDINGS INC

Assignee(s): (std): INTERDIDZHITAL PEJTENT KHOLDINGZ INK ; INTERDIGITAL PATENT HOLDINGS ; INTERDIGITAL PATENT HOLDINGS INC

Inventor(s): (std): PANI DIANA ; POITAU GWENAEAL ; PELLETIER GHYSLAIN ; MARINIER PAUL ; PELLETIER BENOIT ; RUDOLF MARIAN ; DIANA PANI ; GWENAEAL POITAU ; PAUL MARNIER ; GHYSLAIN PELLETIER ; BENOIT PELTIER ; PELLETE BENUA ; PELLETE GISLEN ; PUATO GVENAEAL ; MARINE POL

Agent(s): JOHANSSON MAGNUS; CHINA PATENT AGENT HK LTD; TANI AND ABE PC; CONDO ROCCIA KOPTIW LLP; ROCCIA VINCENT J ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

4) Family number: 55718256 (US2014036747A)

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Title: METHOD AND APPARATUS FOR RECEIVING A CONTROL CHANNEL

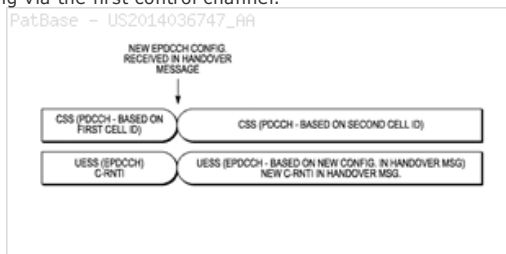
Abstract: Various methods and apparatuses for receiving a control channel involve a communication device monitoring a first control and receiving information from a network regarding the configuration of a second control channel. The communication device receives an uplink grant from the network; transmits a message to the network, in which the message indicates to the network that the communication device is capable of monitoring the second control channel. The communication device monitors the second control channel based on the configuration information receiving via the first control channel.

Classifications:

International (IPC 8-9): H04W24/00 H04W36/00 H04W4/00 H04W52/02 H04W72/04 H04W74/00 H04W74/08 (Advanced/Invention); H04W74/00 (Advanced/Non-invention)

CPC: H04W74/0833 H04W72/0406 H04W74/002

US: 1/1 370/311 370/329 370/330 370/336



Family:

Publication number	Publication date	Application number	Application date
AU2013296879 AA	20140206	AU20130296879	20130725
AU2013296879 BB	20161124	AU20130296879	20130725
AU2017201168 BA	20170330	AU20170201168	20170221
CA2879901 AA	20150122	CA20132879901	20130725
CA2879901 C	20170509	CA20132879901	20130725
DE602013044483 D1	20181031	DE201360044483T	20130725
EP2880940 A1	20150610	EP20130742821	20130725
EP2880940 B1	20181003	EP20130742821	20130725
US2014036747 AA	20140206	US20120566381	20120803
US2014293939 AA	20141002	US20140306663	20140617
US8761109 BB	20140624	US20120566381	20120803
US9320023 BB	20160419	US20140306663	20140617
WO14022179 A1	20140206	WO2013US51923	20130725

Priority:

US20120566381	20120803	AU20130296879	20130725	WO2013US51923	20130725
EP20130742821	20130725	US20140306663	20140617	AU20170201168	20170221

Probable Assignee: GOOGLE INC

Assignee(s): (std): KUCHIBHOTLA RAVI ; MOTOROLA MOBILITY LLC ; NORY RAVIKIRAN ; NIMBALKER AJIT ; LOVE ROBERT T ; NARASIMHA MURALI ; NANGIA VIJAY ; GOOGLE INC ; GOOGLE TECHNOLOGY HOLDINGS LLC

Assignee(s): GOOGLE TECHNOLOGY HOLDINGS LLC MOUNTAIN VIEW

Inventor(s): (std): NORY RAVIKIRAN ; NARASIMHA MURALI ; NIMBALKER AJIT ; NANGIA VIJAY ; KUCHIBHOTLA RAVI ; LOVE ROBERT T

Inventor(s): NORY RAVIKIRAN BUFFALO GROVE ; KUCHIBHOTLA RAVI GURNEE ; LOVE ROBERT T BARRINGTON ; NANGIA VIJAY ALGONQUIN ; NARASIMHA MURALI VERNON HILLS ; NIMBALKER AJIT BUFFALO GROVE

Agent(s): PIZZEYS; PIZZEYS PATENT AND TRADE MARK ATTORNEYS PTY LTD; GOUDREAU GAGE DUBUC; SMART AND BIGGAR; BOULT WADE TENNANT; BOULT WADE TENNANT LLP; LERNER DAVID LITTENBERG KRUMHOLZ AND MENTLIK LLP; BRETSCHER JOHN T ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN

5) Family number: 66904273 (US2019068338A)

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Title: TIMING REQUIREMENT DEPENDENT SEARCH SPACE CONFIGURATION FOR MTC DEVICES OF DIFFERENT CATEGORIES

Abstract: An access node of the wireless communication network determines a configuration of a first search space (210) in terms of first time domain coordinates and first frequency domain coordinates of a time-frequency grid of radio resource elements. Further, the access node determines a configuration of a second search space (220) in terms of second time coordinates and second frequency domain coordinates of the time-frequency grid. The second search space (220) differs from the first search space at least with respect to the time domain coordinates. In radio resource elements of the first search space (210), the access node transmits downlink control information for a first class of radio devices subject to a first timing requirement. In radio resource elements of the second search space (220), the access node transmits downlink control information for a second class of radio devices subject to a second timing requirement which is stricter than the first timing requirement.

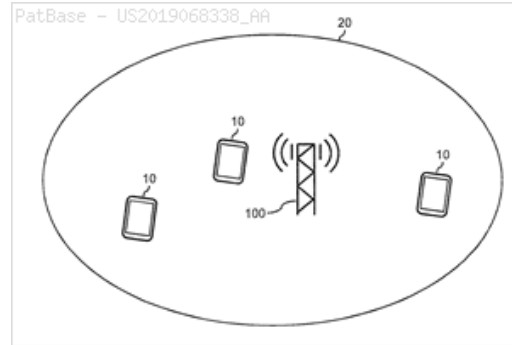
Classifications:

International (IPC 8-9): H04L1/00 H04L5/00

H04W72/04 (Advanced/Invention)

CPC: H04L5/0064 H04W4/70 H04L5/0023 H04W72/0406 H04L1/0038 H04L5/0053

US: 1/1



Family:

Publication number	Publication date	Application number	Application date
CN109075930 A	20181221	CN201680085070	20160229
EP3424170 A1	20190109	EP20160706662	20160229
IN201817032381 A	20190118	IN201817032381	20180829
US2019068338 AA	20190228	US20160080462	20160229
WO17148498 A1	20170908	WO2016EP54205	20160229

Priority:

WO2016EP54205 20160229

Probable Assignee: TELEFONAKTIEBOLAGET LM ERICSSON PUBL

Assignee(s): (std): ERICSSON TELEFON AB L M ; ERICSSON TELEFON AB L M PUBL ; TELEFONAKTIEBOLAGET LM ERICSSON PUBL

Inventor(s): (std): BALDEMAIR ROBERT ; LINDOFF BENGT ; HUSCHKE JOERG ; ASHRAF SHEHZAD ALI

Agent(s): ERICSSON; SCHWARZ MARKKU

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

6) Family number: 54825448 (US2013250874A)

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Title: COMMON SEARCH SPACE FOR EPDCCH IN LTE

Abstract: A method and apparatus for wireless communication manages virtual cell ID(s) for the common search. A UE determines a first virtual cell ID for a common search space (CSS) enhanced physical downlink control channel (EPDCCH) and determines a second virtual cell ID for a user equipment search space (UESS) EPDCCH. The UE processes EPDCCH based on the determined first and second virtual cell IDs.

Classifications:

International (IPC 8-9): H04W48/12 H04W72/04 (Advanced/Invention)

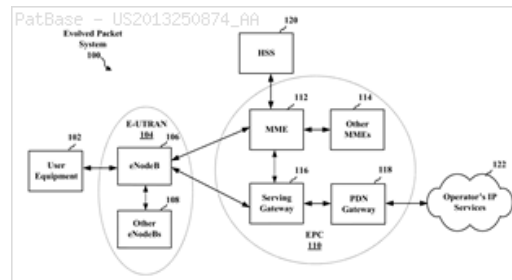
CPC: H04W72/042 H04W48/12 H04W72/04

US: 1/1 370/329

JP F-Term: 5K067 5K067/AA03 5K067/BB04 5K067/CC01 5K067/DD19

5K067/EE02 5K067/EE10

JP F-Index: H04W72/04/136



Family:

Publication number	Publication date	Application number	Application date
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CN104205976 A	20141210	CN201380016364	20130308
EP2832166 A1	20150204	EP20130712035	20130308
JP2015512586 T2	20150427	JP20150503240T	20130308
US2013250874 AA	20130926	US20130789520	20130307
US9338773 BB	20160510	US20130789520	20130307
WO13148120 A1	20131003	WO2013US29979	20130308

Priority:

US20120615803P 20120326 US20130789520 20130307 WO2013US29979 20130308

Probable Assignee: QUALCOMM INC

Assignee(s): (std): QUALCOMM INC

Inventor(s): (std): LUO TAO ; GAAL PETER ; CHEN WANSI

Agent(s): DUNLOP HUGH CHRISTOPHER; SEYFARTH SHAW LLP; LENKIN ALAN M

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

7) Family number: 54825449 (US2013250882A)

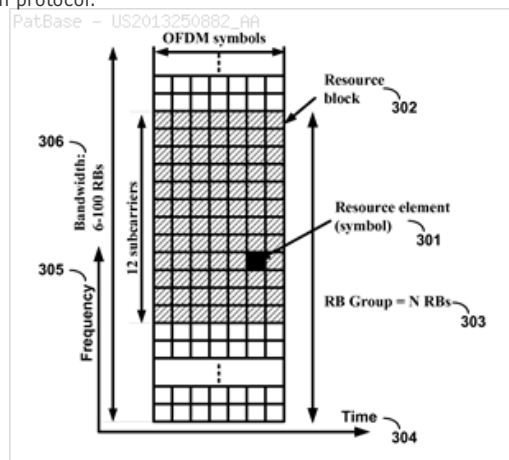
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Title: INFORMATION EXCHANGE BETWEEN BASE STATIONS

Abstract: A first base station receives at least one application protocol message from a second base station. The second base station comprises a downlink carrier comprising a plurality of downlink resource blocks. The at least one application protocol message may comprise a second physical downlink control channel configuration. The first base station may transmit a packet comprising acknowledgement for the receipt of the at least one application protocol.

Classifications:

International (IPC 8-9): H04L5/00 H04W4/00 H04W72/04
H04W74/04 (Advanced/Invention);
H04L5/00 H04W72/00 H04W92/20 (Advanced/Non-invention)
CPC: H04W72/0466 H04L5/0044 H04L5/0048 H04L5/001 H04L5/0023
H04L5/0032 H04L5/0053 H04L5/0092 H04W72/0426 H04W92/20
H04W72/042
US: 1/1 370/329



Family:

Publication number	Publication date	Application number	Application date
US2013250882 AA	20130926	US20130850228	20130325
US2013294369 AA	20131107	US20130887408	20130506
US2016374058 AA	20161222	US20160184532	20160616
US2018077692 AA	20180315	US20170818252	20171120
US2018376482 AA	20181227	US20180954003	20180416
US9497756 BB	20161115	US20130850228	20130325
US9826519 BB	20171121	US20160184532	20160616
US9949265 BB	20180417	US20130887408	20130506
US10397913 BB	20190827	US20170818252	20171120

Priority:

US20120615347P 20120325 US20120642472P 20120504 US20130850228 20130325
US20130887408 20130506 US20160184532 20160616 US20170818252 20171120
US20180954003 20180416

Probable Assignee: COMCAST CABLE COMMUNICATIONS LLC

Assignee(s): (std): COMCAST CABLE COMM LLC ; DINAN ESMAEL HEJAZI

Assignee(s): OFINNO TECHNOLOGIES LLC ; COMCAST CABLE COMMUNICATIONS LLC

Inventor(s): (std): DINAN ESMAEL HEJAZI

Agent(s): BANNER AND WITCOFF LTD

8) Family number: 57561516 (US2016043849A)

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Title: EPDCCH COMMON SEARCH SPACE DESIGN FOR ONE OR MORE CARRIER TYPES

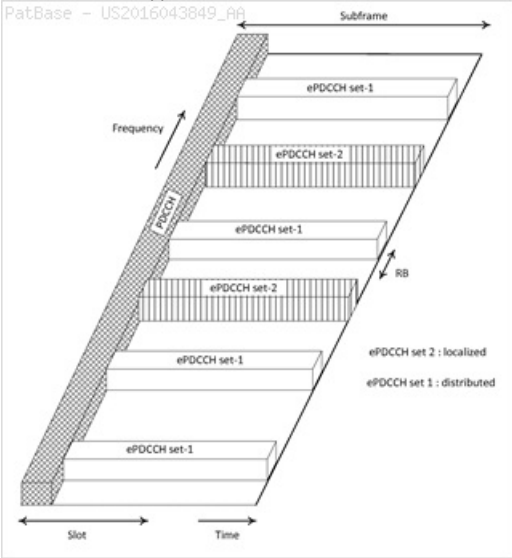
Abstract: Embodiments contemplate enhanced physical downlink control channel (EPDCCH). A user equipment (UE) or a wireless transmit/receive unit (WTRU) may receive a first type (e.g., type 1) EPDCCH common search space (CSS) subframe for example is a subset of subframes. The UE or WTRU may monitor first type downlink control information (DCI), for example perhaps within the first type EPDCCH CSS subframe, among other scenarios. A broadcast channel (e.g. MIB) may be received in the first type EPDCCH CSS. The UE or the WTRU may receive configuration information for a second type (e.g., type 2) EPDCCH CSS, for example from the first type EPDCCH CSS. A system information block (SIB) may be received in the second type EPDCCH CSS. The UE or the WTRU may monitor a second type DCI, for example perhaps in the second type EPDCCH CSS.

Classifications:

International (IPC 8-9): H04L5/00 H04W16/00 H04W48/10 H04W48/12 H04W72/04 (Advanced/Invention)

CPC: H04L5/0048 H04L5/0053 H04L5/0073 H04W72/042

US: 370/329



Family:

Publication number	Publication date	Application number	Application date
CN105075170 A	20151118	CN201480019770	20140403
CN105075170 B	20190503	CN201480019770	20140403
CN110224799 A	20190910	CN201910280195	20140403
EP2982076 A2	20160210	EP20140722062	20140403
EP3509240 A1	20190710	EP20180248186	20140403
TW201507497 A	20150216	TW20140112506	20140403
TW201921962 A	20190601	TW20180140890	20140403
US2016043849 AA	20160211	US20140782251	20140403
WO14165678 A2	20141009	WO2014US32833	20140403
WO14165678 A3	20141127	WO2014US32833	20140403

Priority:

US20130808095P 20130403 CN201480019770 20140403 EP20140722062 20140403
WO2014US32833 20140403 US20140782251 20140403

Probable Assignee: INTERDIGITAL PATENT HOLDINGS INC

Assignee(s): (std): INTERDIGITAL PATENT HOLDINGS ; INTERDIGITAL PATENT HOLDINGS INC

Inventor(s): (std): LEE MOON IL ; TAMAKI NOBUYUKI

Agent(s): AWAPATENT AB; AWA SWEDEN AB; ROCCIA VINCENT J ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

9) Family number: 52730559 (US2014192786A)

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Title: DM RS BASED LTE DOWNLINK PHYSICAL LAYER

Abstract: It is provided an apparatus, including synchronizing means adapted to synchronize with a cell of a cellular communication system based on a synchronization signal and to obtain a cell identification of the cell; receiving means adapted to receive a symbol only on one or more subcarriers and subframes which carry at least one symbol of a physical broadcast channel; first obtaining means adapted to obtain a common demodulation reference symbol based on the cell identification and the received symbol; demodulating means adapted to demodulate a signal received on the physical broadcast channel based on the common demodulation reference symbol; user equipment means adapted to provide a user equipment functionality of the communication system.

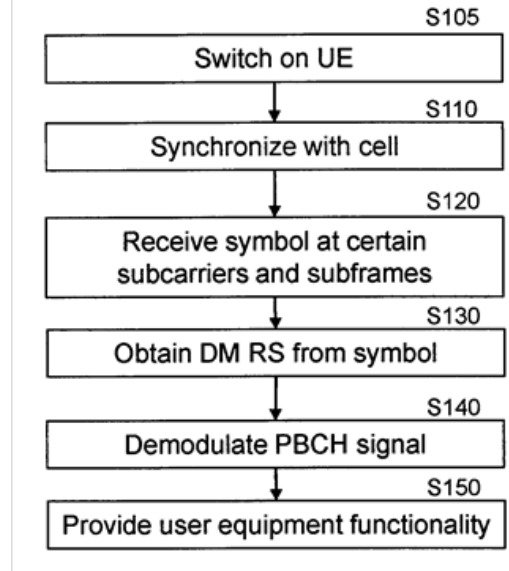
Classifications:

International (IPC 8-9): H04L5/00 H04W4/00 H04W56/00 H04W72/04 H04W74/08 (Advanced/Invention);

H04L27/26 H04L5/00 (Advanced/Non-invention)

CPC: H04L5/0053 H04L27/2601 H04W56/0005 H04W56/0015 H04W72/042 H04W74/0833

US: 1/1 370/336

**Family:**

Publication number	Publication date	Application number	Application date
CN103828396 A	20140528	CN201180072113	20110706
CN103828396 B	20180925	CN201180072113	20110706
EP2730104 A1	20140514	EP20110869020	20110706
EP2730104 A4	20150218	EP20110869020	20110706
EP2730104 B1	20191009	EP20110869020	20110706
US2014192786 AA	20140710	US20110131025	20110706
US9848415 BB	20171219	US20110131025	20110706
WO13003980 A1	20130110	WO2011CN001113	20110706

Priority:

WO2011CN001113 20110706

Probable Assignee: NOKIA TECHNOLOGIES OY**Assignee(s):** (std): MIAO DE SHAN ; MIAO DESHAN ; NOKIA SIEMENS NETWORKS OY ; NOKIA SOLUTIONS AND NETWORKS OY ; SKOV PETER ; WANG XIAOYI**Assignee(s):** NOKIA TECHNOLOGIES OY**Inventor(s):** (std): SKOV PETER ; WANG XIAOYI ; MIAO DESHAN ; MIAO DE SHAN**Agent(s):** SEPPO LAINE OY; HARRINGTON AND SMITH; CHINA PATENT AGENT H K LTD

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

10) Family number: 51892592 (US2014003349A)

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Title: METHOD AND APPARATUS FOR SEARCHING CONTROL INFORMATION BY TERMINAL IN MULTINODE SYSTEM

Abstract: Provided is a method of searching for control information of a user equipment (UE) in a multi-node system including a plurality of nodes and a base station connected to each of the plurality of nodes and capable of controlling the nodes. The method includes: receiving search space indication information from the base station; and searching for the control information in a radio resource region indicated by the search space indication information, wherein the search space indication information indicates any one of a first search space and a second search space.

Classifications:

International (IPC 8-9): H04B7/26 H04J11/00 H04J11/00 H04L1/00 H04L1/18 H04L5/00 H04W72/04 H04W72/14

H04W88/08 (Advanced/Invention);

H04L1/18 H04W72/08 (Advanced/Non-invention)

CPC: H04J11/0083 H04W72/042 H04L5/0092 H04W72/0446 H04W72/0453

H04J11/0079 H04L1/0046 H04L5/0053 H04L5/0091 H04L1/1864

H04L1/1896 H04L5/0048 H04L1/1812 H04L1/1854 H04L1/1861

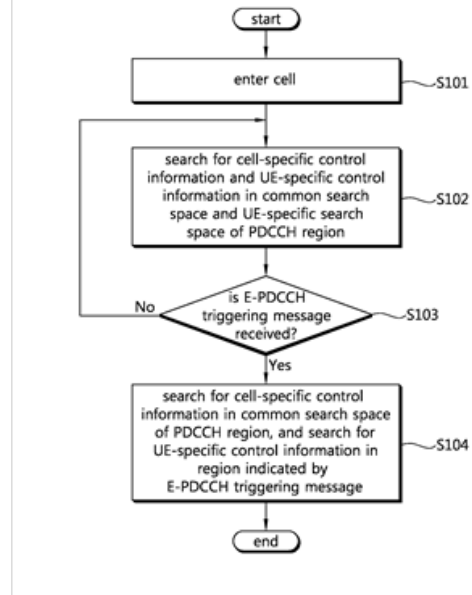
H04L5/0055 H04W72/08 H04W72/14

European: H04L5/00E1 T04L5/00C6**US:** 1/1 370/328 370/329**JP F-Term:** 5K004 5K022 5K067 5K067/AA13 5K067/CC02 5K067/CC04

5K067/EE10 5K067/GG11 5K067/JJ13 5K067/KK03

JP F-Index: H04J11/00 H04J11/00/Z H04L27/26/113 H04L27/26/114

H04W72/04/136 H04W88/08

**Family:**

Publication number	Publication date	Application number	Application date
CN103404046 A	20131120	CN201180068890	20111219
CN103404046 B	20160907	CN201180068890	20111219
CN106027220 A	20161012	CN201610671057	20111219
EP2683098 A2	20140108	EP20110860046	20111219
EP2683098 A4	20150107	EP20110860046	20111219
EP2683098 B1	20190515	EP20110860046	20111219
JP2014511056 T2	20140501	JP20130555351T	20111219
JP5698390 B2	20150408	JP20130555351T	20111219
KR101530801 B1	20150622	KR20137022706	20120229
KR101555112 B1	20151001	KR20137022705	20111219
KR20130116350 A	20131023	KR20137022705	20111219
KR20130118383 A	20131029	KR20137022706	20120229
KR20130119484 A	20131031	KR20137021983	20111219
US2014003349 AA	20140102	US20110002566	20111219
US2014003379 AA	20140102	US20110002322	20111219
US2014016589 AA	20140116	US20120002632	20120229
US9432138 BB	20160830	US20110002322	20111219
US9749116 BB	20170829	US20120002632	20120229
US9923659 BB	20180320	US20110002566	20111219
WO12118269 A2	20120907	WO2011KR09811	20111219
WO12118269 A3	20121026	WO2011KR09811	20111219
WO12118270 A1	20120907	WO2011KR09812	20111219
WO12118334 A2	20120907	WO2012KR01539	20120229
WO12118334 A3	20121220	WO2012KR01539	20120229

Priority:

US20110448146P 20110301	US20110475201P 20110413	US20110563613P 20111125
CN201180068890 20111219	US20110002322 20111219	US20110002566 20111219
WO2011KR09812 20111219	WO2011KR09811 20111219	WO2012KR01539 20120229
US20120002632 20120229		

Probable Assignee: LG ELECTRONICS**Assignee(s):** (std): CHUN JIN YOUNG ; IHM BIN CHUL ; KANG JI WON ; KIM KI TAE ; PARK SUNG HO ; LG ELECTRONICS INC ; KIM SU NAM ; LG ELECTRONICS**Inventor(s):** (std): PARK SUNG HO ; KANG JI WON ; KIM KI TAE ; IHM BIN CHUL ; CHUN JIN YOUNG ; KIM SU NAM**Agent(s):** TER MEER STEINMEISTER AND PARTNER; BIRCH STEWART KOLASCH AND BIRCH LLP; YANG MOON OCK**Designated states:** AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW**Title:** METHOD, BASE STATION, UE, AND SYSTEM FOR SENDING AND RECEIVING PDCCH SIGNALING**Abstract:** A method, a base station, a User Equipment (UE) and a system for sending and receiving Physical Downlink Control Channel (PDCCH) signaling are disclosed. The method for sending PDCCH signaling includes the following steps: the base station

determines locations of a first search space and second search space; and the base station sends only PDCCH signaling exclusive of a Carrier Indication Field (CIF) to the UE in a physically overlapped region between the first search space and the second search space if the physically overlapped region exists and length of PDCCH signaling exclusive of a CIF in the first search space is equal to length of PDCCH signaling inclusive of a CIF in the second search space.

Classifications:

International (IPC 8-9): H04B7/26 H04J11/00 H04L5/00 H04W H04W28/12 H04W52/14 H04W72/04 H04W72/12 H04W72/14 H04W76/00 H04W88/02 H04W88/08 (Advanced/Invention)

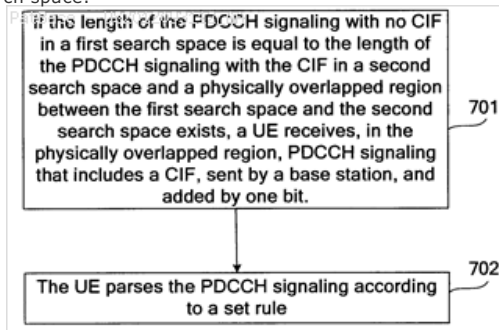
CPC: H04L5/001 H04L5/0053 H04W72/042 H04W28/12

European: H04L5/00A2A11 H04L5/00C6 H04W72/04 H04W72/04F4

US: 1/1 370/329 370/329P 370/343 370/522

JP F-Term: 5K067 5K067/AA21 5K067/BB04 5K067/CC01 5K067/EE02 5K067/EE10 5K067/JJ13 5K067/AA13 5K067/AA14

JP F-Index: H04W72/04/136 H04W72/04/111 H04W72/12/130



Family:

Publication number	Publication date	Application number	Application date
BR112012020255 A2	20160503	BR20121120255	20110211
BR112012020255 B1	20190115	BR20121120255	20110211
CN102158979 A	20110817	CN201010142160	20100329
CN102231915 A	20111102	CN201010165438	20100430
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CN103442444 B	20161207	CN201310363002	20100430
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DE602011004393 D1	20140213	DE201160004393T	20110211
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DE602011047028 D1	20180426	DE201160047028T	20110211
EP2536204 A1	20121219	EP20110741915	20110211
EP2536204 A4	20130116	EP20110741915	20110211
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EP2672651 A3	20140101	EP20130183263	20110211
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EP2672653 A3	20140219	EP20130183265	20110211
EP2672653 B1	20190424	EP20130183265	20110211
EP3534563 A1	20190904	EP20190162445	20110211
ES2450540 T3	20140325	ES20110741915T	20110211
IN07214CN2012 A	20160311	IN2012CN07214	20120817
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JP2014112918 A2	20140619	JP20140017308	20140131
JP5469751 B2	20140416	JP20120552251T	20110211
JP5647363 B2	20141224	JP20140017308	20140131
KR101446639 B1	20141001	KR20127022122	20110211
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MX2012009276 A1	20121015	MX2012009276	20110211
TR201802552 T4	20180321	TR20180002552T	20110211
US2012093112 AA	20120419	US20110336209	20111223
US2013077589 AA	20130328	US20120685092	20121126
US2015055599 AA	20150226	US20140517531	20141017
US2016007326 AA	20160107	US20150851449	20150911
US8340069 BB	20121225	US20110336209	20111223
US8879533 BB	20141104	US20120685092	20121126
US9137794 BB	20150915	US20140517531	20141017
US9510341 BB	20161129	US20150851449	20150911
WO11098044 A1	20110818	WO2011CN070937	20110211
ZA201303696 A	20140326	ZA20130003696	20130521

Priority:

CN201010111643	20100211	CN201010142160	20100329	CN201010165438	20100430
CN201310363002	20100430	CN201310362522	20100430	EP20110741915	20110211
EP20110741915	20110211	JP20120552251	20110211	JP20120552251T	20110211
EP20130183264	20110211	EP20130183262	20110211	EP20130183263	20110211

EP20130183265 20110211 WO2011CN70937 20110211 WO2011CN070937 20110211
US20110336209 20111223 US20120685092 20121126 EP20130183265 20130906
US20140517531 20141017 US20150851449 20150911

Probable Assignee: HUAWEI TECHNOLOGIES CO LTD

Assignee(s): (std): GUAN LEI ; HUAWEI TECH CO LTD ; XUE LIXIA ; QU BINGYU

Assignee(s): HUAWEI TECHNOLOGIES CO., LTD. ; HUAWEI TECHNOLOGIES COLTD ; HUAWEI TECHNOLOGIES CO ; HUAWEI TECHNOLOGIES CO LTD SHEN ZHEN ; HUAWEI TECHNOLOGIES CO LTD SHENZHEN

Inventor(s): (std): LIXIA XUE ; LEI GUAN ; BINGYU QU ; QU BINGYU ; XUE LIXIA ; GUAN LEI

Agent(s): KREUZ GEORG MARIA; GILL JENNINGS AND EVERY LLP; LEHMANN MARIA ISABEL; TOLGA CAYLAK; HUAWEI TECHNOLOGIES CO LTD; SLATER AND MATSIL LLP

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

12) Family number: 63740692 (US2018076924A)

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Title: METHOD AND DEVICE OF MULTI-SUBBAND BASED TRANSMISSION FOR A WIRELESS TRANSMIT/RECEIVE UNIT (WTRU) WITH REDUCED CAPABILITY AND COVERAGE ENHANCEMENT

Abstract: Method, devices and systems of multi-subband based transmission are disclosed herein. A method for use in a wireless transmit/receive unit (WTRU) includes monitoring a plurality of subbands for subbands that include an enhanced physical downlink control channel (EPDCCH), wherein each subband of the plurality of subbands is made up of a subset of frequency resources in a system bandwidth, and determining whether each of the plurality of subbands is a channel state information (CSI) downlink subband (CSI-subband) for CSI feedback based on whether an EPDCCH is included in a corresponding subband of the plurality of subbands. At least two subbands of the plurality of subbands, in which a corresponding EPDCCH is included, are determined as CSI subbands for CSI feedback.

Classifications:

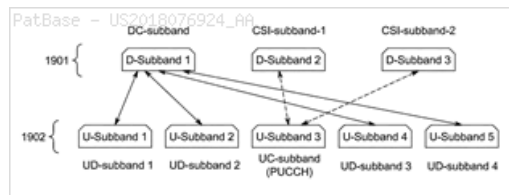
International (IPC 8-9): H04B17/24 H04B17/309 H04L1/00 H04L5/00 H04W24/00 H04W24/10 H04W72/04 (Advanced/Invention)

CPC: H04L1/0026 H04L5/0094 H04W72/042 H04W72/0446

US: 1/1 370/329

JP F-Term: 5K042 5K067 5K067/DD34 5K067/DD43 5K067/EE02 5K067/EE61 5K067/JJ13 5K067/LL11

JP F-Index: H04B17/24 H04B17/309 H04W24/10 H04W72/04/111 H04W72/04/132



Family:

Publication number	Publication date	Application number	Application date
CA2981964 AA	20171005	CA20162981964	20160408
CN107636997 A	20180126	CN201680029253	20160408
EP3281321 A1	20180214	EP20160718111	20160408
JP2018512013 T2	20180426	JP20170553026T	20160408
KR20180004120 A	20180110	KR20177030503	20160408
SG10201807216P A1	20180927	SG20181007216	20160408
SG11201708244Q A1	20171129	SG20171108244	20160408
US2018076924 AA	20180315	US20160564630	20160408
WO16164739 A1	20161013	WO2016US26668	20160408

Priority:

US20150144830P 20150408 US20150161045P 20150513 WO2016US26668 20160408
US20160564630 20160408

Probable Assignee: INTERDIGITAL PATENT HOLDINGS INC

Assignee(s): (std): INTERDIGITAL PATENT HOLDINGS INC

Assignee(s): LEE MOON IL ; STERN BERKOWITZ JANET A

Inventor(s): (std): STERN BERKOWITZ JANET A ; LEE MOON IL

Agent(s): RIDOUT AND MAYBEE LLP; AWAPATENT AB; TANI AND ABE PC; MIRANDAH ASIA SINGAPORE PTE LTD; HEAVENER RYAN F

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

13) Family number: 50642698 (US2012039283A)

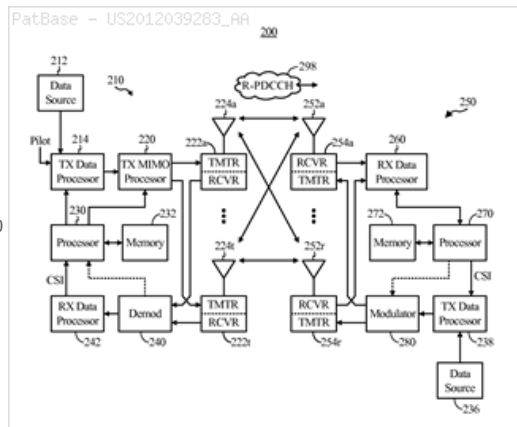
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Title: SEARCH SPACE DESIGN FOR RELAY PHYSICAL DOWNLINK CONTROL CHANNEL (R-PDCCH)

Abstract: Certain aspects of the present disclosure provide methods and apparatus for designing, generating, and monitoring the search space for control information for a node, such as a relay node (RN). This control information may comprise a Relay Physical Downlink Control Channel (R-PDCCH). The search space design may use contiguous, but physically distributed transmission resource units (e.g., physical resource blocks (PRBs)) to increase frequency diversity or frequency selectivity. For certain aspects, pairs of transmission resource units spanning two adjacent slots may have the same virtual resource block (VRB) index.

Classifications:

International (IPC 8-9): H04B7/26 H04J99/00 H04L5/00 H04W16/26 H04W72/04 H04W84/18 (Advanced/Invention);
H04B7/26 H04L1/00 H04W84/04 (Advanced/Non-invention)
CPC: H04B7/15542 H04B7/12 H04L5/16 H04W72/042 H04B7/2606 H04L1/0038 H04L5/0053 H04W84/047
European: H04L5/00C6 H04W72/04F4 T04B7/26B2 T04L1/00A15B T04W84/04C4
US: 1/1 370/329 370/329P 455/450 455/450S
JP F-Term: 5K022 5K067 5K067/AA23 5K067/BB02 5K067/CC01 5K067/CC24 5K067/EE02 5K067/EE10 5K159
JP F-Index: H04B7/0413/200 H04B7/0456/100 H04B7/06/950 H04J15/00 H04J99/00 H04W16/26 H04W72/04/133 H04W72/04/136 H04W84/18/110



Family:

Publication number	Publication date	Application number	Application date
CN103181112 A	20130626	CN201180046823	20110816
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EP2606601 B1	20190417	EP20110767490	20110816
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JP2013541254 T2	20131107	JP20130524934T	20110816
JP5675985 B2	20150225	JP20130524934T	20110816
KR101518312 B1	20150508	KR20137006544	20110816
KR20130032918 A	20130402	KR20137006544	20110816
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WO12024325 A1	20120223	WO2011US47969	20110816

Priority:

US20100374207P 20100816 US20110210102 20110815 WO2011US47969 20110816

Probable Assignee: QUALCOMM INC

Assignee(s): (std): CHEN WANSHI ; MONTOJO JUAN ; QUALCOMM INC

Inventor(s): (std): CHEN WANSHI ; MONTOJO JUAN

Agent(s): WEGNER HANS; PATTERSON AND SHERIDAN LLP; READ RANDOL W ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT QA RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

14) Family number: 53700737 (US2014348093A)

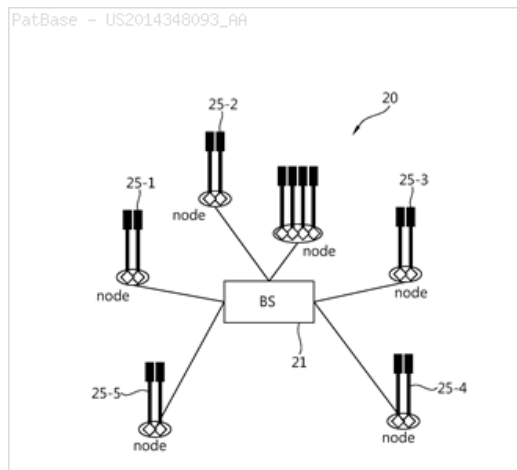
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Title: METHOD AND APPARATUS FOR USER EQUIPMENT SEARCHING CONTROL CHANNEL IN WIRELESS COMMUNICATION SYSTEM

Abstract: Disclosed is a method and apparatus for searching for a user equipment searching for a control channel in a multi-node system. The method comprises: searching inside an E-PDCCH region for a first piece of downlink control information (DCI), which is determined according to a transmission mode; and searching inside the E-PDCCH region for a second piece of DCI, regardless of the transmission mode, wherein the E-PDCCH region is a control channel region to which the DCI, which is decoded on the basis of a user equipment-specific reference signal (URS), is transmitted from a subframe comprising a plurality of orthogonal frequency division multiplexing (OFDM) symbols.

Classifications:

International (IPC 8-9): H04B7/26 H04J11/00 H04W4/00 H04W72/00 H04W72/04 (Advanced/Invention);
H04L5/00 (Advanced/Non-invention)
CPC: H04W72/042 H04L5/001 H04L5/0048 H04L5/0051 H04L5/0053 H04L5/0094 H04W72/00
US: 1/1 370/329



Family:

Publication number	Publication date	Application number	Application date
US2014348093 AA	20141127	US20120355196	20121105
US9338774 BB	20160510	US20120355196	20121105
WO13066122 A1	20130510	WO2012KR09220	20121105

Priority:

US2011055482P 20111104 US20120355196 20121105 WO2012KR09220 20121105

Probable Assignee: LG ELECTRONICS

Assignee(s): (std): LG ELECTRONICS ; LG ELECTRONICS INC

Inventor(s): (std): KIM SU NAM ; CHUN JIN YOUNG ; IHM BIN CHUL ; KIM KI TAE ; KANG JI WON ; PARK SUNG HO

Agent(s): LEE HONG DEGERMAN KANG AND WAIMEY; JONATHAN; RICHARD; S AND IP PATENT AND LAW FIRM

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

15) Family number: 61604763 (US2017223725A)

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Title: PDCCH DESIGN FOR NARROWBAND DEPLOYMENT

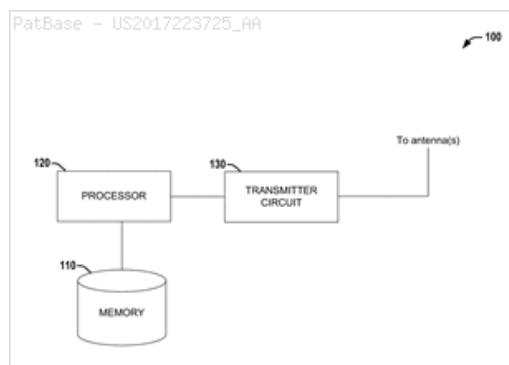
Abstract: Narrowband Physical Downlink Control Channel (PDCCH) implementations are discussed. An example Evolved NodeB (eNB) comprises a memory storing instructions, a processor configured to execute the instructions, and a transmitter circuit. The processor is configured to determine at least one of downlink or uplink scheduling for one or more machine-type communication (MTC)-enabled user equipments (UEs); to generate, based at least in part on the determined scheduling, one or more MTC-physical downlink control channel (PDCCH) signals (M-PDCCH signals) associated with the one or more MTC-enabled UEs; and to perform channel coding, multiplexing, and scrambling of the one or more M-PDCCH signals. The transmitter circuit is configured to map the one or more M-PDCCH signals to resource element groups (REGs) in order of increasing subcarrier followed by orthogonal frequency division multiplexing (OFDM) symbol and to transmit the one or more M-PDCCH signals via a narrowband bandwidth of less than 1.4 MHz.

Classifications:

International (IPC 8-9): H04L H04L25/03 H04L27/26 H04L5/00 H04W4/00 H04W72/04 H04W72/12 H04W72/14 (Advanced/Invention)

CPC: H04L25/03866 H04L27/26 H04L5/0007 H04W72/1278 H04W72/044 H04W72/042 H04W72/14 H04L5/0053 H04W4/70 H04W72/1205

US: 1/1 370/330



Family:

Publication number	Publication date	Application number	Application date
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EP3175574 A4	20180307	EP20150827290	20150326
HK1234229 A1	20180209	HK20170107639	20170801
KR101926282 B1	20181206	KR20177001634	20150326
KR20170023101 A	20170302	KR20177001634	20150326
US2017223725 AA	20170803	US20150324441	20150326
WO16018469 A1	20160204	WO2015US22739	20150326

Priority:

US20140032436P 20140801 US20150324441 20150326 WO2015US22739 20150326

Probable Assignee: INTEL CORP

Assignee(s): (std): INTEL CORP ; INTEL IP CORP

Inventor(s): (std): HAN SEUNGHEE ; XIONG GANG GARY ; FWU JONG KAE ; CHATTERJEE DEBDEEP ; XIONG GANG

Agent(s): 2SPL PATENTANWALTE PARTG MBB; CHAN TANG AND KWOK; ESCHWEILER THOMAS G

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

16) Family number: 51553833 (US2015117240A)

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Title: COMMUNICATION SYSTEM

Abstract: A communication system is presented in which a communication device communicates, in at least one communication cell operated by communication apparatus, using a plurality of subframes, wherein each subframe comprises a plurality of communication resources. A respective measure of communication quality associated with each of the communication resources is obtained and a search space, comprising a set of the communication resources, is defined based on the measures of communication quality. The mobile device searches for control information in the defined search space.

Classifications:

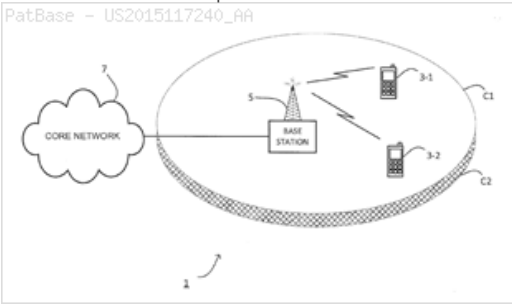
International (IPC 8-9): H04L1/00 H04L5/00 H04W24/08 H04W24/10 H04W72/04 H04W72/08 H04W72/12 (Advanced/Invention)

CPC: H04W72/04 H04W72/1226 H04L5/0007 H04L5/0053 H04L5/006 H04L5/0069 H04W72/042 H04W72/085 H04L1/0025 H04L1/0026 H04L5/0057 H04W24/08

US: 370/252 370/329

JP F-Term: 5K042 5K067 5K067/AA11 5K067/BB04 5K067/DD27 5K067/DD43 5K067/EE02 5K067/EE10 5K067/FF16 5K067/JJ02 5K067/JJ21

JP F-Index: H04B17/382 H04W24/10 H04W72/04/136 H04W72/08



Family:

Publication number	Publication date	Application number	Application date
CN104272843 A	20150107	CN201380024287	20130424
CN104272843 B	20180309	CN201380024287	20130424
EP2848068 A2	20150318	EP20130722132	20130424
GB201208236 A0	20120620	GB20120008236	20120510
GB2501917 A1	20131113	GB20120008236	20120510
IN09389DN2014 A	20150717	IN2014DN09389	20141107
JP2015516119 T2	20150604	JP20140554111T	20130424
JP5930241 B2	20160608	JP20140554111T	20130424
US2015117240 AA	20150430	US20130399659	20130424
US9807749 BB	20171031	US20130399659	20130424
WO13168664 A2	20131114	WO2013JP62744	20130424
WO13168664 A3	20140206	WO2013JP62744	20130424

Priority:

GB20120008236 20120510 WO2013JP62744 20130424

Probable Assignee: NEC CORP

Assignee(s): (std): NEC CORP

Inventor(s): (std): LIANG CAROLINE ; AWAD YASSIN ADEN ; LIANG CAROLINE QUANYI ; ARNOTT ROBERT

Inventor(s): ROBERT ARNOTT ; YASSIN ADEN AWAD ; CAROLINE QUANYI LIANG

Agent(s): MACDOUGALL ALAN JOHN SHAW; WILMER CUTLER PICKERING HALE AND DORR LLP; IKEDA NORIYASU ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

17) Family number: 54705848 (US2014362758A)

© PatBase

Title: METHOD FOR SETTING SEARCH REGION TO DETECT DOWNLINK CONTROL CHANNEL IN WIRELESS COMMUNICATION SYSTEM AND APPARATUS FOR SAME

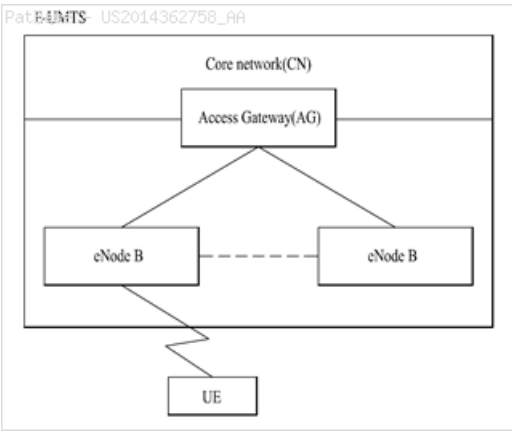
Abstract: In the present application, disclosed a method for a terminal setting a search region for a downlink channel in a wireless communication system. More specifically, the method comprises the steps of receiving from a base station information related to a starting symbol of the search region by way of upper layer signaling; setting the search region by using the information related to the starting symbol; and receiving the downlink control channel by performing blind coding on the search region, wherein the starting symbol of the search region changes according to the characteristic of a subframe which receives the downlink control channel.

Classifications:

International (IPC 8-9): H04B7/26 H04J11/00 H04L12/26 H04L27/26 H04L5/00 H04L5/14 H04W4/06 H04W72/04 (Advanced/Invention)

CPC: H04W4/06 H04W72/042 H04J11/0086 H04B7/2603 H04J2211/005 H04L5/0037 H04L5/0048 H04L5/0053 H04L5/1469 H04L27/2607 H04W72/0446 H04L43/16

US: 1/1 370/312 370/329



Family:

Publication number	Publication date	Application number	Application date
KR20140142692 A	20141212	KR20147022830	20130228
US2014362758 AA	20141211	US20130374461	20130228
US2016345306 AA	20161124	US20160231197	20160808
US9432985 BB	20160830	US20130374461	20130228
US10306614 BB	20190528	US20160231197	20160808
WO13129870 A1	20130906	WO2013KR01643	20130228

Priority:

US20120605744P 20120301 US20130374461 20130228 WO2013KR01643 20130228
US20140374461 20140724 US20160231197 20160808

Probable Assignee: LG ELECTRONICS

Assignee(s): (std): LG ELECTRONICS ; LG ELECTRONICS INC

Inventor(s): (std): LEE SEUNGMIN ; KIM HAKSEONG ; SEO HANBYUL ; SEO HAN BYUL ; LEE SEUNG MIN ; KIM HAK SEONG

Agent(s): BIRCH STEWART KOLASCH AND BIRCH LLP; KIM YONG IN ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

18) Family number: 59348900 (US2016242203A)

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Title: METHOD FOR RECEIVING BUNDLE OF PDCCH, AND MTC DEVICE

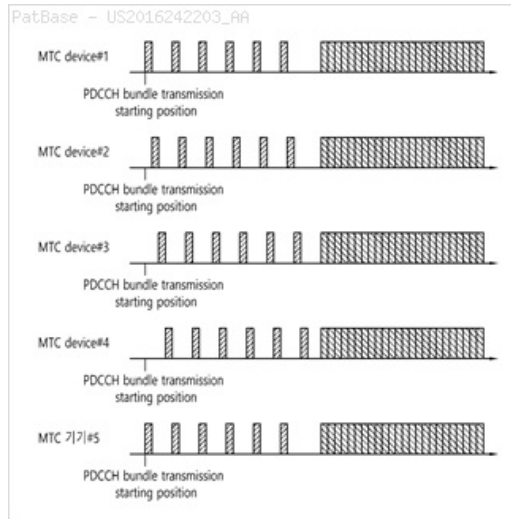
Abstract: A disclosure of the present specification provides a method for receiving a physical downlink shared channel (PDCCH) by a machine type communication (MTC) device. The method may comprise the steps of: when it is required to receive a bundle of PDCCHs in which an identical PDCCH is repeated in N number of sub-frames, determining the first search space for receiving a PDCCH in the first sub-frame among the N number of sub-frames; and determining the second search space for receiving the PDCCH in the second sub-frame among the N number of sub-frames. Herein, the first and the second search space may comprise a plurality of control channel elements (CCE). The location of the CCE in the first search space may be kept the same as in the second search space.

Classifications:

International (IPC 8-9): H04B7/26 H04J11/00 H04L27/26 H04L5/00 H04W4/00 H04W72/04 H04W72/12 (Advanced/Invention)

CPC: H04L5/001 H04L5/0037 H04L5/0053 H04L5/006 H04L5/0082 H04L27/2602 H04W4/70 H04W72/044 H04W72/1273

US: 1/1 370/329



Family:

Publication number	Publication date	Application number	Application date
EP3073658 A1	20160928	EP20140863934	20141121
EP3073658 A4	20170719	EP20140863934	20141121
US2016242203 AA	20160818	US20140026570	20141121
WO15076619 A1	20150528	WO2014KR11277	20141121

Priority:

US20130907400P 20131122 US20130910130P 20131129 US20130914359P 20131210
US20140930483P 20140123 US20140932809P 20140129 US20140026570 20141121
WO2014KR11277 20141121

Probable Assignee: LG ELECTRONICS

Assignee(s): (std): LG ELECTRONICS ; LG ELECTRONICS INC

Inventor(s): (std): AHN JOONKUI ; YANG SUCKCHEL ; SEO DONGYOUN ; YI YUNJUNG ; YOU HYANGSUN

Agent(s): KATERLE AXEL; S AND IP PATENT AND LAW FIRM

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: TERMINAL DEVICE, COMMUNICATION METHOD, AND INTEGRATED CIRCUIT

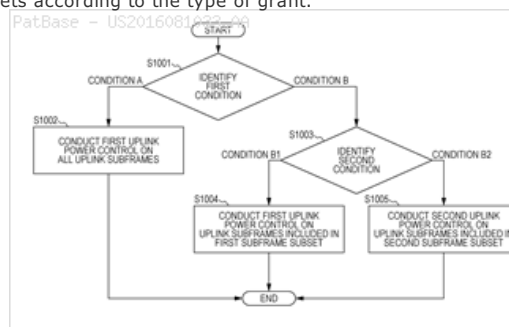
Abstract: Provided is a terminal device (2) that communicates with a base station device, including: a reception unit (205) that receives information related to a first configuration and/or information related to a second configuration, and a grant; and a transmission unit (207) that, in a case of an uplink signal being scheduled based on the grant, transmits the uplink signal to the base station device in an earliest uplink subframe on or after a designated subframe from a subframe in which the grant was detected, wherein in a case of the first configuration and the second configuration being set, the transmission unit (207) configures a transmit power control method for respective subframe subsets according to the type of grant.

Classifications:

International (IPC 8-9): H04B1/04 H04B7/00 H04J3/16 H04L5/14
H04W28/06 H04W52/14 H04W52/24 H04W52/50 H04W52/54 H04W72/04
H04W72/12 H04W88/02 (Advanced/Invention);
H04W72/12 H04W88/02 (Advanced/Non-invention)
CPC: H04W52/146 H04W52/247 H04W52/248 H04W52/50 H04W72/12
H04L5/14 H04W52/243 H04W72/1268 H04W88/02
US: 455/522

JP F-Term: 5K028 5K028/AA02 5K028/BB04 5K028/CC01 5K028/DD01
5K028/DD02 5K028/LL11 5K060 5K060/BB07 5K060/CC04 5K060/CC11
5K060/CC12 5K060/DD04 5K060/HH01 5K060/JJ21 5K060/LL01
5K060/LL25 5K067 5K067/AA03 5K067/BB04 5K067/BB21 5K067/CC04
5K067/DD11 5K067/EE02 5K067/EE10 5K067/EE71 5K067/FF02
5K067/GG08 5K067/HH22 5K067/HH23

JP F-Index: H04B1/04/E H04J3/16/Z H04W28/06/130 H04W52/54
H04W72/04/131



Family:

Publication number	Publication date	Application number	Application date
EP2996415 A1	20160316	EP20140794679	20140508
EP2996415 A4	20161130	EP20140794679	20140508
EP2996415 B1	20190904	EP20140794679	20140508
JP2014181836 A1	20170223	JP20150515894T	20140508
JP6396896 B1	20180926	JP20150515894T	20140508
US2016081033 AA	20160317	US20140889241	20140508
US9603100 BB	20170321	US20140889241	20140508
WO14181836 A1	20141113	WO2014JP62381	20140508

Priority:

JP20130098928 20130509 WO2014JP62381 20140508

Probable Assignee: SHARP KK

Assignee(s): (std): SHARP KK

Inventor(s): (std): AIBA TATSUSHI ; SUZUKI SHOICHI ; OUCHI WATARU

Agent(s): MUELLER HOFFMANN AND PARTNER; HARAKENZO WORLD PATENT AND TRADEMARK; KEATING AND BENNETT LLP

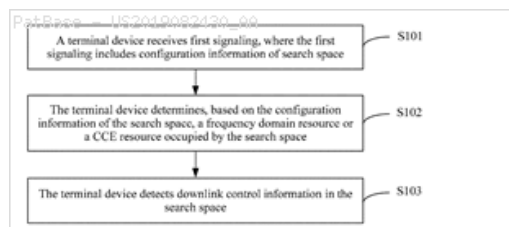
Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: DOWNLINK CONTROL INFORMATION SENDING METHOD, DOWNLINK CONTROL INFORMATION DETECTION METHOD, AND DEVICE

Abstract: The present invention provides a downlink control information sending method, a downlink control information detection method, and a device. The method includes: receiving, by a terminal device, first signaling, where the first signaling includes configuration information of search space; determining, by the terminal device based on the configuration information, a frequency domain resource or a CCE resource occupied by the search space; and detecting, by the terminal device, downlink control information in the search space. A network device may configure the search space to occupy any frequency domain resource or CCE resource. The terminal device determines, based on the first signaling, the search space configured by the network device, and obtains the downlink control information in a timely manner. This effectively improves data transmission efficiency, and in particular, resolves a problem that downlink control information of duration less than 1 ms cannot be obtained in a timely manner.

Classifications:

International (IPC 8-9): H04L1/00 H04L27/26 H04L5/00 H04W48/16
H04W72/04 H04W72/12 (Advanced/Invention)
CPC: H04W72/042 H04W72/044 H04W72/1289 H04L1/0038 H04L1/0061
H04W72/0446 H04W48/16 H04L5/0007 H04L5/0053 H04W72/04
US: 1/1



Family:

Publication number	Publication date	Application number	Application date
BR112018073215 A2	20190219	BR20181173215	20160513
CN109076513 A	20181221	CN201680085442	20160513

EP3451761 A1	20190306	EP20160901332	20160513
EP3451761 A4	20190424	EP20160901332	20160513
IN201837043502 A	20181214	IN201837043502	20181119
JP2019517208 T2	20190620	JP20180559977T	20160513
KR20190005989 A	20190116	KR20187036021	20160513
US2019082430 AA	20190314	US20180189718	20181113
WO17193377 A1	20171116	WO2016CN082056	20160513

Priority:

WO2016CN082056 20160513 US20180189718 20181113

Probable Assignee: HUAWEI TECHNOLOGIES CO LTD

Assignee(s): (std): HUAWEI TECH CO LTD ; HUAWEI TECHNOLOGIES CO LTD

Assignee(s): HUAWEI TECH CO ; HUAWEI TECHNOLOGIES CO

Inventor(s): (std): LI CHAOJUN ; CHAOJUN LI

Agent(s): GILL JENNINGS AND EVERY LLP; RYUKA IP LAW FIRM; LEADER PATENT AND TRADEMARK FIRM

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

21) Family number: 49904975 (US2011274031A)

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Title: EXPANDED SEARCH SPACE FOR R-PDCCH IN LTE-A

Abstract: Certain aspects of the present disclosure provide techniques and apparatuses for providing an expanded search space for a relay-specific control channel on a backhaul link. According to certain aspects, due to inband interference, a Relay Physical Downlink Control Channel (R-PDCCH) may be signaled utilizing resources reserved for backhaul data. According to certain aspects, a two-dimensional search space may be provided for R-PDCCH. R-PDCCH may be transmitted in one of a plurality of layer-specific search spaces corresponding to one of a plurality of antenna ports. Further, in a layer-specific search space, R-PDCCH may be transmitted using at least one of multiple R-PDCCH decoding candidates from a common search space and/or a relay node-specific search space.

Classifications:

International (ipc 8-9): H04B7/04 H04B7/14 H04L5/00 H04W16/26 H04W16/28 H04W72/04 H04W88/04 H04W92/12 (Advanced/Invention); H04B7/26 H04W24/00 H04W84/04 (Advanced/Non-invention)

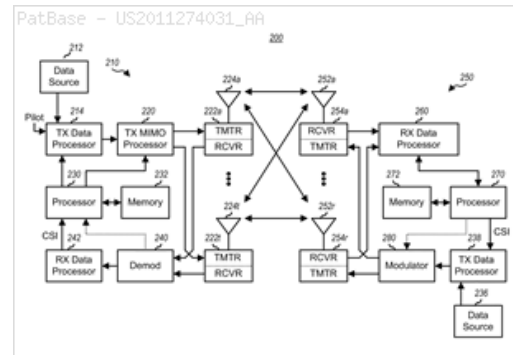
CPC: H04B7/15528 H04B7/0697 H04W28/04 H04L5/0051 H04B7/2606 H04L5/0023 H04L5/0041 H04L5/0053 H04L5/0082 H04L5/0092 H04W24/00 H04W84/047

European: H04L5/00C5B H04L5/00C6 H04L5/00E1 T04B7/26B2 T04L5/00A3C T04L5/00C2B T04L5/00C8C T04W24/00 T04W28/04 T04W84/04C4

US: 1/1 370/315 370/315P

JP F-Term: 5K022 5K067 5K067/AA33 5K067/BB04 5K067/BB21 5K067/DD11 5K067/DD57 5K067/EE02 5K067/EE06 5K067/EE10 5K159

JP F-Index: H04B7/0413/200 H04J99/00 H04W16/26 H04W16/28/110 H04W72/04/136 H04W92/12



Family:

Publication number	Publication date	Application number	Application date
BR112012027918 A2	20170815	BR20121127918	20110505
CN102884752 A	20130116	CN201180022544	20110505
CN102884752 B	20160622	CN201180022544	20110505
EP2567496 A2	20130313	EP20110721874	20110505
IN09806CN2012 A	20141219	IN2012CN09806	20121121
JP2013526238 T2	20130620	JP20130509276T	20110505
JP5536278 B2	20140702	JP20130509276T	20110505
KR101429994 B1	20140814	KR20127031908	20110505
KR20130038862 A	20130418	KR20127031908	20110505
TW201210290 A	20120301	TW20110115834	20110505
TWI511514 B	20151201	TW20110115834	20110505
US2011274031 AA	20111110	US20110100801	20110504
US9276722 BB	20160301	US20110100801	20110504
WO11140384 A2	20111110	WO2011US35414	20110505
WO11140384 A3	20120202	WO2011US35414	20110505

Priority:

US20100331797P 20100505 US20110100801 20110504 WO2011US35414 20110505

Probable Assignee: QUALCOMM INC

Assignee(s): (std): CHEN WANSHI ; GAAL PETER ; MONTOJO JUAN ; QUALCOMM INC

Inventor(s): (std): GAAL PETER ; CHEN WANSHI ; MONTOJO JUAN ; CHEN WAN SHI

Inventor(s): PETER GAAL ; JUAN MONTOJO ; WANSHI CHEN

Agent(s): DUNLOP HUGH CHRISTOPHER; KE; DEHAEMER JR MICHAEL J

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS

IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY
MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG
TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW