

EXHIBIT I-2

Summary of Invalidity Analysis of U.S. Patent No. 11,540,272 (“’272 Patent”) in view of U.S. Patent Application No. US 2018/0376497A1 to You et al. (“You”)]

U.S. Patent Application No. US 2018/0376497A1 to You et al. (“You”), published on December 12, 2018, and was filed on July 25, 2016. Therefore, You qualifies as prior art to the ’272 Patent under at least 35 U.S.C. §§ 102(a). As described in the following claim chart, at least under Pegasus’s apparent infringement theory, the asserted claims of the ’272 Patent are invalid as expressly and/or inherently anticipated by You.

To the extent that You is found not to anticipate, expressly or inherently, one or more of the asserted claims of the ’272 Patent, at least under Pegasus’s apparent infringement theory, these claims are invalid as obvious in view of You in view of the background knowledge and ordinary creativity of a person having ordinary skill in the art at the time of the alleged invention, or in combination with other prior art identified in the cover pleading, herein, or as disclosed in Defendants’ Invalidity Contentions and accompanying charts and appendices. A person of ordinary skill would have been motivated to combine You and any other prior art references, including but not limited to the other prior art identified in the cover pleading or herein, with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

Defendants reserve the right to amend or supplement this invalidity chart at a later date.

1. Claim 1

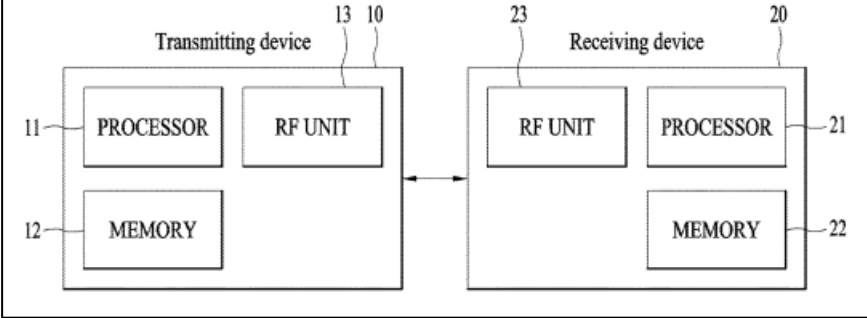
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Claim Language		Exemplary Citations to You
1[pre]	A base station, comprising: a transceiver; a receiver; and a controller which controls the transceiver and receiver thereby performing operations including:	To the extent the preamble is limiting, at least under Pegasus’s apparent infringement theory, You discloses a base station, comprising: a transceiver; a receiver; and a controller which controls the transceiver and receiver thereby performing operations including. For example, You discloses this limitation based on the following exemplary citations: “Control information reception method and user equipment, and control information transmission method and base station” You at Title. “Provided are method and device for transmitting/receiving control information. A downlink grant can comprise information indicating whether or not an uplink grant is transmitted in the same subframe. If the information indicates that an uplink grant exists, a user equipment attempts detection of the uplink grant in the same subframe in which the downlink grant is received. If not, the user equipment does not attempt detection of the uplink grant. For low latency, the subframe can be shorter than an existing subframe.” You at Abstract. “The present invention relates to a wireless communication system and, more particularly, to a method for transmitting or receiving control information and an apparatus therefor.” You at [0001]. “Due to introduction of new radio communication technology, the number of user equipments (UEs) to which a BS should provide a service in a prescribed resource region increases and the amount of data and control information that the BS should transmit to the UEs increases. Since the amount of resources available to the BS for communication with the UE(s) is limited, a new method in which the BS efficiently receives/transmits uplink/downlink data and/or uplink/downlink control information using the limited radio resources is needed.” You at [0005].

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		“For example, the present invention is applicable to contention based communication such as Wi-Fi as well as non-contention based communication as in the 3GPP LTE/LTE-A system in which an eNB allocates a DL/UL time/frequency resource to a UE and the UE receives a DL signal and transmits a UL signal according to resource allocation of the eNB. In a non-contention based communication scheme, an access point (AP) or a control node for controlling the AP allocates a resource for communication between the UE and the AP, whereas, in a contention based communication scheme, a communication resource is occupied through contention between UEs which desire to access the AP. The contention based communication scheme will now be described in brief. One type of the contention based communication scheme is carrier sense multiple access (CSMA). CSMA refers to a probabilistic media access control (MAC) protocol for confirming, before a node or a communication device transmits traffic on a shared transmission medium (also called a shared channel) such as a frequency band, that there is no other traffic on the same shared transmission medium. In CSMA, a transmitting device determines whether another transmission is being performed before attempting to transmit traffic to a receiving device. In other words, the transmitting device attempts to detect presence of a carrier from another transmitting device before attempting to perform transmission. Upon sensing the carrier, the transmitting device waits for another transmitting device which is performing transmission to finish transmission, before performing transmission thereof. Consequently, CSMA can be a communication scheme based on the principle of “sense before transmit” or “listen before talk”. A scheme for avoiding collision between transmitting devices in the contention based communication system using CSMA includes carrier sense multiple access with collision detection (CSMA/CD) and/or carrier sense multiple access with collision avoidance (CSMA/CA). CSMA/CD is a collision detection scheme in a wired local area network (LAN) environment. In CSMA/CD, a personal computer (PC) or a server which desires to perform communication in an Ethernet environment first confirms whether communication occurs on a network and, if another device carries data on the network, the PC or the server waits and then transmits data. That is, when two or more users (e.g. PCs, UEs, etc.) simultaneously transmit data, collision occurs

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		between simultaneous transmission and CSMA/CD is a scheme for flexibly transmitting data by monitoring collision. A transmitting device using CSMA/CD adjusts data transmission thereof by sensing data transmission performed by another device using a specific rule. CSMA/CA is a MAC protocol specified in IEEE 802.11 standards. A wireless LAN (WLAN) system conforming to IEEE 802.11 standards does not use CSMA/CD which has been used in IEEE 802.3 standards and uses CA, i.e. a collision avoidance scheme. Transmitting devices always sense carrier of a network and, if the network is empty, the transmitting devices wait for determined time according to locations thereof registered in a list and then transmit data. Various methods are used to determine priority of the transmitting devices in the list and to reconfigure priority. In a system according to some versions of IEEE 802.11 standards, collision may occur and, in this case, a collision sensing procedure is performed. A transmitting device using CSMA/CA avoids collision between data transmission thereof and data transmission of another transmitting device using a specific rule.” You at [0046]. “In the present invention, a user equipment (UE) may be a fixed or mobile device. Examples of the UE include various devices that transmit and receive user data and/or various kinds of control information to and from a base station (BS). The UE may be referred to as a terminal equipment (TE), a mobile station (MS), a mobile terminal (MT), a user terminal (UT), a subscriber station (SS), a wireless device, a personal digital assistant (PDA), a wireless modem, a handheld device, etc. In addition, in the present invention, a BS generally refers to a fixed station that performs communication with a UE and/or another BS, and exchanges various kinds of data and control information with the UE and another BS. The BS may be referred to as an advanced base station (ABS), a node-B (NB), an evolved node-B (eNB), a base transceiver system (BTS), an access point (AP), a processing server (PS), etc. In describing the present invention, a BS will be referred to as an eNB.” You at [0047]. “For example, it is assumed that a specific PDCCH is CRC-masked with a radio network temporary identity (RNTI) “A” and information about data transmitted using

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		a radio resource “B” (e.g. frequency location) and using transport format information “C” (e.g. transport block size, modulation scheme, coding information, etc.) is transmitted in a specific DL subframe. Then, the UE monitors the PDCCH using RNTI information thereof. The UE having the RNTI “A” receives the PDCCH and receives the PDSCH indicated by “B” and “C” through information of the received PDCCH.” You at [0085]. “A general wireless communication system transmits/receives data through one downlink (DL) band and through one uplink (UL) band corresponding to the DL band (in the case of frequency division duplex (FDD) mode), or divides a prescribed radio frame into a UL time unit and a DL time unit in the time domain and transmits/receives data through the UL/DL time unit (in the case of time division duplex (TDD) mode). Recently, to use a wider frequency band in recent wireless communication systems, introduction of carrier aggregation (or BW aggregation) technology that uses a wider UL/DL BW by aggregating a plurality of UL/DL frequency blocks has been discussed. A carrier aggregation (CA) is different from an orthogonal frequency division multiplexing (OFDM) system in that DL or UL communication is performed using a plurality of carrier frequencies, whereas the OFDM system carries a base frequency band divided into a plurality of orthogonal subcarriers on a single carrier frequency to perform DL or UL communication. Hereinbelow, each of carriers aggregated by carrier aggregation will be referred to as a component carrier (CC).” You at [0094]. “DCI for configuring a PRB location constituting each PRB-set and/or configuring additional PRB-set(s) may be transmitted through a CSS and/or a USS of a legacy PDCCH. Herein, a time point at which a DCI configuration carried by the PDCCH is applied may be as follows. Option 2-a) The sPDCCH related configuration information configured by the DCI may be applied only to all sTTIs of a subframe in which the DCI is transmitted through the PDCCH.

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		Option 2-b) The sPDCCH related configuration information configured by the DCI may be applied until the UE receives and applies a new configuration from a subframe in which the DCI is transmitted through the PDCCH or during a specific duration. Option 2-c) The sPDCCH related configuration information configured by the DCI may be applied until the last sTTI from an k-th (e.g., second) sTTI within a subframe in which the DCI is transmitted through the PDCCH. Option 2-d) The sPDCCH related configuration information configured by the DCI may be applied until the UE receives and applies a new configuration from a k-th (e.g., second) sTTI in a subframe in which the DCI is transmitted through the PDCCH or during a specific duration. Option 2-e) The sPDCCH related configuration information configured by the DCI may be applied only to all sTTIs of the next subframe of a subframe in which the DCI is transmitted through the PDCCH. Option 2-f) The sPDCCH related configuration information configured by the DCI may be applied until the UE receives and applies a new configuration from the next subframe of a subframe in which the DCI is transmitted through the PDCCH or during a specific duration.” You at [0175].

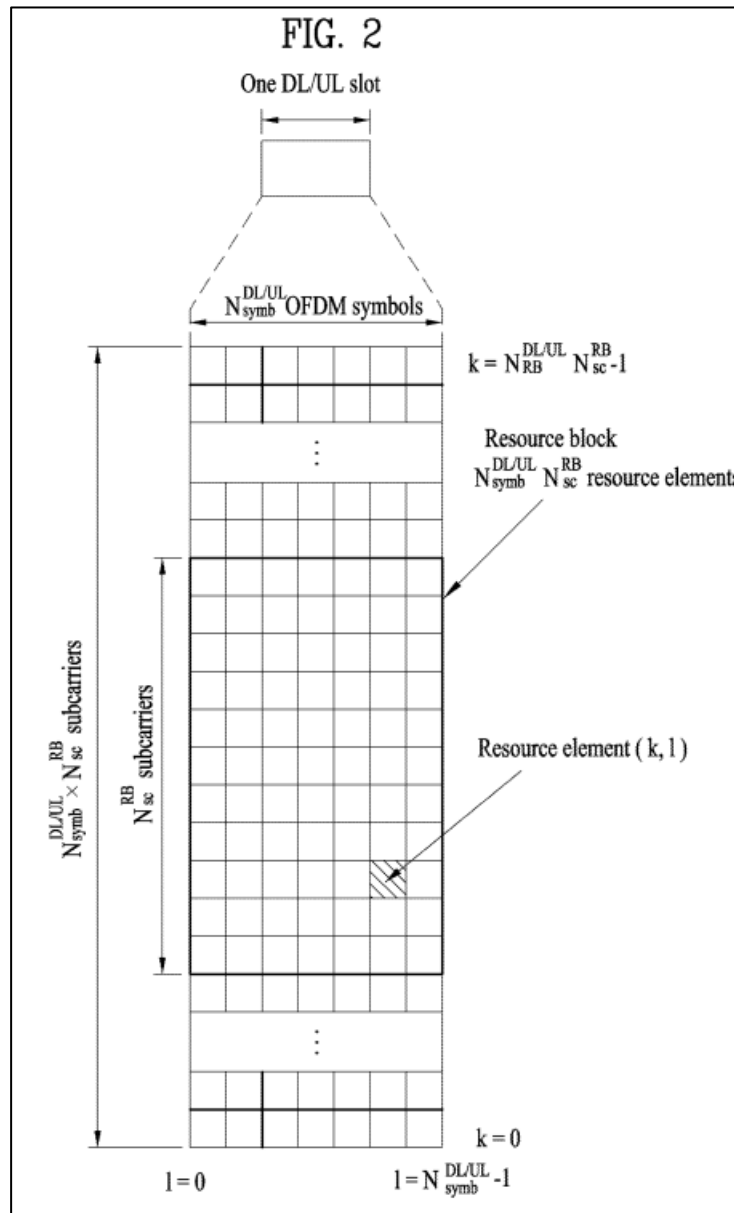
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		FIG. 14  You at Fig. 14. To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
1[a]	transmitting, to a wireless device, a radio resource control (RRC) signal including information on one or more allocations of a time-domain	At least under Pegasus's apparent infringement theory, You discloses transmitting, to a wireless device, a radio resource control (RRC) signal including information on one or more allocations of a time-domain resource, wherein the time-domain resource includes at least one or more orthogonal frequency-division multiplexing (OFDM)

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	resource, wherein the time-domain resource includes at least one or more orthogonal frequency-division multiplexing (OFDM) symbols,	symbols. For example, You discloses this limitation based on the following exemplary citations: <i>See Claim 1[pre], supra.</i> “A general wireless communication system performs data transmission/reception through one downlink (DL) band and through one uplink (UL) band corresponding to the DL band (in case of a frequency division duplex (FDD) mode), or divides a prescribed radio frame into a UL time unit and a DL time unit in the time domain and then performs data transmission/reception through the UL/DL time unit (in case of a time division duplex (TDD) mode). A base station (BS) and a user equipment (UE) transmit and receive data and/or control information scheduled on a prescribed time unit basis, e.g. on a subframe basis. The data is transmitted and received through a data region configured in a UL/DL subframe and the control information is transmitted and received through a control region configured in the UL/DL subframe. To this end, various physical channels carrying radio signals are formed in the UL/DL subframe. In contrast, carrier aggregation technology serves to use a wider UL/DL bandwidth by aggregating a plurality of UL/DL frequency blocks in order to use a broader frequency band so that more signals relative to signals when a single carrier is used can be simultaneously processed.” You at [0003]. “In each aspect of the present invention, the subframe n may be a shortened subframe consisting of partial orthogonal frequency division multiplexing (OFDM) symbols among OFDM symbols within a subframe of 1 ms.” You at [0020]. “For example, the present invention is applicable to contention based communication such as Wi-Fi as well as non-contention based communication as in the 3GPP LTE/LTE-A system in which an eNB allocates a DL/UL time/frequency resource to a UE and the UE receives a DL signal and transmits a UL signal according to resource allocation of the eNB. In a non-contention based communication scheme, an access point (AP) or a control node for controlling the AP allocates a resource for

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		communication between the UE and the AP, whereas, in a contention based communication scheme, a communication resource is occupied through contention between UEs which desire to access the AP. The contention based communication scheme will now be described in brief. One type of the contention based communication scheme is carrier sense multiple access (CSMA). CSMA refers to a probabilistic media access control (MAC) protocol for confirming, before a node or a communication device transmits traffic on a shared transmission medium (also called a shared channel) such as a frequency band, that there is no other traffic on the same shared transmission medium. In CSMA, a transmitting device determines whether another transmission is being performed before attempting to transmit traffic to a receiving device. In other words, the transmitting device attempts to detect presence of a carrier from another transmitting device before attempting to perform transmission. Upon sensing the carrier, the transmitting device waits for another transmitting device which is performing transmission to finish transmission, before performing transmission thereof. Consequently, CSMA can be a communication scheme based on the principle of “sense before transmit” or “listen before talk”. A scheme for avoiding collision between transmitting devices in the contention based communication system using CSMA includes carrier sense multiple access with collision detection (CSMA/CD) and/or carrier sense multiple access with collision avoidance (CSMA/CA). CSMA/CD is a collision detection scheme in a wired local area network (LAN) environment. In CSMA/CD, a personal computer (PC) or a server which desires to perform communication in an Ethernet environment first confirms whether communication occurs on a network and, if another device carries data on the network, the PC or the server waits and then transmits data. That is, when two or more users (e.g. PCs, UEs, etc.) simultaneously transmit data, collision occurs between simultaneous transmission and CSMA/CD is a scheme for flexibly transmitting data by monitoring collision. A transmitting device using CSMA/CD adjusts data transmission thereof by sensing data transmission performed by another device using a specific rule. CSMA/CA is a MAC protocol specified in IEEE 802.11 standards. A wireless LAN (WLAN) system conforming to IEEE 802.11 standards does not use CSMA/CD which has been used in IEEE 802.3 standards and uses CA,

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		i.e. a collision avoidance scheme. Transmitting devices always sense carrier of a network and, if the network is empty, the transmitting devices wait for determined time according to locations thereof registered in a list and then transmit data. Various methods are used to determine priority of the transmitting devices in the list and to reconfigure priority. In a system according to some versions of IEEE 802.11 standards, collision may occur and, in this case, a collision sensing procedure is performed. A transmitting device using CSMA/CA avoids collision between data transmission thereof and data transmission of another transmitting device using a specific rule.” You at [0046]. “Hereinafter, OFDM symbol/subcarrier/RE to or for which CRS/DMRS/CSI-RS/SRS/UE-RS is assigned or configured will be referred to as CRS/DMRS/CSI-RS/SRS/UE-RS symbol/carrier/subcarrier/RE. For example, an OFDM symbol to or for which a tracking RS (TRS) is assigned or configured is referred to as a TRS symbol, a subcarrier to or for which the TRS is assigned or configured is referred to as a TRS subcarrier, and an RE to or for which the TRS is assigned or configured is referred to as a TRS RE. In addition, a subframe configured for transmission of the TRS is referred to as a TRS subframe. Moreover, a subframe in which a broadcast signal is transmitted is referred to as a broadcast subframe or a PBCH subframe and a subframe in which a synchronization signal (e.g. PSS and/or SSS) is transmitted is referred to a synchronization signal subframe or a PSS/SSS subframe. OFDM symbol/subcarrier/RE to or for which PSS/SSS is assigned or configured is referred to as PSS/SSS symbol/subcarrier/RE, respectively.” “Referring to FIG. 2, a slot includes a plurality of orthogonal frequency division multiplexing (OFDM) symbols in the time domain and includes a plurality of resource blocks (RBs) in the frequency domain. The OFDM symbol may refer to one symbol duration. Referring to FIG. 2, a signal transmitted in each slot may be expressed by a resource grid including $N_{RB}^{DL/UL} * N_{sc}^{RB}$ subcarriers and $N_{symb}^{DL/UL}$ OFDM symbols. N_{RB}^{DL} denotes the number of RBs in a DL slot and N_{RB}^{UL} denotes the number of RBs in a UL slot. N_{RB}^{DL} and N_{RB}^{UL} depend on a DL

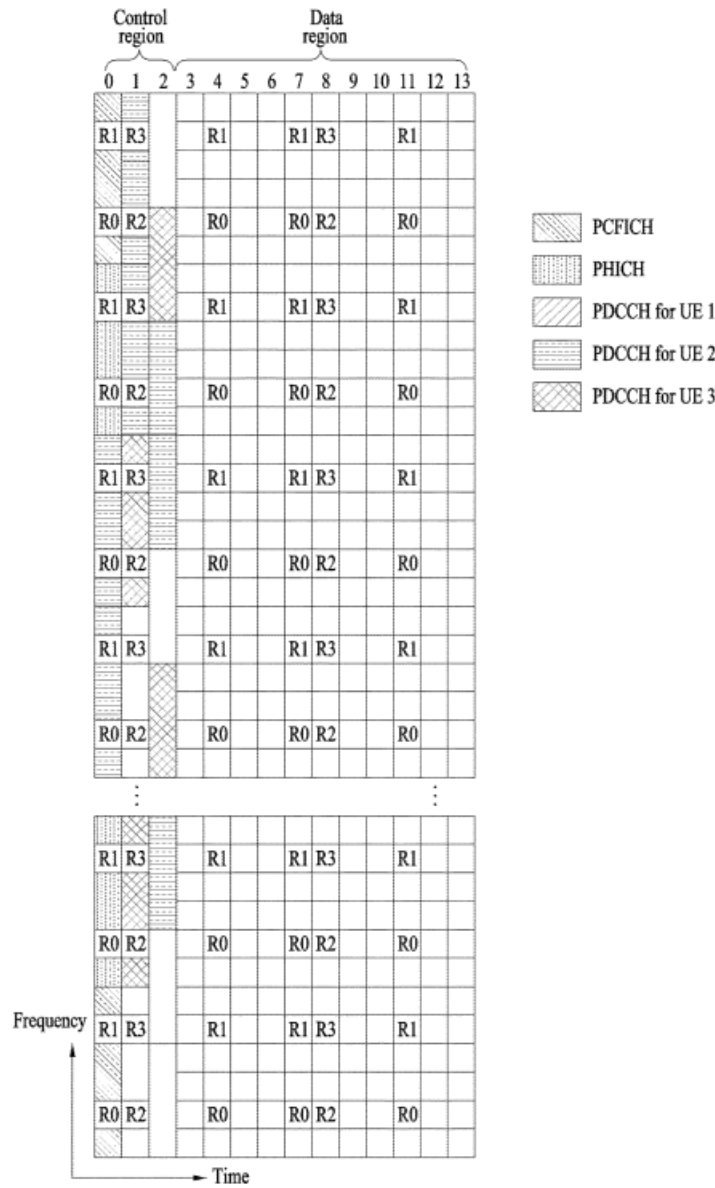
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		transmission bandwidth and a UL transmission bandwidth, respectively. $N^{\text{DL}}_{\text{symb}}$ denotes the number of OFDM symbols in a DL slot, $N^{\text{UL}}_{\text{symb}}$ denotes the number of OFDM symbols in a UL slot, and $N^{\text{RB}}_{\text{sc}}$ denotes the number of subcarriers configuring one RB.” You at [0062]; <i>see also, id.</i> at [0063-65].



You at Fig. 2.

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		“Referring to FIG. 3, a DL subframe is divided into a control region and a data region in the time domain. Referring to FIG. 3, a maximum of 3 (or 4) OFDM symbols located in a front part of a first slot of a subframe corresponds to the control region. Hereinafter, a resource region for PDCCH transmission in a DL subframe is referred to as a PDCCH region. OFDM symbols other than the OFDM symbol(s) used in the control region correspond to the data region to which a physical downlink shared channel (PDSCH) is allocated. Hereinafter, a resource region available for PDSCH transmission in the DL subframe is referred to as a PDSCH region.” You at [0067]; <i>see also, id.</i> at [0068-70].

FIG. 3

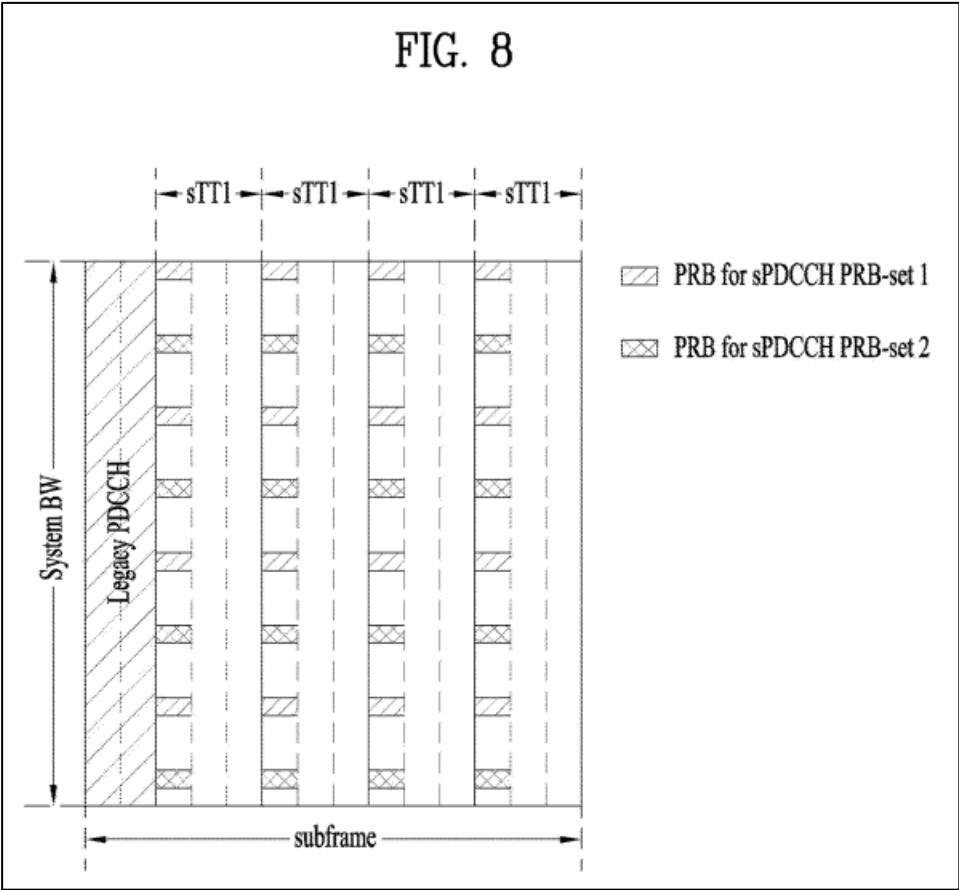


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		You at Fig. 3. <table border="1"> <caption>TABLE 3</caption> <thead> <tr> <th>Subframe</th><th>Number of OFDM symbols for PDCCH when $N_{RB}^{DL} > 10$</th><th>Number of OFDM symbols for PDCCH when $N_{RB}^{DL} \leq 10$</th></tr> </thead> <tbody> <tr> <td>Subframe 1 and 6 for frame structure type 2</td><td>1, 2</td><td>2</td></tr> <tr> <td>MBSFN subframes on a carrier supporting PDSCH, configured with 1 or 2 cell-specific antenna ports</td><td>1, 2</td><td>2</td></tr> <tr> <td>MBSFN subframes on a carrier supporting PDSCH, configured with 4 cell-specific antenna ports</td><td>2</td><td>2</td></tr> <tr> <td>Subframes on a carrier not supporting PDSCH</td><td>0</td><td>0</td></tr> <tr> <td>Non-MBSFN subframes (except subframe 6 for frame structure type 2) configured with positioning reference signals</td><td>1, 2, 3</td><td>2, 3</td></tr> <tr> <td>All other cases</td><td>1, 2, 3</td><td>2, 3, 4</td></tr> </tbody> </table> You at Table 3. “A subset of downlink subframes within a radio frame on a carrier for supporting PDSCH transmission may be configured as MBSFN subframe(s) by a higher layer. Each MBSFN subframe is divided into a non-MBSFN region and an MBSFN region. The non-MBSFN region spans first one or two OFDM symbols, and its length is given by Table 3. The same CP as cyclic prefix (CP) used for subframe 0 is used for transmission within the non-MBSFN region of the MBSFN subframe. The MBSFN region within the MBSFN subframe is defined as OFDM symbols which are not used in the non-MBSFN region. The PCFICH carries a control format indicator (CFI), which indicates any one of values of 1 to 3. For a downlink system bandwidth $N_{RB}^{DL} > 10$, the number 1, 2 or 3 of OFDM symbols which are spans of DCI carried by the PDCCH is given by the CFI. For a downlink system bandwidth $N_{RB}^{DL} \leq 10$, the number 2, 3 or 4 of OFDM symbols which are spans of DCI carried by the PDCCH is given by CFI+1.” You at [0071-72].	Subframe	Number of OFDM symbols for PDCCH when $N_{RB}^{DL} > 10$	Number of OFDM symbols for PDCCH when $N_{RB}^{DL} \leq 10$	Subframe 1 and 6 for frame structure type 2	1, 2	2	MBSFN subframes on a carrier supporting PDSCH, configured with 1 or 2 cell-specific antenna ports	1, 2	2	MBSFN subframes on a carrier supporting PDSCH, configured with 4 cell-specific antenna ports	2	2	Subframes on a carrier not supporting PDSCH	0	0	Non-MBSFN subframes (except subframe 6 for frame structure type 2) configured with positioning reference signals	1, 2, 3	2, 3	All other cases	1, 2, 3	2, 3, 4
Subframe	Number of OFDM symbols for PDCCH when $N_{RB}^{DL} > 10$	Number of OFDM symbols for PDCCH when $N_{RB}^{DL} \leq 10$																					
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		“The control information transmitted through the PDCCH will be referred to as downlink control information (DCI). The DCI includes resource allocation information for a UE or UE group and other control information. Transmit format and resource allocation information of a downlink shared channel (DL-SCH) are referred to as DL scheduling information or DL grant. Transmit format and resource allocation information of an uplink shared channel (UL-SCH) are referred to as UL scheduling information or UL grant. The size and usage of the DCI carried by one PDCCH are varied depending on DCI formats. The size of the DCI may be varied depending on a coding rate. In the current 3GPP LTE system, various formats are defined, wherein formats 0 and 4 are defined for a UL, and formats 1, 1A, 1B, 1C, 1D, 2, 2A, 2B, 2C, 3 and 3A are defined for a DL. Combination selected from control information such as a hopping flag, RB allocation, modulation coding scheme (MCS), redundancy version (RV), new data indicator (NDI), transmit power control (TPC), cyclic shift, cyclic shift demodulation reference signal (DM RS), UL index, channel quality information (CQI) request, DL assignment index, HARQ process number, transmitted precoding matrix indicator (TPMI), precoding matrix indicator (PMI) information is transmitted to the UE as the DCI.” You at [0074]. “The PDCCH is allocated to first m number of OFDM symbol(s) within a subframe. In this case, m is an integer equal to or greater than 1, and is indicated by the PCFICH. The PDCCH is transmitted on an aggregation of one or a plurality of continuous control channel elements (CCEs). The CCE is a logic allocation unit used to provide a coding rate based on the status of a radio channel to the PDCCH. The CCE corresponds to a plurality of resource element groups (REGs). For example, one CCE corresponds to nine resource element groups (REGs), and one REG corresponds to four REs. Four QPSK symbols are mapped to each REG. A resource element (RE) occupied by the reference signal (RS) is not included in the REG. Accordingly, the number of REGs within given OFDM symbols is varied depending on the presence of

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		the RS. The REGs are also used for other downlink control channels (that is, PDFICH and PHICH).” You at [0078-79]. “A general wireless communication system transmits/receives data through one downlink (DL) band and through one uplink (UL) band corresponding to the DL band (in the case of frequency division duplex (FDD) mode), or divides a prescribed radio frame into a UL time unit and a DL time unit in the time domain and transmits/receives data through the UL/DL time unit (in the case of time division duplex (TDD) mode). Recently, to use a wider frequency band in recent wireless communication systems, introduction of carrier aggregation (or BW aggregation) technology that uses a wider UL/DL BW by aggregating a plurality of UL/DL frequency blocks has been discussed. A carrier aggregation (CA) is different from an orthogonal frequency division multiplexing (OFDM) system in that DL or UL communication is performed using a plurality of carrier frequencies, whereas the OFDM system carries a base frequency band divided into a plurality of orthogonal subcarriers on a single carrier frequency to perform DL or UL communication. Hereinbelow, each of carriers aggregated by carrier aggregation will be referred to as a component carrier (CC).” You at [0093]. “In the meantime, the 3GPP LTE-A system uses a concept of cell to manage radio resources. The cell is defined by combination of downlink resources and uplink resources, that is, combination of DL CC and UL CC. The cell may be configured by downlink resources only, or may be configured by downlink resources and uplink resources. If carrier aggregation is supported, linkage between a carrier frequency of the downlink resources (or DL CC) and a carrier frequency of the uplink resources (or UL CC) may be indicated by system information. For example, combination of the DL resources and the UL resources may be indicated by linkage of system information block type 2 (SIB2). In this case, the carrier frequency means a center frequency of each cell or CC. A cell operating on a primary frequency may be referred to as a primary cell (Pcell) or PCC, and a cell operating on a secondary frequency may be referred to as a secondary cell (Scell) or SCC. The carrier

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		corresponding to the Pcell on downlink will be referred to as a downlink primary CC (DL PCC), and the carrier corresponding to the Pcell on uplink will be referred to as an uplink primary CC (UL PCC). A Scell means a cell that may be configured after completion of radio resource control (RRC) connection establishment and used to provide additional radio resources. The Scell may form a set of serving cells for the UE together with the Pcell in accordance with capabilities of the UE. The carrier corresponding to the Scell on the downlink will be referred to as downlink secondary CC (DL SCC), and the carrier corresponding to the Scell on the uplink will be referred to as uplink secondary CC (UL SCC). Although the UE is in RRC-CONNECTED state, if it is not configured by carrier aggregation or does not support carrier aggregation, a single serving cell configured by the Pcell only exists.” You at [0095]. “If cross-carrier scheduling (or cross-CC scheduling) is applied, a PDCCH for downlink allocation for a DL CC B or DL CC C, that is, carrying a DL grant may be transmitted through a DL CC A, and a corresponding PDSCH may be transmitted through the DL CC B or DL CC C. For cross-CC scheduling, a carrier indicator field (CIF) may be introduced. The presence or absence of the CIF within the PDCCH may be semi-statically and UE-specifically (or UE-group-specifically) configured by higher layer signaling (e.g., RRC signaling).” You at [0105]. “FIG. 8 illustrates an example of resource allocation for a control channel within an sTTI. To maximally obtain a frequency diversity effect during transmission of an sPDCCH, PRBs constituting a PRB-set may be evenly distributed within a system bandwidth. For example, referring to FIG. 8, PRBs constituting each PRB-set may be distributively located within a system bandwidth. PRB regions constituting different PRB-sets may be alternately present in the frequency domain.” You at [0159].

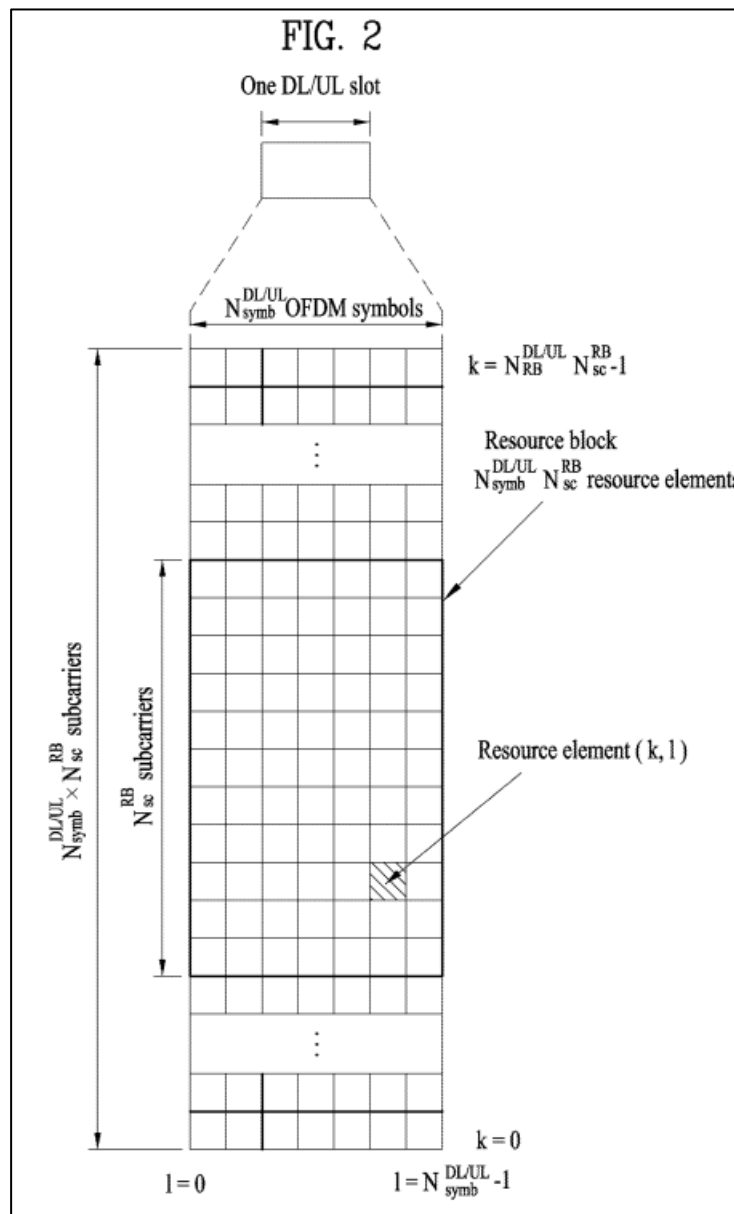
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		FIG. 8  You at Fig. 8. “Method 2. RRC Configuration A PRB location constituting each PRB-set may be semi-statically configured through an RRC signal. For a configuration of each PRB-set transmitted through the RRC signal, a PRB-set index, the number of PRBs, a PRB location, locations/number of OFDM symbols constituting an sPDCCH search space in the corresponding PRB-set

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		(or locations/number of OFDM symbol resources of an sPDCCH transmitted in the PRB-set) may also be configured. The RRC signal including the configuration for the PRB-set may be transmitted through the sPDCCH. Alternatively, the configuration for the PRB-set may be transmitted through a PDCCH common search space (CSS) and/or a UE-specific search space (USS).” You at [0161-163]. “Method 3. DCI Configuration A PRB location constituting each PRB-set may be more dynamically configured through a DCI configuration. A UE may be notified of configurations for each PRB-set through DCI. For example, information about a PRB-set index, the number of PRBs, a PRB location, the locations/number of OFDM symbols constituting an sPDCCH search space in the corresponding PRB-set, or the locations/number of OFDM symbol resources of the sPDCCH transmitted in the corresponding PRB-set may be provided to the UE as PRB-set configuration information. Alternatively, the entire configuration for the PRB-set may be configured through RRC and information only about the number of PRBs and/or the PRB location may be dynamically configured through the DCI. A dynamic configuration of a PRB location through the DCI may advantageously increase flexibility of transmission of the sPDCCH by the eNB, (when one PRB-set or a small number of PRB sets are present) when a resource of a legacy PDSCH overlaps the PRB resource of the PRB-set, or by changing a PRB resource location of the PRB-set. DCI carrying information about a PRB location constituting each PRB-set and/or additional PRB-set configuration(s) may be transmitted as follows.” You at [0164-167]. “Method 1. Allocation of sPDSCH within PRBs for sPDCCH PRB-Set A PRB resource in which the sPDSCH can be scheduled may be limited to a PRB resource in which the sPDCCH can be transmitted or is transmitted. If the number of PRB-sets of the sPDCCH is plural, a PRB resource in which the sPDSCH can be

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		scheduled may be limited to a PRB resource constituting a PRB-set in which DCI for scheduling the sPDSCH is transmitted. Alternatively, when the number of PRB-sets of the sPDCCH is plural, the sPDSCH may be scheduled in all PRB resources constituting the plural PRB-sets. In this case, a PRB resource location in which the sPDSCH is transmitted within a corresponding PRB resource may be configured and PRB resource information for identifying the PRB resource location within the PRB resource may be transmitted through DCI or fast DCI. Alternatively, (a) a PRB resource in which the sPDSCH is transmitted may be equal to all PRB resources constituting a PRB-set in which the sPDCCH for scheduling the sPDSCH is transmitted. Alternatively, (b) when the UE monitors multiple sPDCCH PRB-sets, a PRB resource in which the sPDSCH is transmitted may be equal to all PRB resources constituting PRB-sets for monitoring the sPDCCH. Alternatively, when the UE monitors multiple sPDCCH PRB-sets, whether a PRB resource in which the scheduled sPDSCH is transmitted corresponds to the method (a) or (b) may be configured through DCI, first DCI, or second DCI.” You at [0200-203]; <i>see also, id.</i> at [0204-213]. To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
1[b]	wherein, based on the information, a number of OFDM symbols are	At least under Pegasus’s apparent infringement theory, You discloses wherein, based on the information, a number of OFDM symbols are determined for a physical downlink shared channel (PDSCH) or a physical uplink shared channel (PUSCH),

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	determined for a physical downlink shared channel (PDSCH) or a physical uplink shared channel (PUSCH), and	and. For example, You discloses this limitation based on the following exemplary citations: <i>See</i> 1[a], <i>supra</i>. “In the present invention, a physical downlink control channel (PDCCH), a physical control format indicator channel (PCFICH), a physical hybrid automatic retransmit request indicator channel (PHICH), and a physical downlink shared channel (PDSCH) refer to a set of time-frequency resources or resource elements (REs) carrying downlink control information (DCI), a set of time-frequency resources or REs carrying a control format indicator (CFI), a set of time-frequency resources or REs carrying downlink acknowledgement (ACK)/negative ACK (NACK), and a set of time-frequency resources or REs carrying downlink data, respectively. In addition, a physical uplink control channel (PUCCH), a physical uplink shared channel (PUSCH) and a physical random access channel (PRACH) refer to a set of time-frequency resources or REs carrying uplink control information (UCI), a set of time-frequency resources or REs carrying uplink data and a set of time-frequency resources or REs carrying random access signals, respectively. In the present invention, in particular, a time-frequency resource or RE that is assigned to or belongs to PDCCH/PCFICH/PHICH/PDSCH/PUCCH/PUSCH/PRACH is referred to as PDCCH/PCFICH/PHICH/PDSCH/PUCCH/PUSCH/PRACH RE or PDCCH/PCFICH/PHICH/PDSCH/PUCCH/PUSCH/PRACH time-frequency resource, respectively. Therefore, in the present invention, PUCCH/PUSCH/PRACH transmission of a UE is conceptually identical to UCI/uplink data/random access signal transmission on PUSCH/PUCCH/PRACH, respectively. In addition, PDCCH/PCFICH/PHICH/PDSCH transmission of an eNB is conceptually identical to downlink data/DCI transmission on PDCCH/PCFICH/PHICH/PDSCH, respectively.” You at [0053]. “Referring to FIG. 2, a slot includes a plurality of orthogonal frequency division multiplexing (OFDM) symbols in the time domain and includes a plurality of

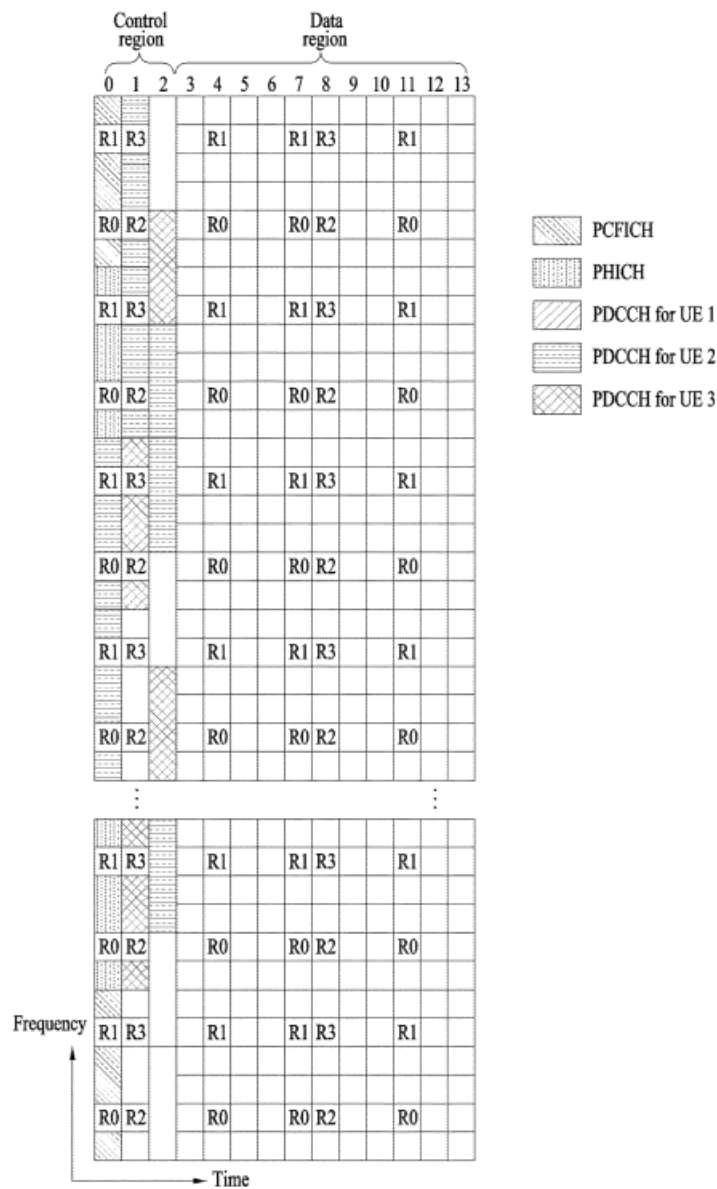
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		resource blocks (RBs) in the frequency domain. The OFDM symbol may refer to one symbol duration. Referring to FIG. 2, a signal transmitted in each slot may be expressed by a resource grid including $N_{RB}^{DL/UL} * N_{sc}^{RB}$ subcarriers and $N_{symb}^{DL/UL}$ OFDM symbols. N_{RB}^{DL} denotes the number of RBs in a DL slot and N_{RB}^{UL} denotes the number of RBs in a UL slot. N_{RB}^{DL} and N_{RB}^{UL} depend on a DL transmission bandwidth and a UL transmission bandwidth, respectively. N_{symb}^{DL} denotes the number of OFDM symbols in a DL slot, N_{symb}^{UL} denotes the number of OFDM symbols in a UL slot, and N_{sc}^{RB} denotes the number of subcarriers configuring one RB. An OFDM symbol may be referred to as an OFDM symbol, a single carrier frequency division multiplexing (SC-FDM) symbol, etc. according to multiple access schemes. The number of OFDM symbols included in one slot may be varied according to channel bandwidths and CP lengths. For example, in a normal cyclic prefix (CP) case, one slot includes 7 OFDM symbols. In an extended CP case, one slot includes 6 OFDM symbols. Although one slot of a subframe including 7 OFDM symbols is shown in FIG. 2 for convenience of description, embodiments of the present invention are similarly applicable to subframes having a different number of OFDM symbols. Referring to FIG. 2, each OFDM symbol includes $N_{RB}^{DL/UL} * N_{sc}^{RB}$ subcarriers in the frequency domain. The type of the subcarrier may be divided into a data subcarrier for data transmission, a reference signal (RS) subcarrier for RS transmission, and a null subcarrier for a guard band and a DC component. The null subcarrier for the DC component is unused and is mapped to a carrier frequency f_0 in a process of generating an OFDM signal or in a frequency up-conversion process. The carrier frequency is also called a center frequency f_c." You at [0062-63].



You at Fig. 2.

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		“Examples of a DL control channel used in 3GPP LTE include a physical control format indicator channel (PCFICH), a physical downlink control channel (PDCCH), a physical hybrid ARQ indicator channel (PHICH), etc. The PCFICH is transmitted in the first OFDM symbol of a subframe and carries information about the number of OFDM symbols available for transmission of a control channel within a subframe. The PCFICH notifies the UE of the number of OFDM symbols used for the corresponding subframe every subframe. The PCFICH is located at the first OFDM symbol. The PCFICH is configured by four resource element groups (REGs), each of which is distributed within a control region on the basis of cell ID. One REG includes four REs.” You at [0068-69].

FIG. 3



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		You at Fig. 3. <table border="1"> <caption>TABLE 3</caption> <tr> <th>Subframe</th><th>Number of OFDM symbols for PDCCH when $N_{RB}^{DL} > 10$</th><th>Number of OFDM symbols for PDCCH when $N_{RB}^{DL} \leq 10$</th></tr> <tr> <td>Subframe 1 and 6 for frame structure type 2</td><td>1, 2</td><td>2</td></tr> <tr> <td>MBSFN subframes on a carrier supporting PDSCH, configured with 1 or 2 cell-specific antenna ports</td><td>1, 2</td><td>2</td></tr> <tr> <td>MBSFN subframes on a carrier supporting PDSCH, configured with 4 cell-specific antenna ports</td><td>2</td><td>2</td></tr> <tr> <td>Subframes on a carrier not supporting PDSCH</td><td>0</td><td>0</td></tr> <tr> <td>Non-MBSFN subframes (except subframe 6 for frame structure type 2) configured with positioning reference signals</td><td>1, 2, 3</td><td>2, 3</td></tr> <tr> <td>All other cases</td><td>1, 2, 3</td><td>2, 3, 4</td></tr> </table> You at Table 3. “The PDCCH is allocated to first m number of OFDM symbol(s) within a subframe. In this case, m is an integer equal to or greater than 1, and is indicated by the PCFICH. The PDCCH is transmitted on an aggregation of one or a plurality of continuous control channel elements (CCEs). The CCE is a logic allocation unit used to provide a coding rate based on the status of a radio channel to the PDCCH. The CCE corresponds to a plurality of resource element groups (REGs). For example, one CCE corresponds to nine resource element groups (REGs), and one REG corresponds to four REs. Four QPSK symbols are mapped to each REG. A resource element (RE) occupied by the reference signal (RS) is not included in the REG. Accordingly, the number of REGs within given OFDM symbols is varied depending on the presence of the RS. The REGs are also used for other downlink control channels (that is, PDFICH and PHICH).” You at [0078-79].	Subframe	Number of OFDM symbols for PDCCH when $N_{RB}^{DL} > 10$	Number of OFDM symbols for PDCCH when $N_{RB}^{DL} \leq 10$	Subframe 1 and 6 for frame structure type 2	1, 2	2	MBSFN subframes on a carrier supporting PDSCH, configured with 1 or 2 cell-specific antenna ports	1, 2	2	MBSFN subframes on a carrier supporting PDSCH, configured with 4 cell-specific antenna ports	2	2	Subframes on a carrier not supporting PDSCH	0	0	Non-MBSFN subframes (except subframe 6 for frame structure type 2) configured with positioning reference signals	1, 2, 3	2, 3	All other cases	1, 2, 3	2, 3, 4
Subframe	Number of OFDM symbols for PDCCH when $N_{RB}^{DL} > 10$	Number of OFDM symbols for PDCCH when $N_{RB}^{DL} \leq 10$																					
Subframe 1 and 6 for frame structure type 2	1, 2	2																					
MBSFN subframes on a carrier supporting PDSCH, configured with 1 or 2 cell-specific antenna ports	1, 2	2																					
MBSFN subframes on a carrier supporting PDSCH, configured with 4 cell-specific antenna ports	2	2																					
Subframes on a carrier not supporting PDSCH	0	0																					
Non-MBSFN subframes (except subframe 6 for frame structure type 2) configured with positioning reference signals	1, 2, 3	2, 3																					
All other cases	1, 2, 3	2, 3, 4																					

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		“A configured cell refers to a cell in which CA is performed for a UE based on measurement report from another eNB or UE among cells of an eNB and is configured for each UE. The configured cell for the UE may be a serving cell in terms of the UE. The configured cell for the UE, i.e. the serving cell, pre-reserves resources for ACK/NACK transmission for PDSCH transmission. An activated cell refers to a cell configured to be actually used for PDSCH/PUSCH transmission among configured cells for the UE and CSI reporting and SRS transmission for PDSCH/PUSCH transmission are performed on the activated cell. A deactivated cell refers to a cell configured not to be used for PDSCH/PUSCH transmission by the command of an eNB or the operation of a timer and CSI reporting and SRS transmission are stopped on the deactivated cell.” You at [0097]. “FIG. 7 illustrates an sTTI and transmission of a control channel and data channel within the sTTI. In the downlink environment, a PDCCH for transmission/scheduling of data within an sTTI (i.e., sPDCCH) and a PDSCH transmitted within an sTTI (i.e., sPDSCH) may be transmitted. For example, referring to FIG. 7, a plurality of the sTTIs may be configured within one subframe, using different OFDM symbols. For example, the OFDM symbols in the subframe may be divided into one or more sTTIs in the time domain. OFDM symbols constituting an sTTI may be configured, excluding the leading OFDM symbols on which the legacy control channel is transmitted. Transmission of the sPDCCH and sPDSCH may be performed in a TDM manner within the sTTI, using different OFDM symbol regions. In an sTTI, the sPDCCH and sPDSCH may be transmitted in an FDM manner, using different regions of PRB(s)/frequency resources.” You at [0148-149]; <i>see also, id.</i> at [0150-152].

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		FIG. 7 The diagram illustrates a Short Frame (1ms, 14 symbols) and a Short TTI. The Short Frame is divided into 14 symbols. The Short TTI is a subset of the Short Frame, consisting of 10 symbols. The Short TTI is further divided into 5 pairs of sPDCCH and sPDSCH. The sPDCCH and sPDSCH are shown as pairs of channels, with sPDCCH preceding sPDSCH. A PDCCH is shown at the beginning of the TTI, and a PDSCH is shown at the end. The TTI is the total duration of the transmission. You at Fig. 7. “Method 2. RRC Configuration A PRB location constituting each PRB-set may be semi-statically configured through an RRC signal. For a configuration of each PRB-set transmitted through the RRC signal, a PRB-set index, the number of PRBs, a PRB location, locations/number of OFDM symbols constituting an sPDCCH search space in the corresponding PRB-set (or locations/number of OFDM symbol resources of an sPDCCH transmitted in the PRB-set) may also be configured. The RRC signal including the configuration for the PRB-set may be transmitted through the sPDCCH. Alternatively, the configuration for the PRB-set may be transmitted through a PDCCH common search space (CSS) and/or a UE-specific search space (USS).” You at [0161-163]. “Method 3. DCI Configuration

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		A PRB location constituting each PRB-set may be more dynamically configured through a DCI configuration. A UE may be notified of configurations for each PRB-set through DCI. For example, information about a PRB-set index, the number of PRBs, a PRB location, the locations/number of OFDM symbols constituting an sPDCCH search space in the corresponding PRB-set, or the locations/number of OFDM symbol resources of the sPDCCH transmitted in the corresponding PRB-set may be provided to the UE as PRB-set configuration information. Alternatively, the entire configuration for the PRB-set may be configured through RRC and information only about the number of PRBs and/or the PRB location may be dynamically configured through the DCI.” You at [0164-165]. “C. sPDSCH PRB Allocation Hereinafter, methods of allocating a PRB region in which the sPDSCH is transmitted within an sTTI will be proposed.” You at [0198-199]; <i>see also, id.</i> at [0200-225]. “D. Starting OFDM Symbol Location of sPDSCH Transmission A PRB or an RB mentioned in the embodiments of the present invention may indicate a new PRB (hereinafter, sPRB) or RB (hereinafter, sRB) defined within an sTTI. The sPRB may be configured by OFDM symbol(s) within the sTTI in the time domain and $12 \cdot X$ subcarriers in the frequency domain, i.e., a frequency resource obtained by adding X legacy PRBs. When the number of OFDM symbols constituting the sTTI is T, the value of X may be equal to $12/T$ or $14/T$. A resource constituting an sPRB/sRB for transmission of an sPDCCH and a resource constituting an sPRB/sRB for transmission of an sPDSCH may differ. For example, an sPRB for the sPDSCH (hereinafter, sPRB_sPDSCH) may be configured by OFDM symbol(s) within the sTTI in the time domain and $12 \cdot X$ subcarriers in the frequency domain. If the number of OFDM symbols constituting the sTTI is T, the value of X may be equal to $12/T$ or $14/T$. Meanwhile, an sPRB for the sPDCCH (hereinafter, sPRB_sPDCCH) may be configured by OFDM symbols region in the time domain, in which the sPDCCH can be transmitted, and $12/T$ or $14/r$ in the frequency domain.” You at [0226-0228].

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		“An sPDSCH starting OFDM symbol location within an sPDCCH PRB-set in which the UE monitors the sPDCCH or an sPDSCH starting OFDM symbol location within an sPRB_sPDSCH region overlapping an sPDCCH sPRB_sPDCCH-set in which the UE monitors the sPDCCH) may be as follows. Option 1. The sPDSCH transmission starting OFDM symbol location may be fixed to the next OFDM symbol of the last sPDCCH transmission OFDM symbol. Option 2. The sPDSCH transmission starting OFDM symbol location may be semi-statically configured by the eNB through an SIB and/or an RRC signal. Option 3. The sPDSCH transmission starting OFDM symbol location may be semi-statically configured by the eNB through an SIB and/or an RRC signal. Option 4. The sPDSCH transmission starting OFDM symbol location may be dynamically configured by the eNB through a PCFICH transmitted within an sTTI in which the sPDSCH is received. Option 5. The sPDSCH transmission starting OFDM symbol location may be dynamically configured by the eNB through DCI for scheduling the sPDSCH.” You at [0240]. “An sPDSCH starting OFDM symbol location in a PRB location other than the sPDCCH PRB-set in which the UE monitors the sPDCCH or an sPDSCH starting OFDM symbol location in an sPRB_sPDSCH location which does not overlap an sPDCCH sPRB_sPDCCH-set in which the UE monitors the sPDCCH may be as follows. Option 1. The sPDSCH transmission starting OFDM symbol location may be fixed to the first OFDM symbol of an sTTI. Option 2. The sPDSCH transmission starting OFDM symbol location may be semi-statically configured by the eNB through an SIB and/or an RRC signal. Option 3. The sPDSCH transmission starting OFDM symbol location may be configured by the eNB through the DCI transmitted on a legacy PDCCH.

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		Option 4. The sPDSCH transmission starting OFDM symbol location may be dynamically configured by the eNB through a PCFICH transmitted within an sTTI in which the sPDSCH is received. Option 5. The sPDSCH transmission starting OFDM symbol location may be dynamically configured by the eNB through DCI for scheduling the sPDSCH.” You at [0246]. “Method 3. Transmission of sPDSCH Only in OFDM Symbol Region in which sPDCCH is not Transmitted in all PRBs when sPDSCH Transmission PRB Resource Overlaps sPDCCH PRB-Set(s) As illustrated in 11(c), transmission of the sPDSCH may be started from the first OFDM symbol location within an sTTI. However, when all or some of a PRB region in which the sPDSCH is transmitted overlaps a PRB region in which the sPDCCH is transmitted or can be transmitted (i.e., a PRB region in which the UE monitors the sPDCCH), the sPDSCH may be transmitted starting from the next OFDM symbol of the last OFDM symbol of transmission of the sPDCCH. That is, if the PRB region in which the sPDSCH is transmitted overlaps the PRB region in which the sPDCCH can be transmitted (i.e., a PRB region constituting a PRB-set of the sPDCCH or a PRB region constituting an sPDCCH search space), an sPDSCH transmission starting OFDM symbol location may always be equal to the next OFDM symbol of the last OFDM symbol of transmission of the sPDCCH. However, if the PRB region in which the sPDSCH is transmitted does not overlap the PRB region in which the sPDCCH can be transmitted (i.e., a PRB region constituting a PRB-set of the sPDCCH or a PRB region constituting the sPDCCH search space), the sPDSCH transmission starting OFDM symbol location may be equal to the first OFDM symbol within an sTTI.” You at [0252-253]; <i>see also, id.</i> at [0254-266]; [0272-283]. “An sPDSCH starting OFDM symbol location within a PRB region which is not used to transmit the sPDCCH determined by the configuration information may be as follows.

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		Option 1. The sPDSCH transmission starting OFDM symbol location may be fixed to the first OFDM symbol of an sTTI. Option 2. The sPDSCH transmission starting OFDM symbol location may be semi-statically configured by the eNB through an SIB and/or an RRC signal. Option 3. The sPDSCH transmission starting OFDM symbol location may be configured by the eNB through DCI transmitted on a legacy PDCCH. Option 4. The sPDSCH transmission starting OFDM symbol location may be dynamically configured by the eNB through a PCFICH transmitted within an sTTI in which the sPDSCH is received. Option 5. The sPDSCH transmission starting OFDM symbol location may be dynamically configured by the eNB through DCI for scheduling the sPDSCH.” You at [0283]. “The first OFDM symbol for transmitting the sPDSCH may be configured for the UE by providing the UE with information about a PRB location in which transmission of the sPDSCH can be started from the first OFDM symbol or information about a PRB location in which transmission of the sPDSCH should be performed in an OFDM symbol region in which the sPDCCH is not transmitted. Such configuration information may be dynamically transmitted to the UE through (E)PDCCH/sPDCCH DCI or through DCI for scheduling the sPDSCH. An sPDSCH starting OFDM symbol location in a PRB region in which transmission of the sPDSCH should be performed in an OFDM symbol region in which the sPDCCH is not transmitted may be as follows. Option 1. The sPDSCH transmission starting OFDM symbol location may be fixed to the next OFDM symbol of the last OFDM symbol on which the sPDCCH can be transmitted. Option 2. The sPDSCH transmission starting OFDM symbol location may be fixed to the next OFDM symbol of the last OFDM symbol on which the sPDCCH for scheduling the sPDSCH is transmitted. Option 3. The sPDSCH transmission starting OFDM symbol location may be semi-statically configured by the eNB through an SIB and/or an RRC signal.

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		Option 4. The sPDSCH transmission starting OFDM symbol location may be configured by the eNB through DCI transmitted on a legacy PDCCH. Option 5. The sPDSCH transmission starting OFDM symbol location may be dynamically configured by the eNB through a PCFICH transmitted within an sTTI in which the sPDSCH is received. Option 6. The sPDSCH transmission starting OFDM symbol location may be dynamically configured by the eNB through the DCI for scheduling the sPDSCH.” You at [0289]. “Specifically, the information about a PRB location used to transmit the sPDCCH (or information about a PRB location which is not used to transmit the sPDCCH) or the information about a PRB location in which transmission of the sPDSCH can be started from the first OFDM symbol (or information about a PRB location in which transmission of the sPDSCH should be performed in an OFDM symbol region in which the sPDCCH is not transmitted) may be provided to the UE using the following schemes. Method 1. Information about a PRB location which is not used (or is used) to transmit the sPDCCH or a PRB location in which transmission of the sPDSCH can be started from the first OFDM symbol (or a PRB location in which transmission of the sPDSCH should be performed in an OFDM symbol region in which the sPDCCH is not transmitted), among PRBs in the entire system bandwidth or PRBs within an sPDCCH-PRB-set, may be transmitted. Such configuration information may be transmitted by a bitmap scheme. The configuration information may be dynamically transmitted to the UE through (E)PDCCH/sPDCCH DCI or through DCI for scheduling the sPDSCH. Method 2. Among PRB groups in the entire system bandwidth or PRB groups within an sPDCCH-PRB-set, which are generated by dividing PRBs in the entire system bandwidth or PRBs in the sPDCCH-PRB-set into a plurality of groups, information about a PRB group location which is not used (or is used) to transmit the sPDCCH or a PRB group location in which transmission of the sPDSCH can be started from the first OFDM symbol (or a PRB group location in which transmission of the sPDSCH

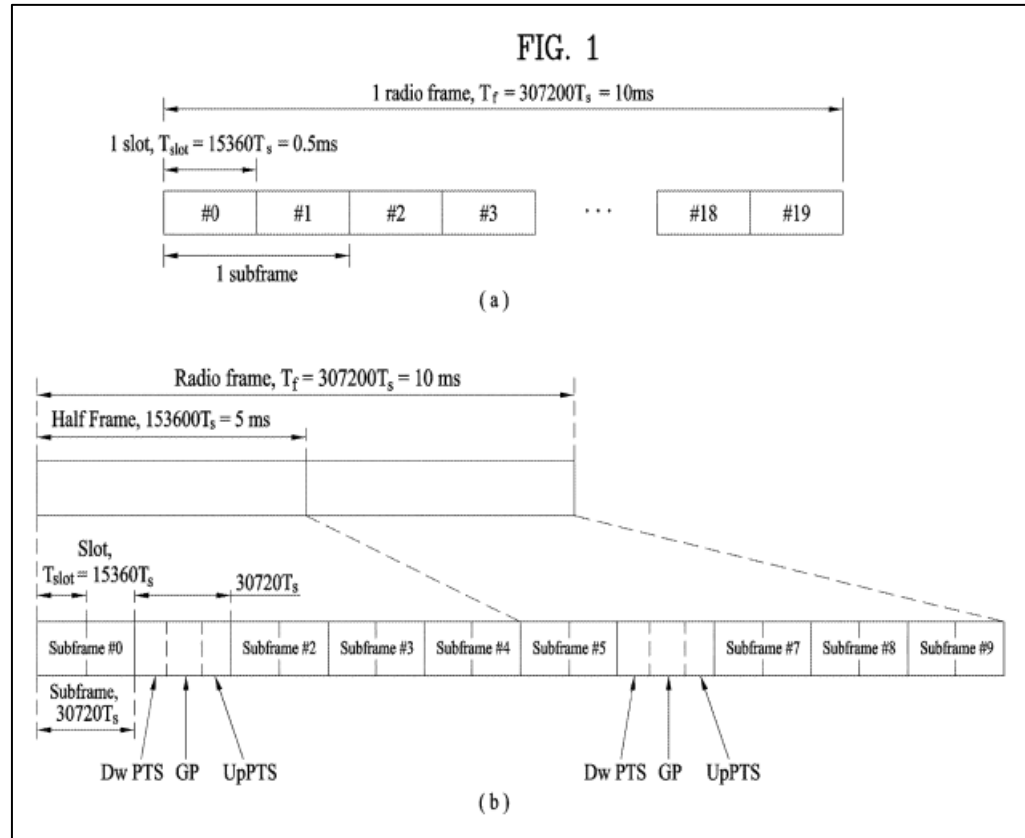
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		should be performed in an OFDM symbol region in which the sPDCCH is not transmitted) may be transmitted. Such configuration information may be transmitted by a bitmap scheme. The configuration information may be dynamically transmitted to the UE through (E)PDCCH/sPDCCH DCI or through DCI for scheduling the sPDSCH. Method 3. When multiple sPDCCH PRB-sets that the UE monitors are present, information about an sPDCCH PRB-set which is not used (or is used) to transmit the sPDCCH or an sPDCCH PRB-set in which transmission of the sPDSCH can be started from the first OFDM symbol (or an sPDCCH PRB-set in which transmission of the sPDSCH should be performed in an OFDM symbol region in which the sPDCCH is not transmitted), among sPDCCH PRB-sets, may be transmitted. For example, whether each sPDCCH PRB-set that the UE monitors has been used or has not been used to transmit the sPDCCH may be indicated to the UE. Such configuration information may be dynamically transmitted to the UE through (E)PDCCH/sPDCCH DCI or through DCI for scheduling the sPDSCH.” You at [0296]; <i>see also, id.</i> at [0300]. “The UE processor of the present invention may control the UE RF unit to receive the PDCCH and/or sPDCCH carrying the DCI (e.g., DL grant or UL grant) within the subframe or the sTTI according to any one of the embodiments proposed in Section A to Section E. The UE processor may control the UE RF unit to receive the PDSCH/sPDSCH within the subframe or the sTTI according to the DL grant. The UE processor may control the UE RF unit to transmit the PUSCH/sPUSCH within the subframe or the sTTI according to the UL grant. The subframe/sTTI in which the DL grant is received may be equal to the subframe/sTTI in which the corresponding PDSCH/sPDSCH is transmitted. The subframe/sTTI in which the UL grant is received may be different from the subframe/sTTI in which the corresponding PUSCH/sPUSCH is transmitted. A difference between a UL grant reception timing and a transmission timing of the corresponding PUSCH/sPUSCH may be a multiple of a predefined integer of the subframe/sTTI. The UE processor may exclude a signal received on a specific resource from a decoding procedure of the PDSCH/sPDSCH

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		under the assumption that the PDSCH/sPDSCH is rate-matched or punctured on the specific resource (e.g., UL grant resource or UL grant candidate resource) and then is transmitted according to an embodiment of the present invention.” You at [0334]. To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
1[c]	wherein the determined number of OFDM symbols is smaller than or equal to a number of OFDM symbols included in a slot; and	At least under Pegasus’s apparent infringement theory, You discloses wherein the determined number of OFDM symbols is smaller than or equal to a number of OFDM symbols included in a slot; and. For example, You discloses this limitation based on the following exemplary citations: <i>See</i> 1[b], <i>supra</i>. “Referring to FIG. 1, a 3GPP LTE/LTE-A radio frame is 10 ms (307,200Ts) in duration. The radio frame is divided into 10 subframes of equal size. Subframe numbers may be assigned to the 10 subframes within one radio frame, respectively. Here, Ts denotes sampling time where $T_s=1/(2048*15\text{ kHz})$. Each subframe is 1 ms long and is further divided into two slots. 20 slots are sequentially numbered from 0 to 19 in one radio frame. Duration of each slot is 0.5 ms. A time interval in which one subframe is transmitted is defined as a transmission time interval (TTI). Time resources may be distinguished by a radio frame number (or radio frame index), a subframe number (or subframe index), a slot number (or slot index), and the like.” You at [0058].

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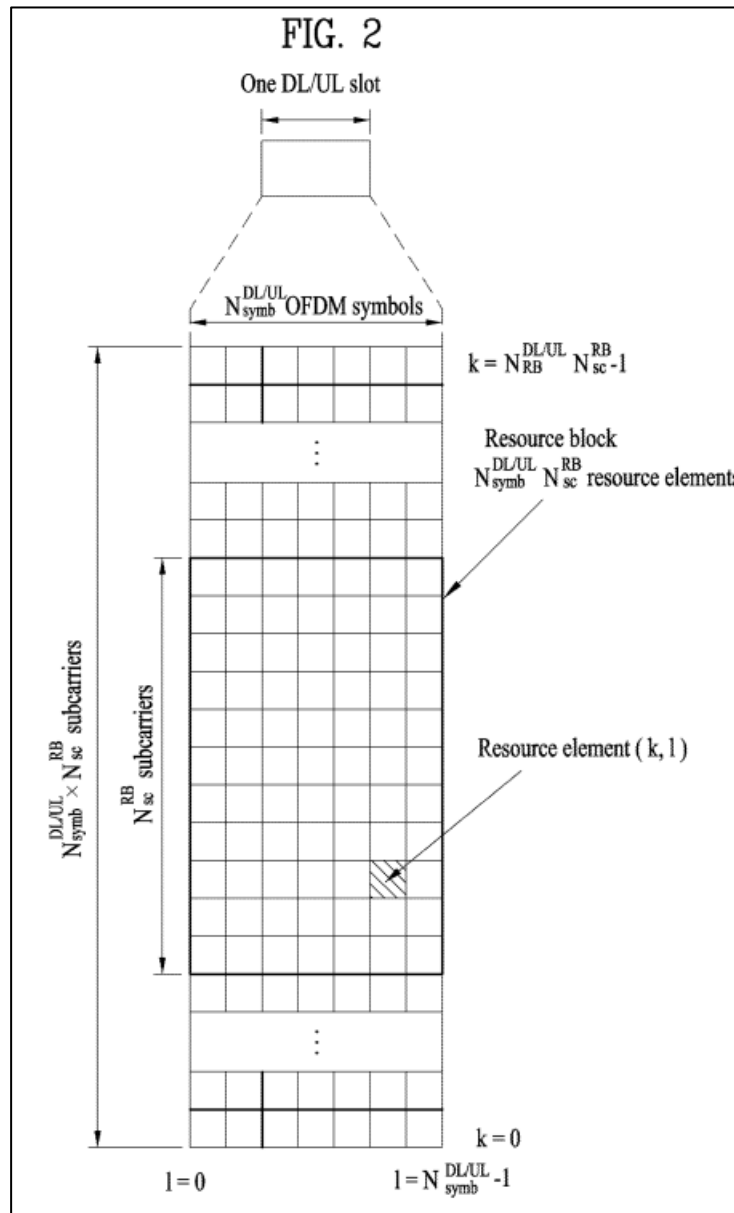
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You at Fig. 1.

“Referring to FIG. 2, a slot includes a plurality of orthogonal frequency division multiplexing (OFDM) symbols in the time domain and includes a plurality of resource blocks (RBs) in the frequency domain. The OFDM symbol may refer to one symbol duration. Referring to FIG. 2, a signal transmitted in each slot may be expressed by a resource grid including $N_{\text{RB}}^{\text{DL/UL}} * N_{\text{sc}}^{\text{RB}}$ subcarriers and

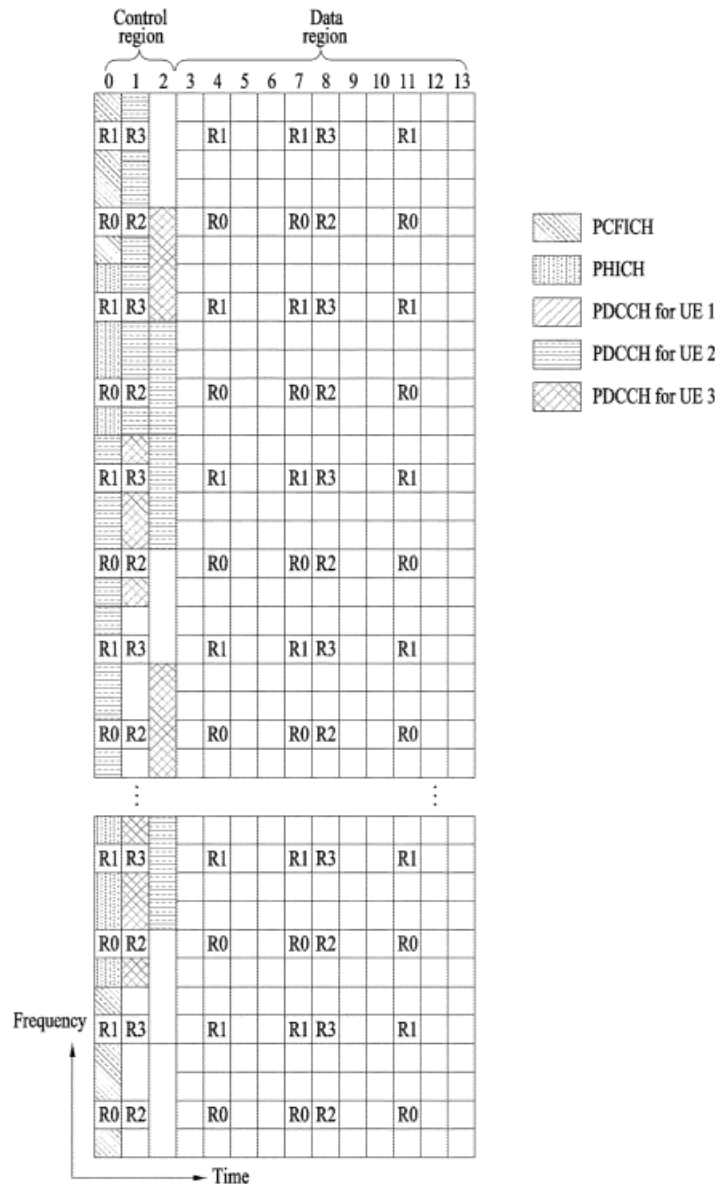
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		$N_{\text{symb}}^{\text{DL/UL}}$ OFDM symbols. $N_{\text{RB}}^{\text{DL}}$ denotes the number of RBs in a DL slot and $N_{\text{RB}}^{\text{UL}}$ denotes the number of RBs in a UL slot. $N_{\text{RB}}^{\text{DL}}$ and $N_{\text{RB}}^{\text{UL}}$ depend on a DL transmission bandwidth and a UL transmission bandwidth, respectively. $N_{\text{symb}}^{\text{DL}}$ denotes the number of OFDM symbols in a DL slot, $N_{\text{symb}}^{\text{UL}}$ denotes the number of OFDM symbols in a UL slot, and $N_{\text{sc}}^{\text{RB}}$ denotes the number of subcarriers configuring one RB. An OFDM symbol may be referred to as an OFDM symbol, a single carrier frequency division multiplexing (SC-FDM) symbol, etc. according to multiple access schemes. The number of OFDM symbols included in one slot may be varied according to channel bandwidths and CP lengths. For example, in a normal cyclic prefix (CP) case, one slot includes 7 OFDM symbols. In an extended CP case, one slot includes 6 OFDM symbols. Although one slot of a subframe including 7 OFDM symbols is shown in FIG. 2 for convenience of description, embodiments of the present invention are similarly applicable to subframes having a different number of OFDM symbols. Referring to FIG. 2, each OFDM symbol includes $N_{\text{RB}}^{\text{DL/UL}} * N_{\text{sc}}^{\text{RB}}$ subcarriers in the frequency domain. The type of the subcarrier may be divided into a data subcarrier for data transmission, a reference signal (RS) subcarrier for RS transmission, and a null subcarrier for a guard band and a DC component. The null subcarrier for the DC component is unused and is mapped to a carrier frequency f_0 in a process of generating an OFDM signal or in a frequency up-conversion process. The carrier frequency is also called a center frequency f_c." You at [0062-63].



You at Fig. 2.

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		“Examples of a DL control channel used in 3GPP LTE include a physical control format indicator channel (PCFICH), a physical downlink control channel (PDCCH), a physical hybrid ARQ indicator channel (PHICH), etc. The PCFICH is transmitted in the first OFDM symbol of a subframe and carries information about the number of OFDM symbols available for transmission of a control channel within a subframe. The PCFICH notifies the UE of the number of OFDM symbols used for the corresponding subframe every subframe. The PCFICH is located at the first OFDM symbol. The PCFICH is configured by four resource element groups (REGs), each of which is distributed within a control region on the basis of cell ID. One REG includes four REs.” You at [0068-69].

FIG. 3



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		You at Fig. 3. <table border="1"> <caption>TABLE 3</caption> <tr> <th>Subframe</th><th>Number of OFDM symbols for PDCCH when $N_{RB}^{DL} > 10$</th><th>Number of OFDM symbols for PDCCH when $N_{RB}^{DL} \leq 10$</th></tr> <tr> <td>Subframe 1 and 6 for frame structure type 2</td><td>1, 2</td><td>2</td></tr> <tr> <td>MBSFN subframes on a carrier supporting PDSCH, configured with 1 or 2 cell-specific antenna ports</td><td>1, 2</td><td>2</td></tr> <tr> <td>MBSFN subframes on a carrier supporting PDSCH, configured with 4 cell-specific antenna ports</td><td>2</td><td>2</td></tr> <tr> <td>Subframes on a carrier not supporting PDSCH</td><td>0</td><td>0</td></tr> <tr> <td>Non-MBSFN subframes (except subframe 6 for frame structure type 2) configured with positioning reference signals</td><td>1, 2, 3</td><td>2, 3</td></tr> <tr> <td>All other cases</td><td>1, 2, 3</td><td>2, 3, 4</td></tr> </table> You at Table 3. “The PDCCH is allocated to first m number of OFDM symbol(s) within a subframe. In this case, m is an integer equal to or greater than 1, and is indicated by the PCFICH. The PDCCH is transmitted on an aggregation of one or a plurality of continuous control channel elements (CCEs). The CCE is a logic allocation unit used to provide a coding rate based on the status of a radio channel to the PDCCH. The CCE corresponds to a plurality of resource element groups (REGs). For example, one CCE corresponds to nine resource element groups (REGs), and one REG corresponds to four REs. Four QPSK symbols are mapped to each REG. A resource element (RE) occupied by the reference signal (RS) is not included in the REG. Accordingly, the number of REGs within given OFDM symbols is varied depending on the presence of the RS. The REGs are also used for other downlink control channels (that is, PDFICH and PHICH).” You at [0078-79].	Subframe	Number of OFDM symbols for PDCCH when $N_{RB}^{DL} > 10$	Number of OFDM symbols for PDCCH when $N_{RB}^{DL} \leq 10$	Subframe 1 and 6 for frame structure type 2	1, 2	2	MBSFN subframes on a carrier supporting PDSCH, configured with 1 or 2 cell-specific antenna ports	1, 2	2	MBSFN subframes on a carrier supporting PDSCH, configured with 4 cell-specific antenna ports	2	2	Subframes on a carrier not supporting PDSCH	0	0	Non-MBSFN subframes (except subframe 6 for frame structure type 2) configured with positioning reference signals	1, 2, 3	2, 3	All other cases	1, 2, 3	2, 3, 4
Subframe	Number of OFDM symbols for PDCCH when $N_{RB}^{DL} > 10$	Number of OFDM symbols for PDCCH when $N_{RB}^{DL} \leq 10$																					
Subframe 1 and 6 for frame structure type 2	1, 2	2																					
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MBSFN subframes on a carrier supporting PDSCH, configured with 4 cell-specific antenna ports	2	2																					
Subframes on a carrier not supporting PDSCH	0	0																					
Non-MBSFN subframes (except subframe 6 for frame structure type 2) configured with positioning reference signals	1, 2, 3	2, 3																					
All other cases	1, 2, 3	2, 3, 4																					

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		“Method 2. RRC Configuration A PRB location constituting each PRB-set may be semi-statically configured through an RRC signal. For a configuration of each PRB-set transmitted through the RRC signal, a PRB-set index, the number of PRBs, a PRB location, locations/number of OFDM symbols constituting an sPDCCH search space in the corresponding PRB-set (or locations/number of OFDM symbol resources of an sPDCCH transmitted in the PRB-set) may also be configured. The RRC signal including the configuration for the PRB-set may be transmitted through the sPDCCH. Alternatively, the configuration for the PRB-set may be transmitted through a PDCCH common search space (CSS) and/or a UE-specific search space (USS).” You at [0161-163]. “Method 3. DCI Configuration A PRB location constituting each PRB-set may be more dynamically configured through a DCI configuration. A UE may be notified of configurations for each PRB-set through DCI. For example, information about a PRB-set index, the number of PRBs, a PRB location, the locations/number of OFDM symbols constituting an sPDCCH search space in the corresponding PRB-set, or the locations/number of OFDM symbol resources of the sPDCCH transmitted in the corresponding PRB-set may be provided to the UE as PRB-set configuration information. Alternatively, the entire configuration for the PRB-set may be configured through RRC and information only about the number of PRBs and/or the PRB location may be dynamically configured through the DCI.” You at [0164-165]. “C. sPDSCH PRB Allocation Hereinafter, methods of allocating a PRB region in which the sPDSCH is transmitted within an sTTI will be proposed.” You at [0198-199]; <i>see also, id.</i> at [0200-225]. “D. Starting OFDM Symbol Location of sPDSCH Transmission A PRB or an RB mentioned in the embodiments of the present invention may indicate a new PRB (hereinafter, sPRB) or RB (hereinafter, sRB) defined within an sTTI. The

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		sPRB may be configured by OFDM symbol(s) within the sTTI in the time domain and $12 \cdot X$ subcarriers in the frequency domain, i.e., a frequency resource obtained by adding X legacy PRBs. When the number of OFDM symbols constituting the sTTI is T, the value of X may be equal to $12/T$ or $14/T$. A resource constituting an sPRB/sRB for transmission of an sPDCCH and a resource constituting an sPRB/sRB for transmission of an sPDSCH may differ. For example, an sPRB for the sPDSCH (hereinafter, sPRB_sPDSCH) may be configured by OFDM symbol(s) within the sTTI in the time domain and $12 \cdot X$ subcarriers in the frequency domain. If the number of OFDM symbols constituting the sTTI is T, the value of X may be equal to $12/T$ or $14/T$. Meanwhile, an sPRB for the sPDCCH (hereinafter, sPRB_sPDCCH) may be configured by OFDM symbols region in the time domain, in which the sPDCCH can be transmitted, and $12/T$ or $14/r$ in the frequency domain.” You at [0226-0228]. To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
1[d]	transmitting, to the wireless device, downlink control information (DCI), including a field including a bit string,	At least under Pegasus’s apparent infringement theory, You discloses transmitting, to the wireless device, downlink control information (DCI), including a field including a bit string. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[pre] and 1[a], supra.</i>

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		“Due to introduction of new radio communication technology, the number of user equipments (UEs) to which a BS should provide a service in a prescribed resource region increases and the amount of data and control information that the BS should transmit to the UEs increases. Since the amount of resources available to the BS for communication with the UE(s) is limited, a new method in which the BS efficiently receives/transmits uplink/downlink data and/or uplink/downlink control information using the limited radio resources is needed.” You at [0005]. “In the present invention, a physical downlink control channel (PDCCH), a physical control format indicator channel (PCFICH), a physical hybrid automatic retransmit request indicator channel (PHICH), and a physical downlink shared channel (PDSCH) refer to a set of time-frequency resources or resource elements (REs) carrying downlink control information (DCI), a set of time-frequency resources or REs carrying a control format indicator (CFI), a set of time-frequency resources or REs carrying downlink acknowledgement (ACK)/negative ACK (NACK), and a set of time-frequency resources or REs carrying downlink data, respectively. In addition, a physical uplink control channel (PUCCH), a physical uplink shared channel (PUSCH) and a physical random access channel (PRACH) refer to a set of time-frequency resources or REs carrying uplink control information (UCI), a set of time-frequency resources or REs carrying uplink data and a set of time-frequency resources or REs carrying random access signals, respectively. In the present invention, in particular, a time-frequency resource or RE that is assigned to or belongs to PDCCH/PCFICH/PHICH/PDSCH/PUCCH/PUSCH/PRACH is referred to as PDCCH/PCFICH/PHICH/PDSCH/PUCCH/PUSCH/PRACH RE or PDCCH/PCFICH/PHICH/PDSCH/PUCCH/PUSCH/PRACH time-frequency resource, respectively. Therefore, in the present invention, PUCCH/PUSCH/PRACH transmission of a UE is conceptually identical to UCI/uplink data/random access signal transmission on PUSCH/PUCCH/PRACH, respectively. In addition, PDCCH/PCFICH/PHICH/PDSCH transmission of an eNB is conceptually identical to downlink data/DCI transmission on PDCCH/PCFICH/PHICH/PDSCH, respectively.” You at [0053].

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		“The PHICH carries a HARQ (Hybrid Automatic Repeat Request) ACK/NACK (acknowledgment/negative-acknowledgment) signal as a response to UL transmission. The PHICH includes three REGs, and is scrambled cell-specifically. ACK/NACK is indicated by 1 bit, and the ACK/NACK of 1 bit is repeated three times. Each of the repeated ACK/NACK bits is spread with a spreading factor (SF) 4 or 2 and then mapped into a control region.” You at [0073]. “The control information transmitted through the PDCCH will be referred to as downlink control information (DCI). The DCI includes resource allocation information for a UE or UE group and other control information. Transmit format and resource allocation information of a downlink shared channel (DL-SCH) are referred to as DL scheduling information or DL grant. Transmit format and resource allocation information of an uplink shared channel (UL-SCH) are referred to as UL scheduling information or UL grant. The size and usage of the DCI carried by one PDCCH are varied depending on DCI formats. The size of the DCI may be varied depending on a coding rate. In the current 3GPP LTE system, various formats are defined, wherein formats 0 and 4 are defined for a UL, and formats 1, 1A, 1B, 1C, 1D, 2, 2A, 2B, 2C, 3 and 3A are defined for a DL. Combination selected from control information such as a hopping flag, RB allocation, modulation coding scheme (MCS), redundancy version (RV), new data indicator (NDI), transmit power control (TPC), cyclic shift, cyclic shift demodulation reference signal (DM RS), UL index, channel quality information (CQI) request, DL assignment index, HARQ process number, transmitted precoding matrix indicator (TPMI), precoding matrix indicator (PMI) information is transmitted to the UE as the DCI.” You at [0074]. ““A plurality of PDCCHs may be transmitted within a control region. A UE may monitor the plurality of PDCCHs. An eNB determines a DCI format depending on the DCI to be transmitted to the UE, and attaches cyclic redundancy check (CRC) to the DCI. The CRC is masked (or scrambled) with an identifier (for example, a radio network temporary identifier (RNTI)) depending on usage of the PDCCH or owner of

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		the PDCCH. For example, if the PDCCH is for a specific UE, the CRC may be masked with an identifier (for example, cell-RNTI (C-RNTI)) of the corresponding UE. If the PDCCH is for a paging message, the CRC may be masked with a paging identifier (for example, paging-RNTI (P-RNTI)). If the PDCCH is for system information (in more detail, system information block (SIB)), the CRC may be masked with system information RNTI (SI-RNTI). If the PDCCH is for a random access response, the CRC may be masked with a random access RNTI (RA-RNTI). For example, CRC masking (or scrambling) includes XOR operation of CRC and RNTI at the bit level. Generally, a DCI format, which may be transmitted to the UE, is varied depending on a transmission mode configured for the UE. In other words, certain DCI format(s) corresponding to the specific transmission mode not all DCI formats may only be used for the UE configured to a specific transmission mode.” You at [0075-76]. “A DCI format and the number of DCI bits are determined in accordance with the number of CCEs. The CCEs are numbered and consecutively used. To simplify the decoding process, a PDCCH having a format including n CCEs may be initiated only on CCEs assigned numbers corresponding to multiples of n. The number of CCEs used for transmission of a specific PDCCH is determined by a network or the eNB in accordance with channel status. For example, one CCE may be required for a PDCCH for a UE (for example, adjacent to eNB) having a good downlink channel. However, in case of a PDCCH for a UE (for example, located near the cell edge) having a poor channel, eight CCEs may be required to obtain sufficient robustness. Additionally, a power level of the PDCCH may be adjusted to correspond to a channel status.” You at [0081]. “The PUCCH may be used to transmit the following control information. Scheduling request (SR): SR is information used to request a UL-SCH resource and is transmitted using an on-off keying (OOK) scheme. HARQ-ACK: HARQ-ACK is a response to a PDCCH and/or a response to a DL data packet (e.g. a codeword) on a PDSCH. HARQ-ACK indicates whether the PDCCH or

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		PDSCH has been successfully received. 1-bit HARQ-ACK is transmitted in response to a single DL codeword and 2-bit HARQ-ACK is transmitted in response to two DL codewords. A HARQ-ACK response includes a positive ACK (simply, ACK), negative ACK (NACK), discontinuous transmission (DTX), or NACK/DRX. HARQ-ACK is used interchangeably with HARQ ACK/NACK and ACK/NACK. Channel state information (CSI): CSI is feedback information for a DL channel. CSI may include channel quality information (CQI), a precoding matrix indicator (PMI), a precoding type indicator, and/or a rank indicator (RI). In the CSI, MIMO-related feedback information includes the RI and the PMI. The RI indicates the number of streams or the number of layers that the UE can receive through the same time-frequency resource. The PMI is a value reflecting a space characteristic of a channel, indicating an index of a preferred precoding matrix for DL signal transmission based on a metric such as an SINR. The CQI is a value of channel strength, indicating a received SINR that can be obtained by the UE generally when the eNB uses the PMI.” You at [0089]. “Method 7. Resource Pattern Indication To reduce the size of a resource allocation (RA) field of DCI, each value indicated by the RA field may mean a specific sPDSCH transmission resource pattern. For example, a pattern actually applied to an sPDSCH among 2N sPDSCH transmission resource patterns may be indicated to the UE through N bits. Such an sPDSCH transmission resource pattern may indicate only a PRB resource region in which the sPDSCH is transmitted. Alternatively, the sPDSCH transmission resource pattern may indicate not only the PRB resource region in which the sPDSCH is transmitted but also a resource region in which the sPDSCH is transmitted within an OFDM symbol region in which the sPDCCH is transmitted in the PRB resource region in which the sPDSCH is transmitted.” You at [0221-222]. To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge

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		of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
1[e]	wherein the bit string in the field relates to a row index of an allocation table, and	At least under Pegasus’s apparent infringement theory, You discloses wherein the bit string in the field relates to a row index of an allocation table, and. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[f], supra.</i> “A DCI format and the number of DCI bits are determined in accordance with the number of CCEs. The CCEs are numbered and consecutively used. To simplify the decoding process, a PDCCH having a format including n CCEs may be initiated only on CCEs assigned numbers corresponding to multiples of n. The number of CCEs used for transmission of a specific PDCCH is determined by a network or the eNB in accordance with channel status. For example, one CCE may be required for a PDCCH for a UE (for example, adjacent to eNB) having a good downlink channel. However, in case of a PDCCH for a UE (for example, located near the cell edge) having a poor channel, eight CCEs may be required to obtain sufficient robustness. Additionally, a power level of the PDCCH may be adjusted to correspond to a channel status.” You at [0081]. “An eNB transmits an actual PDCCH (DCI) on a PDCCH candidate in a search space and a UE monitors the search space to detect the PDCCH (DCI). Here, monitoring implies attempting to decode each PDCCH in the corresponding SS according to all monitored DCI formats. The UE may detect a PDCCH thereof by monitoring a plurality of PDCCHs. Basically, the UE does not know the location at which a PDCCH thereof is transmitted. Therefore, the UE attempts to decode all PDCCHs of

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		the corresponding DCI format for each subframe until a PDCCH having an ID thereof is detected and this process is referred to as blind detection (or blind decoding (BD)).” You at [0084]. <table><tr><th colspan="4">TABLE 4</th></tr><tr><th colspan="3">Search space $S^{(L)}_k$</th><th>Number of</th></tr><tr><th>Type</th><th>Aggregation level L</th><th>Size [in CCEs]</th><th>PDCCH candidates $M^{(L)}$</th></tr><tr><td rowspan="4">UE-specific</td><td>1</td><td>6</td><td>6</td></tr><tr><td>2</td><td>12</td><td>6</td></tr><tr><td>4</td><td>8</td><td>2</td></tr><tr><td>8</td><td>16</td><td>2</td></tr><tr><td rowspan="2">Common</td><td>4</td><td>16</td><td>4</td></tr><tr><td>8</td><td>16</td><td>2</td></tr></table> You at Table 4. “The EPDCCH may be configured within rear OFDM symbols starting from a configured OFDM symbol, instead of front OFDM symbols of a subframe. The EPDCCH may be configured using continuous frequency resources, or may be configured using discontinuous frequency resources for frequency diversity. By using the EPDCCH, control information per node may be transmitted to a UE, and a problem that a legacy PDCCH region may not be sufficient may be solved. For reference, the PDCCH may be transmitted through the same antenna port(s) as that(those) configured for transmission of a CRS, and a UE configured to decode the PDCCH may demodulate or decode the PDCCH by using the CRS. Unlike the PDCCH transmitted based on the CRS, the EPDCCH is transmitted based on the demodulation RS (hereinafter, DMRS). Accordingly, the UE decodes/demodulates the PDCCH based on the CRS and decodes/demodulates the EPDCCH based on the DMRS. The DMRS associated with EPDCCH is transmitted on the same antenna port $p \in \{107, 108, 109, 110\}$ as the associated EPDCCH physical resource, is present for EPDCCH demodulation only if the EPDCCH transmission is associated with the		TABLE 4				Search space $S^{(L)}_k$			Number of	Type	Aggregation level L	Size [in CCEs]	PDCCH candidates $M^{(L)}$	UE-specific	1	6	6	2	12	6	4	8	2	8	16	2	Common	4	16	4	8	16	2
TABLE 4																																			
Search space $S^{(L)}_k$			Number of																																
Type	Aggregation level L	Size [in CCEs]	PDCCH candidates $M^{(L)}$																																
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	2	12	6																																
	4	8	2																																
	8	16	2																																
Common	4	16	4																																
	8	16	2																																

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		corresponding antenna port, and is transmitted only on the PRB(s) upon which the corresponding EPDCCH is mapped. For example, the REs occupied by the UE-RS(s) of the antenna port 7 or 8 may be occupied by the DMRS(s) of the antenna port 107 or 108 on the PRB to which the EPDCCH is mapped, and the REs occupied by the UE-RS(s) of antenna port 9 or 10 may be occupied by the DMRS(s) of the antenna port 109 or 110 on the PRB to which the EPDCCH is mapped. In other words, a certain number of REs are used on each RB pair for transmission of the DMRS for demodulation of the EPDCCH regardless of the UE or cell if the type of EPDCCH and the number of layers are the same as in the case of the UE-RS for demodulation of the PDSCH.” You at [0108]. “An EPDCCH is transmitted using an aggregation of one or several consecutive enhanced control channel elements (ECCEs). Each ECCE consists of multiple enhanced resource element groups (EREGs). EREGs are used for defining the mapping of enhanced control channels to resource elements. There are 16 EREGs, numbered from 0 to 15, per physical resource block (PRB) pair. Number all resource elements (REs), except resource elements carrying DMRS (hereinafter, EPDCCH DMRS) for demodulation of the EPDCCH, in a physical resource-block pair cyclically from 0 to 15 in an increasing order of first frequency. Therefore, all the REs, except REs carrying the EPDCCH DMRS, in the PRB pair has any one of numbers 0 to 15. All REs with number i in that PRB pair constitutes EREG number i. As described above, it is noted that EREGs are distributed on frequency and time axes within the PRB pair and an EPDCCH transmitted using aggregation of one or more ECCEs, each of which includes a plurality of EREGs, is also distributed on frequency and time axes within the PRB pair.” You at [0115]. “The number of ECCEs used for one EPDCCH depends on the EPDCCH format as given by Table 5, the number of EREGs per ECCE is given by Table 6. Table 5 shows an example of supported EPDCCH formats, and Table 6 shows an example of the number of EREGs per ECCE, NEREG ECCE. Both localized and distributed transmission is supported.” You at [0116].

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		“An EPDCCH can use either localized or distributed transmission, differing in the mapping of ECCEs to EREGs and PRB pairs. One or two sets of PRB pairs which a UE shall monitor for EPDCCH transmissions can be configured. All EPDCCH candidates in EPDCCH set S_p (i.e., EPDCCH-PRB-set) use either only localized or only distributed transmission as configured by higher layers. Within EPDCCH set S_p in subframe k, the ECCEs available for transmission of EPDCCHs are numbered from 0 to $N_{ECCE,p,k}-1$. ECCE number n is corresponding to the following EREG(s): EREGs numbered $(n \bmod N^{ECCE}_{RB})+jN^{ECCE}_{RB}$ in PRB index $\text{floor}(n/N^{ECCE}_{RB})$ for localized mapping, and EREGs numbered $\text{floor}(n/N^{Sm}_{RB})+jN^{ECCE}_{RB}$ in PRB indices $(n+j\max(1,N^{Sp}_{RB}/N^{EREG}_{ECCE}))\bmod N^{Sp}_{RB}$ for distributed mapping, where $j=0,1,\dots,N^{EREG}_{ECCE}-1$, N^{EREG}_{ECCE} is the number of EREGs per ECCE, and $N^{ECCE}_{RB}=16/N^{EREG}_{ECCE}$ is the number of ECCEs per RB pair. The PRB pairs constituting EPDCCH set S_p are assumed to be numbered in ascending order from 0 to $N^{Sp}_{RB}-1$.” You at [0117-120].																																			
		<table><tr><th colspan="5">TABLE 5</th></tr><tr><th colspan="5">Number of ECCEs for one EPDCCH, N^{ECCE}_{EPDCCH}</th></tr><tr><th colspan="3">Case A</th><th colspan="2">Case B</th></tr><tr><th>EPDCCH format</th><th>Localized transmission</th><th>Distributed transmission</th><th>Localized transmission</th><th>Distributed transmission</th></tr><tr><td>0</td><td>2</td><td>2</td><td>1</td><td>1</td></tr><tr><td>1</td><td>4</td><td>4</td><td>2</td><td>2</td></tr><tr><td>2</td><td>8</td><td>8</td><td>4</td><td>4</td></tr></table>	TABLE 5					Number of ECCEs for one EPDCCH, N^{ECCE}_{EPDCCH}					Case A			Case B		EPDCCH format	Localized transmission	Distributed transmission	Localized transmission	Distributed transmission	0	2	2	1	1	1	4	4	2	2	2	8	8	4	4
TABLE 5																																					
Number of ECCEs for one EPDCCH, N^{ECCE}_{EPDCCH}																																					
Case A			Case B																																		
EPDCCH format	Localized transmission	Distributed transmission	Localized transmission	Distributed transmission																																	
0	2	2	1	1																																	
1	4	4	2	2																																	
2	8	8	4	4																																	

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TABLE 5-continued				
Number of ECCEs for one EPDCCH, N_{EPDCCH}^{ECCE}				
Case A		Case B		
EPDCCH format	Localized transmission	Distributed transmission	Localized transmission	Distributed transmission
3	16	16	8	8
4	—	32	—	16

You at Table 5.

TABLE 6				
Normal cyclic prefix			Extended cyclic prefix	
Normal subframe	Special subframe, configuration 3, 4, 8	Special subframe, configuration 1, 2, 6, 7, 9	Normal subframe	Special subframe, configuration 1, 2, 3, 5, 6
4			8	

You at Table 6.

“Case A in Table 5 applies when:

DCI formats 2, 2A, 2B, 2C or 2D is used and $N_{RB}^{DL} \geq 25$, or

any DCI format when $n_{EPDCCH} < 104$ and normal cyclic prefix is used in normal subframes or special subframes with configuration 3, 4, 8.

Otherwise case 2 is used. The quantity n_{EPDCCH} for a particular UE is defined as the number of downlink resource elements (k,l) in a PRB pair configured for possible EPDCCH transmission of EPDCCH set S_0 and fulfilling all of the following criteria,

they are part of any one of the 16 EREGs in the physical resource-block pair,
they are assumed by the UE not to be used for CRSs or CSI-RSs,

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		the index/in a subframe fulfils $\geq l_{\text{EPDCCHStart}}$ where $l_{\text{EPDCCHStart}}$ is given based on higher layer signaling ‘epdcch-StartSymbol-r11’, higher layer signaling ‘pdsch-Start-r11’, or CFI value carried by PCFICH.” You at [0121-128]. <table><tr><th colspan="4">TABLE 7</th></tr><tr><th colspan="4">Normal cyclic prefix</th></tr><tr><th></th><th>Normal subframes, Special subframes, configurations</th><th>Special subframes, configurations</th><th>Extended cyclic prefix</th></tr><tr><th>n'</th><th>3, 4, 8</th><th>1, 2, 6, 7, 9</th><th>Any subframe</th></tr><tr><td>0</td><td>107</td><td>107</td><td>107</td></tr><tr><td>1</td><td>108</td><td>109</td><td>108</td></tr><tr><td>2</td><td>109</td><td>—</td><td>—</td></tr><tr><td>3</td><td>110</td><td>—</td><td>—</td></tr></table> You at Table 7. “FIG. 6 illustrates the length of a transmission time interval (TTI) which is needed to implement low latency. Referring to FIG. 6, a propagation delay (PD), a buffering time, a decoding time, an A/N preparation time, an uplink PD, and an OTA (over the air) delay according to a retransmission margin are produced while a signal transmitted from the eNB reaches the UE, the UE transmits an A/N for the signal, and the A/N reaches the eNB. To satisfy low latency, a shortened TTI (sTTI) shorter than or equal to 0.5 ms needs to be designed by shortening the TTI, which is the smallest unit of data transmission. For example, to shorten the OTA delay, which is a time taken from the moment the eNB starts to transmit data (PDCCH and PDSCH) until the UE completes transmission of an A/N for the data to the eNB, to a time shorter than 1 ms, the TTI is preferably set to 0.21 ms. That is, to shorten the user plane (U-plane) delay to 1 ms, the sTTI may be set in the unit of about three OFDM symbols.	TABLE 7				Normal cyclic prefix					Normal subframes, Special subframes, configurations	Special subframes, configurations	Extended cyclic prefix	n'	3, 4, 8	1, 2, 6, 7, 9	Any subframe	0	107	107	107	1	108	109	108	2	109	—	—	3	110	—	—
TABLE 7																																		
Normal cyclic prefix																																		
	Normal subframes, Special subframes, configurations	Special subframes, configurations	Extended cyclic prefix																															
n'	3, 4, 8	1, 2, 6, 7, 9	Any subframe																															
0	107	107	107																															
1	108	109	108																															
2	109	—	—																															
3	110	—	—																															

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	While FIG. 6 illustrates that the sTTI is configured with three OFDM symbols to satisfy 1 ms as the OTA delay or U-plane delay, an sTTI shorter than 1 ms may also be configured. For example, for the normal CP, an sTTI consisting of 2 OFDM symbols, an sTTI consisting of 4 OFDM symbols and/or an sTTI consisting of 7 OFDM symbols may be configured. In the time domain, all OFDM symbols constituting a default TTI or the OFDM symbols except the OFDM symbols occupying the PDCCH region of the TTI may be divided into two or more sTTIs on some or all frequency resources in the frequency band of the default TTI, namely the channel band or system band of the TTI.” You at [0143-146]. FIG. 6 The diagram illustrates the timing of a subframe (sTTI) in a time-domain view. It shows the interaction between the eNB (base station) and the UE (user equipment). The timeline starts with the eNB transmitting a 'symbol' (DATA). The UE receives the 'symbol' (DATA) and then transmits 'A/N' (Acknowledgment/Negative Acknowledgment). The timeline is divided into several segments: PD (0.071ms Buff.), PDCCH (e.g., 0.125ms), PDSCH (e.g., 0.315ms), A/N pre. (<0.2ms), and PD. The DL Data decoding time is 0.44ms, and the Latency (Req. <0.525ms) is shown. The OTA Latency is 1ms. The TTI (0.21ms) is shown, along with decoding (0.315ms) and encoding (0.315ms). The User plane Latency is 1ms. The ReTx Margin (20%) is also indicated.	

You at Fig. 6.

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		“Specifically, the information about a PRB location used to transmit the sPDCCH (or information about a PRB location which is not used to transmit the sPDCCH) or the information about a PRB location in which transmission of the sPDSCH can be started from the first OFDM symbol (or information about a PRB location in which transmission of the sPDSCH should be performed in an OFDM symbol region in which the sPDCCH is not transmitted) may be provided to the UE using the following schemes. Method 1. Information about a PRB location which is not used (or is used) to transmit the sPDCCH or a PRB location in which transmission of the sPDSCH can be started from the first OFDM symbol (or a PRB location in which transmission of the sPDSCH should be performed in an OFDM symbol region in which the sPDCCH is not transmitted), among PRBs in the entire system bandwidth or PRBs within an sPDCCH-PRB-set, may be transmitted. Such configuration information may be transmitted by a bitmap scheme. The configuration information may be dynamically transmitted to the UE through (E)PDCCH/sPDCCH DCI or through DCI for scheduling the sPDSCH. Method 2. Among PRB groups in the entire system bandwidth or PRB groups within an sPDCCH-PRB-set, which are generated by dividing PRBs in the entire system bandwidth or PRBs in the sPDCCH-PRB-set into a plurality of groups, information about a PRB group location which is not used (or is used) to transmit the sPDCCH or a PRB group location in which transmission of the sPDSCH can be started from the first OFDM symbol (or a PRB group location in which transmission of the sPDSCH should be performed in an OFDM symbol region in which the sPDCCH is not transmitted) may be transmitted. Such configuration information may be transmitted by a bitmap scheme. The configuration information may be dynamically transmitted to the UE through (E)PDCCH/sPDCCH DCI or through DCI for scheduling the sPDSCH. Method 3. When multiple sPDCCH PRB-sets that the UE monitors are present, information about an sPDCCH PRB-set which is not used (or is used) to transmit the sPDCCH or an sPDCCH PRB-set in which transmission of the sPDSCH can be

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		started from the first OFDM symbol (or an sPDCCH PRB-set in which transmission of the sPDSCH should be performed in an OFDM symbol region in which the sPDCCH is not transmitted), among sPDCCH PRB-sets, may be transmitted. For example, whether each sPDCCH PRB-set that the UE monitors has been used or has not been used to transmit the sPDCCH may be indicated to the UE. Such configuration information may be dynamically transmitted to the UE through (E)PDCCH/sPDCCH DCI or through DCI for scheduling the sPDSCH.” You at [0296]. “UL Grant Resource Associated with DL Grant Resource The UE may not receive the sPDSCH on many resources if rate-matching or puncturing the sPDSCH on all sPDCCH resources unnecessarily, on which the UL grant can be transmitted, in consideration of uncertainty of UL grant reception when the UE receives the sPDSCH. To solve such a problem, it is proposed that an sPDCCH resource location in which the UL grant can be transmitted be determined by an sPDCCH resource location in which the DL grant is transmitted. When both the DL grant and the UL grant are transmitted, the UL grant may be transmitted using a UL grant transmission sPDCCH resource associated with an sPDCCH transmission resource on which the DL grant is transmitted. According to an sPDCCH resource location or an sPDCCH decoding candidate index in which the DL grant is transmitted, one sPDCCH resource location (e.g., sPDCCH decoding candidate index) in which the UL grant can be transmitted to the UE may be determined. Alternatively, according to the sPDCCH resource location or the sPDCCH decoding candidate index in which the DL grant is transmitted, a plurality of sPDCCH resource locations (e.g., sPDCCH decoding candidate indexes) in which the UL grant can be transmitted to the UE may be determined. When the plural UL grant sPDCCH resource locations are determined, the UL grant may be transmitted in one resource location among the plural sPDCCH resource locations. For example, as illustrated in FIG. 8, a UL grant transmission sPDCCH resource associated with each sPDCCH resource on which the DL grant can be transmitted may be present. When both the DL grant and the UL grant are transmitted, the UL grant may be transmitted using a

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		UL grant transmission sPDCCH resource associated with an sPDCCH transmission resource on which the DL grant is transmitted.” You at [0312-313]. To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
1[f]	wherein the allocation table includes information on a starting OFDM symbol and the number of the OFDM symbols which is smaller than or equal to the number of OFDM symbols included in the slot.	At least under Pegasus’s apparent infringement theory, You discloses wherein the allocation table includes information on a starting OFDM symbol and the number of the OFDM symbols which is smaller than or equal to the number of OFDM symbols included in the slot. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[e], supra.</i> “Case A in Table 5 applies when: DCI formats 2, 2A, 2B, 2C or 2D is used and $N_{RB}^{DL} \geq 25$, or any DCI format when $n_{EPDCCH} < 104$ and normal cyclic prefix is used in normal subframes or special subframes with configuration 3, 4, 8. Otherwise case 2 is used. The quantity n_{EPDCCH} for a particular UE is defined as the number of downlink resource elements (k,l) in a PRB pair configured for possible EPDCCH transmission of EPDCCH set S_0 and and fulfilling all of the following criteria, they are part of any one of the 16 EREGs in the physical resource-block pair, they are assumed by the UE not to be used for CRSs or CSI-RSs,

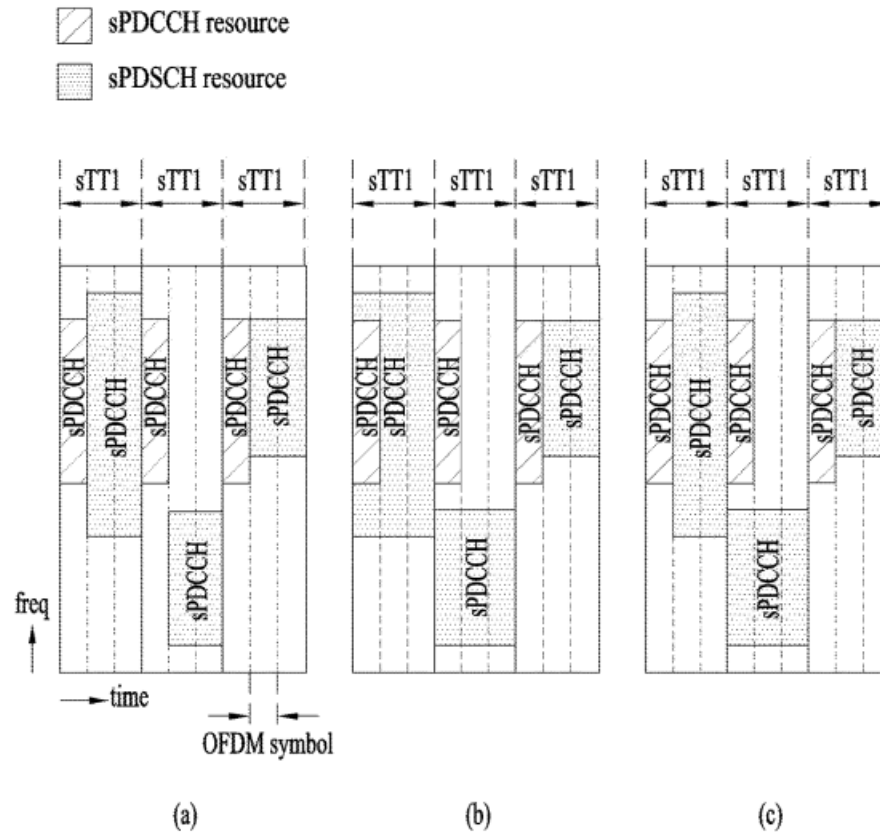
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		the index/in a subframe fulfils $\geq l_{\text{EPDCCHStart}}$ where $l_{\text{EPDCCHStart}}$ is given based on higher layer signaling ‘epdcch-StartSymbol-r11’, higher layer signaling ‘pdsch-Start-r11’, or CFI value carried by PCFICH.” You at [0121-128]. “D. Starting OFDM Symbol Location of sPDSCH Transmission A PRB or an RB mentioned in the embodiments of the present invention may indicate a new PRB (hereinafter, sPRB) or RB (hereinafter, sRB) defined within an sTTI. The sPRB may be configured by OFDM symbol(s) within the sTTI in the time domain and $12 \cdot X$ subcarriers in the frequency domain, i.e., a frequency resource obtained by adding X legacy PRBs. When the number of OFDM symbols constituting the sTTI is T, the value of X may be equal to $12/T$ or $14/T$.” You at [0226-227]; <i>see also, id.</i> at [0228-229]. “When the sPDSCH is transmitted only within a PRB region in which the sPDCCH can always be transmitted/is always transmitted, the location of a starting OFDM symbol for transmission of the sPDSCH may always be equal to the next OFDM symbol of the last OFDM symbol for transmission of the sPDCCH. However, as proposed in Method 2 or Method 3 of Section C, if the sPDSCH could be transmitted in a region other than the PRB region in which the sPDCCH can be transmitted/is transmitted, the location of an OFDM symbol on which transmission of the sPDSCH is started may be determined using the following methods. Alternatively, when a PRB region in which the sPDSCH can be transmitted/is transmitted overlaps a PRB region in which the sPDCCH can be transmitted/is transmitted, the starting location of transmission of the sPDSCH may be determined as follows.” You at [0230]. “Method 1. Transmission Through OFDM Symbol on which sPDCCH is not Transmitted As illustrated in FIG. 11(a) or 12(a), an sPDSCH within an sTTI may always be transmitted using only OFDM symbols on which an sPDCCH is not transmitted. That is, the location of an OFDM symbol on which transmission of the sPDSCH is started

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		may always be the same as the next OFDM symbol of the last OFDM symbol on which the sPDCCH is transmitted. In this case, even when the sPDSCH is transmitted only in a PRB region in which the sPDCCH is not transmitted, the location of an OFDM symbol on which transmission of the sPDSCH is started may always be the same as the next OFDM symbol of the last OFDM symbol on which the sPDCCH is transmitted. Alternatively, the location of an OFDM symbol location on which transmission of the sPDSCH is started may be configured by the eNB through RRC, DCI, or a PCFICH and the UE may assume that the sPDSCH is transmitted starting from the configured OFDM symbol location in all PRB regions.” You at [0233-234]. “Method 2. Transmission Only in OFDM Symbol Region in which sPDCCH is not Transmitted within sPDCCH PRB-Set(s) As illustrated in FIG. 11(b) or 12(b), transmission of the sPDSCH may be started from the first OFDM symbol location within an sTTI. However, in a PRB region in which the sPDCCH is transmitted or can be transmitted, transmission of the sPDSCH may be performed starting from the next OFDM symbol of the last OFDM symbol on which the sPDCCH is transmitted. The PRB region in which the sPDCCH can be transmitted refers to an sPDCCH PRB-set, i.e., a PRB region in which the UE monitors the sPDCCH. For example, in the PRB region in which the sPDCCH can be transmitted (i.e., a PRB region constituting a PRB-set of the sPDCCH or a PRB region constituting an sPDCCH search space), the starting OFDM symbol location of transmission of the sPDSCH may always be the same as the next OFDM symbol of the last OFDM symbol of transmission of the sPDCCH and, in the other PRB regions, the starting OFDM symbol location of transmission of the sPDSCH may be the same as the first OFDM symbol within an sTTI.” You at [0236-237].

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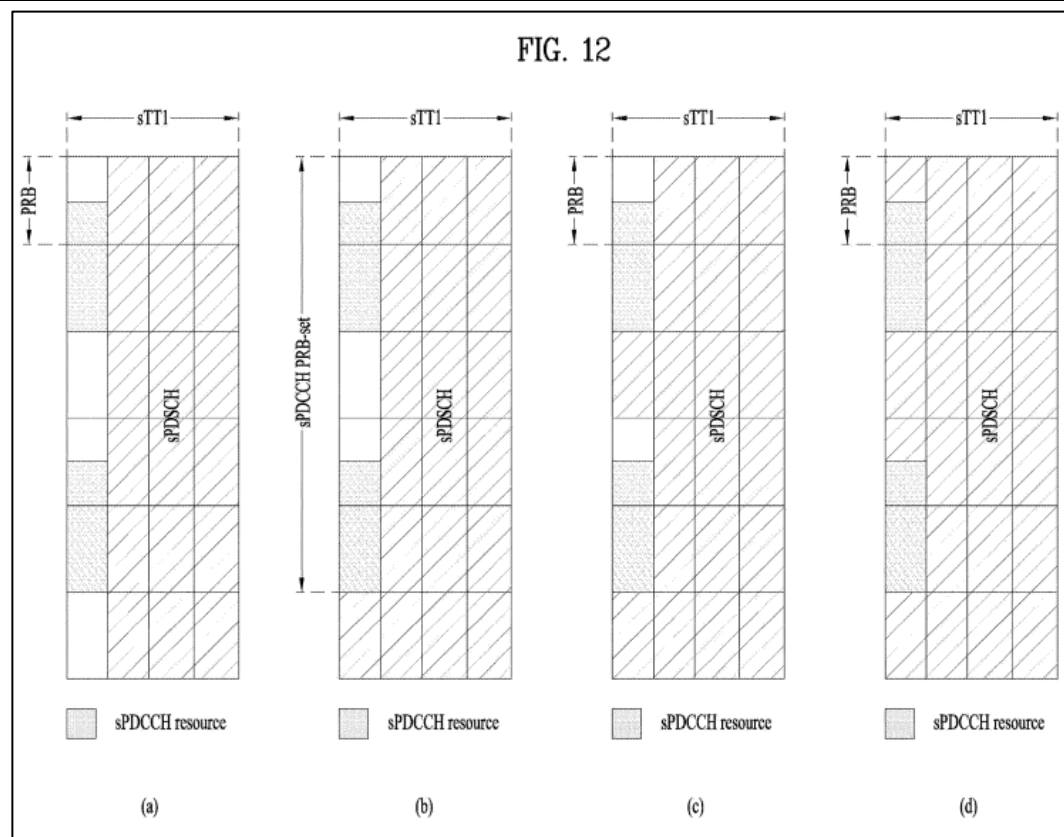
FIG. 11



You at Fig. 11.

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You at Fig. 12.

“When there are multiple PRB-sets of the sPDCCH, the starting OFDM symbol location of transmission of the sPDSCH in a PRB region of all PRB-sets may always be the same as the next OFDM symbol of the last OFDM symbol of transmission of the sPDCCH and the starting OFDM symbol location of transmission of the sPDSCH in the other PRB regions may be the same as the first OFDM symbol within an sTTI.”
You at [0238].

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		“In an sPRB_sPDSCH region overlapping an sPRB_sPDCCH region in which the sPDCCH can be transmitted (i.e., a sPRB_sPDCCH region constituting an sPRB_sPDCCH-set of the sPDCCH or an sPRB_PDCCH region constituting an sPDCCH search space), the starting OFDM symbol location of transmission of the sPDSCH may always be the same as the next OFDM symbol of the last OFDM symbol of transmission of the sPDCCH and, in the other sPRB-sPDSCH regions, the starting OFDM symbol location of transmission of the sPDSCH may be the same as the first OFDM symbol within an sTTI.” You at [0239]. “An sPDSCH starting OFDM symbol location within an sPDCCH PRB-set in which the UE monitors the sPDCCH or an sPDSCH starting OFDM symbol location within an sPRB_sPDSCH region overlapping an sPDCCH sPRB_sPDCCH-set in which the UE monitors the sPDCCH) may be as follows. Option 1. The sPDSCH transmission starting OFDM symbol location may be fixed to the next OFDM symbol of the last sPDCCH transmission OFDM symbol. Option 2. The sPDSCH transmission starting OFDM symbol location may be semi-statically configured by the eNB through an SIB and/or an RRC signal. Option 3. The sPDSCH transmission starting OFDM symbol location may be semi-statically configured by the eNB through an SIB and/or an RRC signal. Option 4. The sPDSCH transmission starting OFDM symbol location may be dynamically configured by the eNB through a PCFICH transmitted within an sTTI in which the sPDSCH is received. Option 5. The sPDSCH transmission starting OFDM symbol location may be dynamically configured by the eNB through DCI for scheduling the sPDSCH.” You at [0240]. “An sPDSCH starting OFDM symbol location in a PRB location other than the sPDCCH PRB-set in which the UE monitors the sPDCCH or an sPDSCH starting OFDM symbol location in an sPRB_sPDSCH location which does not overlap an sPDCCH sPRB_sPDCCH-set in which the UE monitors the sPDCCH may be as follows.

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		Option 1. The sPDSCH transmission starting OFDM symbol location may be fixed to the first OFDM symbol of an sTTI. Option 2. The sPDSCH transmission starting OFDM symbol location may be semi-statically configured by the eNB through an SIB and/or an RRC signal. Option 3. The sPDSCH transmission starting OFDM symbol location may be configured by the eNB through the DCI transmitted on a legacy PDCCH. Option 4. The sPDSCH transmission starting OFDM symbol location may be dynamically configured by the eNB through a PCFICH transmitted within an sTTI in which the sPDSCH is received. Option 5. The sPDSCH transmission starting OFDM symbol location may be dynamically configured by the eNB through DCI for scheduling the sPDSCH.” You at [0246]. “As illustrated in 11(c), transmission of the sPDSCH may be started from the first OFDM symbol location within an sTTI. However, when all or some of a PRB region in which the sPDSCH is transmitted overlaps a PRB region in which the sPDCCH is transmitted or can be transmitted (i.e., a PRB region in which the UE monitors the sPDCCH), the sPDSCH may be transmitted starting from the next OFDM symbol of the last OFDM symbol of transmission of the sPDCCH. That is, if the PRB region in which the sPDSCH is transmitted overlaps the PRB region in which the sPDCCH can be transmitted (i.e., a PRB region constituting a PRB-set of the sPDCCH or a PRB region constituting an sPDCCH search space), an sPDSCH transmission starting OFDM symbol location may always be equal to the next OFDM symbol of the last OFDM symbol of transmission of the sPDCCH. However, if the PRB region in which the sPDSCH is transmitted does not overlap the PRB region in which the sPDCCH can be transmitted (i.e., a PRB region constituting a PRB-set of the sPDCCH or a PRB region constituting the sPDCCH search space), the sPDSCH transmission starting OFDM symbol location may be equal to the first OFDM symbol within an sTTI. When multiple PRB-sets of the sPDCCH are present, if a PRB region in which the sPDSCH is transmitted overlaps a PRB region constituting at least one sPDCCH

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		PRB-set, the PDSCH transmission starting OFDM symbol location may always be equal to the next OFDM symbol of the last OFDM symbol of transmission of the sPDCCH. However, if the PRB region in which the sPDSCH is transmitted does not overlap the PRB region constituting an sPDCCH PRB-set with respect to all sPDCCH PRB-sets, the sPDSCH transmission starting OFDM symbol location may be equal to the first OFDM symbol within an sTTI.” You at [0253-254]; <i>see also, id.</i> at [0258-271]. To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

2. Claim 2

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2[a]	The base station of claim 1, wherein the bit string is 3 bits in length.	At least under Pegasus’s apparent infringement theory, You discloses the base station of claim 1, wherein the bit string is 3 bits in length. For example, You discloses this limitation based on the following exemplary citations: <i>See Claim 1, supra.</i>

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Claim Language		Exemplary Citations to You																																																																																																																																		
		“In Table 1, D denotes a DL subframe, U denotes a UL subframe, and S denotes a special subframe. The special subframe includes three fields, i.e. downlink pilot time slot (DwPTS), guard period (GP), and uplink pilot time slot (UpPTS). DwPTS is a time slot reserved for DL transmission and UpPTS is a time slot reserved for UL transmission. Table 2 shows an example of the special subframe configuration.” You at [0060]. <table><tr><th colspan="13">TABLE 1</th></tr><tr><th rowspan="2">Uplink- downlink configu- ration</th><th rowspan="2">Downlink- to-Uplink Switch-point periodicity</th><th colspan="11">Subframe number</th></tr><tr><th>0</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th></tr><tr><td>0</td><td>5 ms</td><td>D</td><td>S</td><td>U</td><td>U</td><td>U</td><td>D</td><td>S</td><td>U</td><td>U</td><td>U</td></tr><tr><td>1</td><td>5 ms</td><td>D</td><td>S</td><td>U</td><td>U</td><td>D</td><td>D</td><td>S</td><td>U</td><td>U</td><td>D</td></tr><tr><td>2</td><td>5 ms</td><td>D</td><td>S</td><td>U</td><td>D</td><td>D</td><td>D</td><td>S</td><td>U</td><td>D</td><td>D</td></tr><tr><td>3</td><td>10 ms</td><td>D</td><td>S</td><td>U</td><td>U</td><td>U</td><td>D</td><td>D</td><td>D</td><td>D</td><td>D</td></tr><tr><td>4</td><td>10 ms</td><td>D</td><td>S</td><td>U</td><td>U</td><td>D</td><td>D</td><td>D</td><td>D</td><td>D</td><td>D</td></tr><tr><td>5</td><td>10 ms</td><td>D</td><td>S</td><td>U</td><td>D</td><td>D</td><td>D</td><td>D</td><td>D</td><td>D</td><td>D</td></tr><tr><td>6</td><td>5 ms</td><td>D</td><td>S</td><td>U</td><td>U</td><td>U</td><td>D</td><td>S</td><td>U</td><td>U</td><td>D</td></tr></table> You at Table 1.											TABLE 1													Uplink- downlink configu- ration	Downlink- to-Uplink Switch-point periodicity	Subframe number											0	1	2	3	4	5	6	7	8	9	0	5 ms	D	S	U	U	U	D	S	U	U	U	1	5 ms	D	S	U	U	D	D	S	U	U	D	2	5 ms	D	S	U	D	D	D	S	U	D	D	3	10 ms	D	S	U	U	U	D	D	D	D	D	4	10 ms	D	S	U	U	D	D	D	D	D	D	5	10 ms	D	S	U	D	D	D	D	D	D	D	6	5 ms	D	S	U	U	U	D	S	U	U	D
TABLE 1																																																																																																																																				
Uplink- downlink configu- ration	Downlink- to-Uplink Switch-point periodicity	Subframe number																																																																																																																																		
		0	1	2	3	4	5	6	7	8	9																																																																																																																									
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		TABLE 3 <table> <tr> <th>Subframe</th><th>Number of OFDM symbols for PDCCH when $N_{RB}^{DL} > 10$</th><th>Number of OFDM symbols for PDCCH when $N_{RB}^{DL} \leq 10$</th></tr> <tr> <td>Subframe 1 and 6 for frame structure type 2</td><td>1, 2</td><td>2</td></tr> <tr> <td>MBSFN subframes on a carrier supporting PDSCH, configured with 1 or 2 cell-specific antenna ports</td><td>1, 2</td><td>2</td></tr> <tr> <td>MBSFN subframes on a carrier supporting PDSCH, configured with 4 cell-specific antenna ports</td><td>2</td><td>2</td></tr> <tr> <td>Subframes on a carrier not supporting PDSCH</td><td>0</td><td>0</td></tr> <tr> <td>Non-MBSFN subframes (except subframe 6 for frame structure type 2) configured with positioning reference signals</td><td>1, 2, 3</td><td>2, 3</td></tr> <tr> <td>All other cases</td><td>1, 2, 3</td><td>2, 3, 4</td></tr> </table> You at Table 3. “A subset of downlink subframes within a radio frame on a carrier for supporting PDSCH transmission may be configured as MBSFN subframe(s) by a higher layer. Each MBSFN subframe is divided into a non-MBSFN region and an MBSFN region. The non-MBSFN region spans first one or two OFDM symbols, and its length is given by Table 3. The same CP as cyclic prefix (CP) used for subframe 0 is used for transmission within the non-MBSFN region of the MBSFN subframe. The MBSFN region within the MBSFN subframe is defined as OFDM symbols which are not used in the non-MBSFN region. The PCFICH carries a control format indicator (CFI), which indicates any one of values of 1 to 3. For a downlink system bandwidth $N_{RB}^{DL} > 10$, the number 1, 2 or 3 of OFDM symbols which are spans of DCI carried by the PDCCH is given by the CFI. For a downlink system bandwidth $N_{RB}^{DL} \leq 10$, the number 2, 3 or 4 of OFDM symbols which are spans of DCI carried by the PDCCH is given by CFI+1.” You at [0071-72].	Subframe	Number of OFDM symbols for PDCCH when $N_{RB}^{DL} > 10$	Number of OFDM symbols for PDCCH when $N_{RB}^{DL} \leq 10$	Subframe 1 and 6 for frame structure type 2	1, 2	2	MBSFN subframes on a carrier supporting PDSCH, configured with 1 or 2 cell-specific antenna ports	1, 2	2	MBSFN subframes on a carrier supporting PDSCH, configured with 4 cell-specific antenna ports	2	2	Subframes on a carrier not supporting PDSCH	0	0	Non-MBSFN subframes (except subframe 6 for frame structure type 2) configured with positioning reference signals	1, 2, 3	2, 3	All other cases	1, 2, 3	2, 3, 4
Subframe	Number of OFDM symbols for PDCCH when $N_{RB}^{DL} > 10$	Number of OFDM symbols for PDCCH when $N_{RB}^{DL} \leq 10$																					
Subframe 1 and 6 for frame structure type 2	1, 2	2																					
MBSFN subframes on a carrier supporting PDSCH, configured with 1 or 2 cell-specific antenna ports	1, 2	2																					
MBSFN subframes on a carrier supporting PDSCH, configured with 4 cell-specific antenna ports	2	2																					
Subframes on a carrier not supporting PDSCH	0	0																					
Non-MBSFN subframes (except subframe 6 for frame structure type 2) configured with positioning reference signals	1, 2, 3	2, 3																					
All other cases	1, 2, 3	2, 3, 4																					

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		“The PHICH carries a HARQ (Hybrid Automatic Repeat Request) ACK/NACK (acknowledgment/negative-acknowledgment) signal as a response to UL transmission. The PHICH includes three REGs, and is scrambled cell-specifically. ACK/NACK is indicated by 1 bit, and the ACK/NACK of 1 bit is repeated three times. Each of the repeated ACK/NACK bits is spread with a spreading factor (SF) 4 or 2 and then mapped into a control region.” You at [0073]. “Referring to FIG. 6, a propagation delay (PD), a buffering time, a decoding time, an A/N preparation time, an uplink PD, and an OTA (over the air) delay according to a retransmission margin are produced while a signal transmitted from the eNB reaches the UE, the UE transmits an A/N for the signal, and the A/N reaches the eNB. To satisfy low latency, a shortened TTI (sTTI) shorter than or equal to 0.5 ms needs to be designed by shortening the TTI, which is the smallest unit of data transmission. For example, to shorten the OTA delay, which is a time taken from the moment the eNB starts to transmit data (PDCCH and PDSCH) until the UE completes transmission of an A/N for the data to the eNB, to a time shorter than 1 ms, the TTI is preferably set to 0.21 ms. That is, to shorten the user plane (U-plane) delay to 1 ms, the sTTI may be set in the unit of about three OFDM symbols. While FIG. 6 illustrates that the sTTI is configured with three OFDM symbols to satisfy 1 ms as the OTA delay or U-plane delay, an sTTI shorter than 1 ms may also be configured. For example, for the normal CP, an sTTI consisting of 2 OFDM symbols, an sTTI consisting of 4 OFDM symbols and/or an sTTI consisting of 7 OFDM symbols may be configured.” You at [0144-145]. To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of

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		success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

3. Claim 3

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Claim Language		Exemplary Citations to You
3[a]	The base station of claim 1, wherein the DCI further includes information on one or more allocations of a frequency-domain resource.	At least under Pegasus's apparent infringement theory, You discloses the base station of claim 1, wherein the DCI further includes information on one or more allocations of a frequency-domain resource. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[a] and 1[d], supra.</i> “Referring to FIG. 2, a slot includes a plurality of orthogonal frequency division multiplexing (OFDM) symbols in the time domain and includes a plurality of resource blocks (RBs) in the frequency domain. The OFDM symbol may refer to one symbol duration. Referring to FIG. 2, a signal transmitted in each slot may be expressed by a resource grid including $N_{RB}^{DL/UL} * N_{sc}^{RB}$ subcarriers and $N_{symb}^{DL/UL}$ OFDM symbols. N_{RB}^{DL} denotes the number of RBs in a DL slot and N_{RB}^{UL} denotes the number of RBs in a UL slot. N_{RB}^{DL} and N_{RB}^{UL} depend on a DL transmission bandwidth and a UL transmission bandwidth, respectively. N_{symb}^{DL} denotes the number of OFDM symbols in a DL slot, N_{symb}^{UL} denotes the number of OFDM symbols in a UL slot, and N_{sc}^{RB} denotes the number of subcarriers configuring one RB.” You at [0062]. “An OFDM symbol may be referred to as an OFDM symbol, a single carrier frequency division multiplexing (SC-FDM) symbol, etc. according to multiple access schemes. The number of OFDM symbols included in one slot may be varied

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		according to channel bandwidths and CP lengths. For example, in a normal cyclic prefix (CP) case, one slot includes 7 OFDM symbols. In an extended CP case, one slot includes 6 OFDM symbols. Although one slot of a subframe including 7 OFDM symbols is shown in FIG. 2 for convenience of description, embodiments of the present invention are similarly applicable to subframes having a different number of OFDM symbols. Referring to FIG. 2, each OFDM symbol includes $N_{RB}^{DL/UL} * N_{sc}^{RB}$ subcarriers in the frequency domain. The type of the subcarrier may be divided into a data subcarrier for data transmission, a reference signal (RS) subcarrier for RS transmission, and a null subcarrier for a guard band and a DC component. The null subcarrier for the DC component is unused and is mapped to a carrier frequency f_0 in a process of generating an OFDM signal or in a frequency up-conversion process. The carrier frequency is also called a center frequency f_c.” You at [0063]. “One RB is defined as $N_{symb}^{DL/UL}$ (e.g. 7) consecutive OFDM symbols in the time domain and as N_{sc}^{RB} (e.g. 12) consecutive subcarriers in the frequency domain. For reference, a resource composed of one OFDM symbol and one subcarrier is referred to a resource element (RE) or tone. Accordingly, one RB includes $N_{symb}^{DL/UL} * N_{sc}^{RB}$ REs. Each RE within a resource grid may be uniquely defined by an index pair (k,l) within one slot. k is an index ranging from 0 to $N_{RB}^{DL/UL} * N_{sc}^{RB} - 1$ in the frequency domain, and l is an index ranging from 0 to $N_{symb}^{DL/UL} - 1$ in the time domain.” You at [0064]. “Meanwhile, one RB is mapped to one physical resource block (PRB) and one virtual resource block (VRB). A PRB is defined as N_{symb}^{DL} (e.g. 7) consecutive OFDM or SC-FDM symbols in the time domain and N_{sc}^{RB} (e.g. 12) consecutive subcarriers in the frequency domain. Accordingly, one PRB is configured with $N_{symb}^{DL/UL} * N_{sc}^{RB}$ REs. In one subframe, two RBs each located in two slots of the subframe while occupying the same N_{sc}^{RB} consecutive subcarriers are referred to as a physical resource block (PRB) pair. Two RBs configuring a PRB pair have the same PRB number (or the same PRB index).” You at [0065].

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		“Referring to FIG. 4, a UL subframe may be divided into a data region and a control region in the frequency domain. One or several PUCCHs may be allocated to the control region to deliver UCI. One or several PUSCHs may be allocated to the data region of the UE subframe to carry user data.” You at [0087]. “For example, three 20 MHz CCs in each of UL and DL are aggregated to support a BW of 60 MHz. The CCs may be contiguous or non-contiguous in the frequency domain. Although a case that a BW of UL CC and a BW of DL CC are the same and are symmetrical is described, a BW of each component carrier may be defined independently. In addition, asymmetric carrier aggregation where the number of UL CCs is different from the number of DL CCs may be configured. A DL/UL CC for a specific UE may be referred to as a serving UL/DL CC configured at the specific UE.” You at [0094]. “D. Starting OFDM Symbol Location of sPDSCH Transmission A PRB or an RB mentioned in the embodiments of the present invention may indicate a new PRB (hereinafter, sPRB) or RB (hereinafter, sRB) defined within an sTTI. The sPRB may be configured by OFDM symbol(s) within the sTTI in the time domain and $12 \times X$ subcarriers in the frequency domain, i.e., a frequency resource obtained by adding X legacy PRBs. When the number of OFDM symbols constituting the sTTI is T, the value of X may be equal to $12/T$ or $14/T$. A resource constituting an sPRB/sRB for transmission of an sPDCCH and a resource constituting an sPRB/sRB for transmission of an sPDSCH may differ. For example, an sPRB for the sPDSCH (hereinafter, sPRB_sPDSCH) may be configured by OFDM symbol(s) within the sTTI in the time domain and $12 \times X$ subcarriers in the frequency domain. If the number of OFDM symbols constituting the sTTI is T, the value of X may be equal to $12/T$ or $14/T$. Meanwhile, an sPRB for the sPDCCH (hereinafter, sPRB_sPDCCH) may be configured by OFDM symbols region in the time domain, in which the sPDCCH can be transmitted, and $12/T$ or $14/r$ in the frequency domain.” You at [0226-228].

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		To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

4. Claim 4

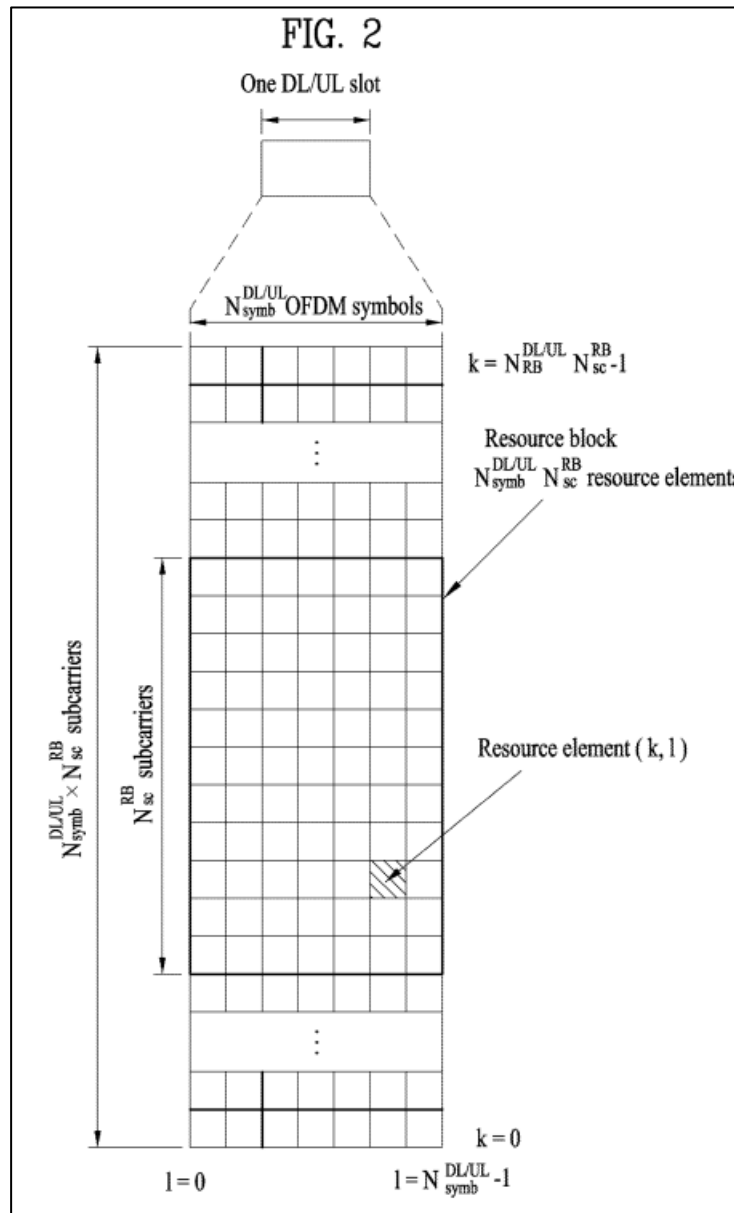
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Claim Language		Exemplary Citations to You
4[a]	The base station of claim 1, wherein the base station supports a new radio access technology (NR).	At least under Pegasus’s apparent infringement theory, You discloses the base station of claim 1, wherein the base station supports a new radio access technology (NR). For example, You discloses this limitation based on the following exemplary citations: “Due to introduction of new radio communication technology, the number of user equipments (UEs) to which a BS should provide a service in a prescribed resource region increases and the amount of data and control information that the BS should transmit to the UEs increases. Since the amount of resources available to the BS for communication with the UE(s) is limited, a new method in which the BS efficiently receives/transmits uplink/downlink data and/or uplink/downlink control information using the limited radio resources is needed.” You at [0005]. “With development of technologies, overcoming delay or latency has become an important challenge. Applications whose performance critically depends on

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Claim Language		Exemplary Citations to You
		delay/latency are increasing. Accordingly, a method to reduce delay/latency compared to the legacy system is demanded.” You at [0006]. “Embodiments of the present invention described below may be applied to a new radio access technology (RAT) system in addition to the 3GPP LTE/LTE-A system. As more and more communication devices demand larger communication capacity, there is a need for improved mobile broadband communication compared to existing RAT. Also, massive MTC, which provides various services by connecting many devices and objects, is one of the major issues to be considered in the next generation communication. In addition, a communication system design considering a service/UE sensitive to reliability and latency is being discussed. The introduction of next-generation RAT, which takes into account such advanced mobile broadband communication, massive MTC, and URLLC (Ultra-Reliable and Low Latency Communication), is being discussed. In the present invention, this technology is referred to as new RAT for simplicity.” You at [0135]. To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

5. Claim 5

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Claim Language		Exemplary Citations to You
5[a]	The base station of claim 1, wherein the base station supports different numerologies which are defined by a subcarrier spacing (SCS).	At least under Pegasus’s apparent infringement theory, You discloses the base station of claim 1, wherein the base station supports different numerologies which are defined by a subcarrier spacing (SCS). For example, You discloses this limitation based on the following exemplary citations: “Hereinafter, OFDM symbol/subcarrier/RE to or for which CRS/DMRS/CSI-RS/SRS/UE-RS is assigned or configured will be referred to as CRS/DMRS/CSI-RS/SRS/UE-RS symbol/carrier/subcarrier/RE. For example, an OFDM symbol to or for which a tracking RS (TRS) is assigned or configured is referred to as a TRS symbol, a subcarrier to or for which the TRS is assigned or configured is referred to as a TRS subcarrier, and an RE to or for which the TRS is assigned or configured is referred to as a TRS RE. In addition, a subframe configured for transmission of the TRS is referred to as a TRS subframe. Moreover, a subframe in which a broadcast signal is transmitted is referred to as a broadcast subframe or a PBCH subframe and a subframe in which a synchronization signal (e.g. PSS and/or SSS) is transmitted is referred to a synchronization signal subframe or a PSS/SSS subframe. OFDM symbol/subcarrier/RE to or for which PSS/SSS is assigned or configured is referred to as PSS/SSS symbol/subcarrier/RE, respectively.” You at [0054]. “Referring to FIG. 2, a slot includes a plurality of orthogonal frequency division multiplexing (OFDM) symbols in the time domain and includes a plurality of resource blocks (RBs) in the frequency domain. The OFDM symbol may refer to one symbol duration. Referring to FIG. 2, a signal transmitted in each slot may be expressed by a resource grid including $N_{RB}^{DL/UL} * N_{sc}^{RB}$ subcarriers and $N_{symb}^{DL/UL}$ OFDM symbols. N_{RB}^{DL} denotes the number of RBs in a DL slot and N_{RB}^{UL} denotes the number of RBs in a UL slot. N_{RB}^{DL} and N_{RB}^{UL} depend on a DL transmission bandwidth and a UL transmission bandwidth, respectively. N_{symb}^{DL} denotes the number of OFDM symbols in a DL slot, N_{symb}^{UL} denotes the

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		number of OFDM symbols in a UL slot, and N_{sc}^{RB} denotes the number of subcarriers configuring one RB.” You at [0062]; <i>see also, id.</i> at [0063-65].



You at Fig. 2.

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		“In the following description, a default TTI or main TTI used in the system is referred to as a TTI or subframe, and the TTI having a shorter length than the default/main TTI of the system is referred to as an sTTI. For example, in a system in which a TTI of 1 ms is used as the default TTI as in the current LTE/LTE-A system, a TTI shorter than 1 ms may be referred to as the sTTI. In addition, in the following description, a physical downlink control channel/physical downlink data channel/physical uplink control channel/physical uplink data channel transmitted in units of the default/main TTI are referred to as a PDCCH/PDSCH/PUCCH/PUSCH, and a PDCCH/PDSCH/PUCCH/PUSCH transmitted within an sTTI or in units of sTTI are referred to as sPDCCH/sPDSCH/sPUCCH/sPUSCH. In the new RAT environment, the numerology may be changed, and thus a default/main TTI different from that for the current LTE/LTE-A system may be used. However, for simplicity, the default/main TTI will be referred to as a TTI, subframe, legacy TTI or legacy subframe, and a TTI shorter than 1 ms will be referred to as an sTTI, on the assumption that the time length of the default/main TTI is 1 ms. The method of transmitting/receiving a signal in a TTI and an sTTI according to embodiments described below is applicable not only to the system according to the current LTE/LTE-A numerology but also to the default/main TTI and sTTI of the system according to the numerology for the new RAT environment.” You at [0147]. To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

6. Claim 6

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Claim Language		Exemplary Citations to You
6[pre]	The base station of claim 1, wherein the operations further include:	At least under Pegasus’s apparent infringement theory, You discloses the base station of claim 1, wherein the operations further include. For example, You discloses this limitation based on the following exemplary citations: <i>See 6[a]–[b], infra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
6[a]	transmitting, to the wireless device, downlink data via the PDSCH; and	At least under Pegasus’s apparent infringement theory, You discloses transmitting, to the wireless device, downlink data via the PDSCH; and. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[b], supra.</i> “3GPP LTE/LTE-A standards define DL physical channels corresponding to resource elements carrying information derived from a higher layer and DL physical signals corresponding to resource elements which are used by a physical layer but which do not carry information derived from a higher layer. For example, a physical downlink shared channel (PDSCH), a physical broadcast channel (PBCH), a physical multicast channel (PMCH), a physical control format indicator channel (PCFICH), a physical

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		downlink control channel (PDCCH), and a physical hybrid ARQ indicator channel (PHICH) are defined as the DL physical channels, and a reference signal and a synchronization signal are defined as the DL physical signals. A reference signal (RS), also called a pilot, refers to a special waveform of a predefined signal known to both a BS and a UE. For example, a cell-specific RS (CRS), a UE-specific RS (UE-RS), a positioning RS (PRS), and channel state information RS (CSI-RS) may be defined as DL RSs. Meanwhile, the 3GPP LTE/LTE-A standards define UL physical channels corresponding to resource elements carrying information derived from a higher layer and UL physical signals corresponding to resource elements which are used by a physical layer but which do not carry information derived from a higher layer. For example, a physical uplink shared channel (PUSCH), a physical uplink control channel (PUCCH), and a physical random access channel (PRACH) are defined as the UL physical channels, and a demodulation reference signal (DMRS) for a UL control/data signal and a sounding reference signal (SRS) used for UL channel measurement are defined as the UL physical signal.” You at [0052]. “In the present invention, a physical downlink control channel (PDCCH), a physical control format indicator channel (PCFICH), a physical hybrid automatic retransmit request indicator channel (PHICH), and a physical downlink shared channel (PDSCH) refer to a set of time-frequency resources or resource elements (REs) carrying downlink control information (DCI), a set of time-frequency resources or REs carrying a control format indicator (CFI), a set of time-frequency resources or REs carrying downlink acknowledgement (ACK)/negative ACK (NACK), and a set of time-frequency resources or REs carrying downlink data, respectively. In addition, a physical uplink control channel (PUCCH), a physical uplink shared channel (PUSCH) and a physical random access channel (PRACH) refer to a set of time-frequency resources or REs carrying uplink control information (UCI), a set of time-frequency resources or REs carrying uplink data and a set of time-frequency resources or REs carrying random access signals, respectively. In the present invention, in particular, a time-frequency resource or RE that is assigned to or belongs to PDCCH/PCFICH/PHICH/PDSCH/PUCCH/PUSCH/PRACH is referred to

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		as PDCCH/PCFICH/PHICH/PDSCH/PUCCH/PUSCH/PRACH RE or PDCCH/PCFICH/PHICH/PDSCH/PUCCH/PUSCH/PRACH time-frequency resource, respectively. Therefore, in the present invention, PUCCH/PUSCH/PRACH transmission of a UE is conceptually identical to UCI/uplink data/random access signal transmission on PUSCH/PUCCH/PRACH, respectively. In addition, PDCCH/PCFICH/PHICH/PDSCH transmission of an eNB is conceptually identical to downlink data/DCI transmission on PDCCH/PCFICH/PHICH/PDSCH, respectively.” You at [0053]. “FIG. 7 illustrates an sTTI and transmission of a control channel and data channel within the sTTI. In the downlink environment, a PDCCH for transmission/scheduling of data within an sTTI (i.e., sPDCCH) and a PDSCH transmitted within an sTTI (i.e., sPDSCH) may be transmitted. For example, referring to FIG. 7, a plurality of the sTTIs may be configured within one subframe, using different OFDM symbols. For example, the OFDM symbols in the subframe may be divided into one or more sTTIs in the time domain. OFDM symbols constituting an sTTI may be configured, excluding the leading OFDM symbols on which the legacy control channel is transmitted. Transmission of the sPDCCH and sPDSCH may be performed in a TDM manner within the sTTI, using different OFDM symbol regions. In an sTTI, the sPDCCH and sPDSCH may be transmitted in an FDM manner, using different regions of PRB(s)/frequency resources.” You at [0148-149]; <i>see also, id.</i> at [0150-152].

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		FIG. 7 The diagram illustrates the timing of a Short Frame (1ms, 14 symbols). It shows a sequence of PDCCH (Physical Downlink Control Channel) and PDSCH (Physical Downlink Shared Channel) transmissions. The Short TTl (Transmission Time Interval) is indicated by a double-headed arrow above the frame. The full TTl is indicated by a double-headed arrow below the frame. The PDCCH is shown as a series of shaded blocks, and the PDSCH is shown as a series of white blocks. The PDCCH and PDSCH are shown as a single transmission unit, with the PDCCH preceding the PDSCH. The diagram shows that the PDCCH and PDSCH are transmitted in a single TTl, and the Short TTl is a subset of the full TTl. You at Fig. 7. “A configured cell refers to a cell in which CA is performed for a UE based on measurement report from another eNB or UE among cells of an eNB and is configured for each UE. The configured cell for the UE may be a serving cell in terms of the UE. The configured cell for the UE, i.e. the serving cell, pre-reserves resources for ACK/NACK transmission for PDSCH transmission. An activated cell refers to a cell configured to be actually used for PDSCH/PUSCH transmission among configured cells for the UE and CSI reporting and SRS transmission for PDSCH/PUSCH transmission are performed on the activated cell. A deactivated cell refers to a cell configured not to be used for PDSCH/PUSCH transmission by the command of an eNB or the operation of a timer and CSI reporting and SRS transmission are stopped on the deactivated cell.” You at [0097].

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		“Meanwhile, since one serving cell is only present in case of communication based on a single carrier, a PDCCH carrying UL/DL grant and corresponding PUSCH/PDSCH are transmitted on one cell. In other words, in case of FDD under a single carrier environment, a PDCCH for a DL grant for a PDSCH, which will be transmitted on a specific DL CC, is transmitted on the specific CC, and a PDCCH for a UL grant for a PUSCH, which will be transmitted on a specific UL CC, is transmitted on a DL CC linked to the specific UL CC. In case of TDD under a single carrier environment, a PDCCH for a DL grant for a PDSCH, which will be transmitted on a specific DL CC, is transmitted on the specific CC, and a PDCCH for a UL grant for a PUSCH, which will be transmitted on a specific UL CC, is transmitted on the specific CC.” You at [0101]. To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
6[b]	receiving, from the wireless device, uplink data via the PUSCH.	At least under Pegasus’s apparent infringement theory, You discloses receiving, from the wireless device, uplink data via the PUSCH. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[b], supra.</i> “3GPP LTE/LTE-A standards define DL physical channels corresponding to resource elements carrying information derived from a higher layer and DL physical signals corresponding to resource elements which are used by a physical layer but which do

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		not carry information derived from a higher layer. For example, a physical downlink shared channel (PDSCH), a physical broadcast channel (PBCH), a physical multicast channel (PMCH), a physical control format indicator channel (PCFICH), a physical downlink control channel (PDCCH), and a physical hybrid ARQ indicator channel (PHICH) are defined as the DL physical channels, and a reference signal and a synchronization signal are defined as the DL physical signals. A reference signal (RS), also called a pilot, refers to a special waveform of a predefined signal known to both a BS and a UE. For example, a cell-specific RS (CRS), a UE-specific RS (UE-RS), a positioning RS (PRS), and channel state information RS (CSI-RS) may be defined as DL RSs. Meanwhile, the 3GPP LTE/LTE-A standards define UL physical channels corresponding to resource elements carrying information derived from a higher layer and UL physical signals corresponding to resource elements which are used by a physical layer but which do not carry information derived from a higher layer. For example, a physical uplink shared channel (PUSCH), a physical uplink control channel (PUCCH), and a physical random access channel (PRACH) are defined as the UL physical channels, and a demodulation reference signal (DMRS) for a UL control/data signal and a sounding reference signal (SRS) used for UL channel measurement are defined as the UL physical signal.” You at [0052]. “In the present invention, a physical downlink control channel (PDCCH), a physical control format indicator channel (PCFICH), a physical hybrid automatic retransmit request indicator channel (PHICH), and a physical downlink shared channel (PDSCH) refer to a set of time-frequency resources or resource elements (REs) carrying downlink control information (DCI), a set of time-frequency resources or REs carrying a control format indicator (CFI), a set of time-frequency resources or REs carrying downlink acknowledgement (ACK)/negative ACK (NACK), and a set of time-frequency resources or REs carrying downlink data, respectively. In addition, a physical uplink control channel (PUCCH), a physical uplink shared channel (PUSCH) and a physical random access channel (PRACH) refer to a set of time-frequency resources or REs carrying uplink control information (UCI), a set of time-frequency resources or REs carrying uplink data and a set of time-frequency

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		resources or REs carrying random access signals, respectively. In the present invention, in particular, a time-frequency resource or RE that is assigned to or belongs to PDCCH/PCFICH/PHICH/PDSCH/PUCCH/PUSCH/PRACH is referred to as PDCCH/PCFICH/PHICH/PDSCH/PUCCH/PUSCH/PRACH RE or PDCCH/PCFICH/PHICH/PDSCH/PUCCH/PUSCH/PRACH time-frequency resource, respectively. Therefore, in the present invention, PUCCH/PUSCH/PRACH transmission of a UE is conceptually identical to UCI/uplink data/random access signal transmission on PUSCH/PUCCH/PRACH, respectively. In addition, PDCCH/PCFICH/PHICH/PDSCH transmission of an eNB is conceptually identical to downlink data/DCI transmission on PDCCH/PCFICH/PHICH/PDSCH, respectively.” You at [0053]. “Referring to FIG. 4, a UL subframe may be divided into a data region and a control region in the frequency domain. One or several PUCCHs may be allocated to the control region to deliver UCI. One or several PUSCHs may be allocated to the data region of the UE subframe to carry user data.” You at [0087]. “A configured cell refers to a cell in which CA is performed for a UE based on measurement report from another eNB or UE among cells of an eNB and is configured for each UE. The configured cell for the UE may be a serving cell in terms of the UE. The configured cell for the UE, i.e. the serving cell, pre-reserves resources for ACK/NACK transmission for PDSCH transmission. An activated cell refers to a cell configured to be actually used for PDSCH/PUSCH transmission among configured cells for the UE and CSI reporting and SRS transmission for PDSCH/PUSCH transmission are performed on the activated cell. A deactivated cell refers to a cell configured not to be used for PDSCH/PUSCH transmission by the command of an eNB or the operation of a timer and CSI reporting and SRS transmission are stopped on the deactivated cell.” You at [0097]. “Meanwhile, since one serving cell is only present in case of communication based on a single carrier, a PDCCH carrying UL/DL grant and corresponding

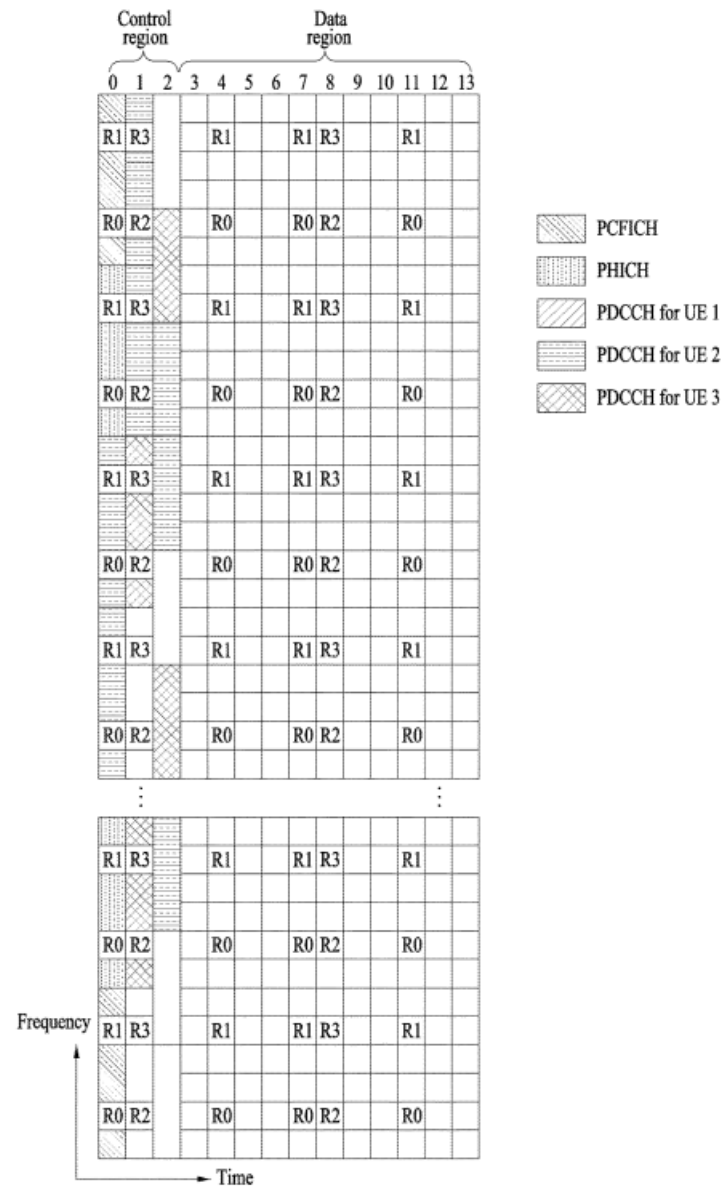
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Claim Language		Exemplary Citations to You
		PUSCH/PDSCH are transmitted on one cell. In other words, in case of FDD under a single carrier environment, a PDCCH for a DL grant for a PDSCH, which will be transmitted on a specific DL CC, is transmitted on the specific CC, and a PDCCH for a UL grant for a PUSCH, which will be transmitted on a specific UL CC, is transmitted on a DL CC linked to the specific UL CC. In case of TDD under a single carrier environment, a PDCCH for a DL grant for a PDSCH, which will be transmitted on a specific DL CC, is transmitted on the specific CC, and a PDCCH for a UL grant for a PUSCH, which will be transmitted on a specific UL CC, is transmitted on the specific CC.” You at [0101]. To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

7. Claim 7

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7[a]	The base station of claim 1, wherein the number of the OFDM symbols is a maximum of 14.	At least under Pegasus’s apparent infringement theory, You discloses the base station of claim 1, wherein the number of the OFDM symbols is a maximum of 14. For example, You discloses this limitation based on the following exemplary citations: <i>See Claim 1, supra.</i>

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		“FIG. 3 illustrates the structure of a DL subframe used in a wireless communication system. Referring to FIG. 3, a DL subframe is divided into a control region and a data region in the time domain. Referring to FIG. 3, a maximum of 3 (or 4) OFDM symbols located in a front part of a first slot of a subframe corresponds to the control region. Hereinafter, a resource region for PDCCH transmission in a DL subframe is referred to as a PDCCH region. OFDM symbols other than the OFDM symbol(s) used in the control region correspond to the data region to which a physical downlink shared channel (PDSCH) is allocated. Hereinafter, a resource region available for PDSCH transmission in the DL subframe is referred to as a PDSCH region.” You at [0066-67].

FIG. 3



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		You at Fig. 3. <table> <tr> <th colspan="3">TABLE 3</th></tr> <tr> <th>Subframe</th><th>Number of OFDM symbols for PDCCH when $N_{RB}^{DL} > 10$</th><th>Number of OFDM symbols for PDCCH when $N_{RB}^{DL} \leq 10$</th></tr> <tr> <td>Subframe 1 and 6 for frame structure type 2</td><td>1, 2</td><td>2</td></tr> <tr> <td>MBSFN subframes on a carrier supporting PDSCH, configured with 1 or 2 cell-specific antenna ports</td><td>1, 2</td><td>2</td></tr> <tr> <td>MBSFN subframes on a carrier supporting PDSCH, configured with 4 cell-specific antenna ports</td><td>2</td><td>2</td></tr> <tr> <td>Subframes on a carrier not supporting PDSCH</td><td>0</td><td>0</td></tr> <tr> <td>Non-MBSFN subframes (except subframe 6 for frame structure type 2) configured with positioning reference signals</td><td>1, 2, 3</td><td>2, 3</td></tr> <tr> <td>All other cases</td><td>1, 2, 3</td><td>2, 3, 4</td></tr> </table> You at Table 3. “A subset of downlink subframes within a radio frame on a carrier for supporting PDSCH transmission may be configured as MBSFN subframe(s) by a higher layer. Each MBSFN subframe is divided into a non-MBSFN region and an MBSFN region. The non-MBSFN region spans first one or two OFDM symbols, and its length is given by Table 3. The same CP as cyclic prefix (CP) used for subframe 0 is used for transmission within the non-MBSFN region of the MBSFN subframe. The MBSFN region within the MBSFN subframe is defined as OFDM symbols which are not used in the non-MBSFN region. The PCFICH carries a control format indicator (CFI), which indicates any one of values of 1 to 3. For a downlink system bandwidth $N_{RB}^{DL} > 10$, the number 1, 2 or 3 of OFDM symbols which are spans of DCI carried by the PDCCH is given by the CFI. For a downlink system bandwidth $N_{RB}^{DL} \leq 10$, the number 2, 3 or 4 of OFDM	TABLE 3			Subframe	Number of OFDM symbols for PDCCH when $N_{RB}^{DL} > 10$	Number of OFDM symbols for PDCCH when $N_{RB}^{DL} \leq 10$	Subframe 1 and 6 for frame structure type 2	1, 2	2	MBSFN subframes on a carrier supporting PDSCH, configured with 1 or 2 cell-specific antenna ports	1, 2	2	MBSFN subframes on a carrier supporting PDSCH, configured with 4 cell-specific antenna ports	2	2	Subframes on a carrier not supporting PDSCH	0	0	Non-MBSFN subframes (except subframe 6 for frame structure type 2) configured with positioning reference signals	1, 2, 3	2, 3	All other cases	1, 2, 3	2, 3, 4
TABLE 3																										
Subframe	Number of OFDM symbols for PDCCH when $N_{RB}^{DL} > 10$	Number of OFDM symbols for PDCCH when $N_{RB}^{DL} \leq 10$																								
Subframe 1 and 6 for frame structure type 2	1, 2	2																								
MBSFN subframes on a carrier supporting PDSCH, configured with 1 or 2 cell-specific antenna ports	1, 2	2																								
MBSFN subframes on a carrier supporting PDSCH, configured with 4 cell-specific antenna ports	2	2																								
Subframes on a carrier not supporting PDSCH	0	0																								
Non-MBSFN subframes (except subframe 6 for frame structure type 2) configured with positioning reference signals	1, 2, 3	2, 3																								
All other cases	1, 2, 3	2, 3, 4																								

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		symbols which are spans of DCI carried by the PDCCH is given by CFI+1.” You at [0071-72]. “FIG. 7 illustrates an sTTI and transmission of a control channel and data channel within the sTTI. In the downlink environment, a PDCCH for transmission/scheduling of data within an sTTI (i.e., sPDCCH) and a PDSCH transmitted within an sTTI (i.e., sPDSCH) may be transmitted. For example, referring to FIG. 7, a plurality of the sTTIs may be configured within one subframe, using different OFDM symbols. For example, the OFDM symbols in the subframe may be divided into one or more sTTIs in the time domain. OFDM symbols constituting an sTTI may be configured, excluding the leading OFDM symbols on which the legacy control channel is transmitted. Transmission of the sPDCCH and sPDSCH may be performed in a TDM manner within the sTTI, using different OFDM symbol regions. In an sTTI, the sPDCCH and sPDSCH may be transmitted in an FDM manner, using different regions of PRB(s)/frequency resources.” You at [0148-149]; <i>see also, id.</i> at [0150-152].

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		FIG. 7 The diagram illustrates a Short Frame (1ms, 14 symbols) and a Short TTI. The Short Frame is represented by a horizontal bar at the top. Below it, the Short TTI is shown as a subset of the Short Frame. The TTI is shown at the bottom. The diagram shows a sequence of symbols: PDCCH, sPDCCH, sPDSCH, sPDCCH, sPDSCH, sPDCCH, sPDSCH, sPDCCH, sPDSCH. The sPDCCH and sPDSCH symbols are grouped together. The PDCCH is shown at the beginning of the TTI, and the PDSCH is shown later. The Short TTI is a subset of the Short Frame. You at Fig. 7. “A PRB or an RB mentioned in the embodiments of the present invention may indicate a new PRB (hereinafter, sPRB) or RB (hereinafter, sRB) defined within an sTTI. The sPRB may be configured by OFDM symbol(s) within the sTTI in the time domain and 12*X subcarriers in the frequency domain, i.e., a frequency resource obtained by adding X legacy PRBs. When the number of OFDM symbols constituting the sTTI is T, the value of X may be equal to 12/T or 14/T.” You at [0227]. “A resource constituting an sPRB/sRB for transmission of an sPDCCH and a resource constituting an sPRB/sRB for transmission of an sPDSCH may differ. For example, an sPRB for the sPDSCH (hereinafter, sPRB_sPDSCH) may be configured by OFDM symbol(s) within the sTTI in the time domain and 12*X subcarriers in the frequency domain. If the number of OFDM symbols constituting the sTTI is T, the value of X may be equal to 12/T or 14/T. Meanwhile, an sPRB for the sPDCCH

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		(hereinafter, sPRB_sPDCCH) may be configured by OFDM symbols region in the time domain, in which the sPDCCH can be transmitted, and $12/T$ or $14/r$ in the frequency domain.” You at [0228]. To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

8. Claim 8

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8[pre - c]	A wireless device, comprising: a transceiver; a receiver; and a controller which controls the transceiver and receiver thereby performing operations including:	To the extent the preamble is limiting, at least under Pegasus’s apparent infringement theory, You discloses a wireless device, comprising: a transceiver; a receiver; and a controller which controls the transceiver and receiver thereby performing operations including. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[pre], supra.</i>

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		To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
8[d]	receiving, from a base station, a radio resource control (RRC) signal including information on one or more allocations of a time-domain resource,	At least under Pegasus's apparent infringement theory, You discloses receiving, from a base station, a radio resource control (RRC) signal including information on one or more allocations of a time-domain resource. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[a], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
8[e]	wherein the time-domain resource includes at least one or more orthogonal frequency-	At least under Pegasus's apparent infringement theory, You discloses wherein the time-domain resource includes at least one or more orthogonal frequency-division

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	division multiplexing (OFDM) symbols,	multiplexing (OFDM) symbols. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[a], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
8[f]	wherein, based on the information, a number of OFDM symbols are determined for a physical downlink shared channel (PDSCH) or a physical uplink shared channel (PUSCH), and	At least under Pegasus’s apparent infringement theory, You discloses wherein, based on the information, a number of OFDM symbols are determined for a physical downlink shared channel (PDSCH) or a physical uplink shared channel (PUSCH), and. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[b], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same

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		field of endeavor to address the same known problems, according to known methods which would yield predictable results.
8[g]	wherein the determined number of OFDM symbols is smaller than or equal to a number of OFDM symbols included in a slot; and	At least under Pegasus's apparent infringement theory, You discloses wherein the determined number of OFDM symbols is smaller than or equal to a number of OFDM symbols included in a slot; and. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[c], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
8[i]	receiving, from the base station, downlink control information (DCI), including a field including a bit string,	At least under Pegasus's apparent infringement theory, You discloses receiving, from the base station, downlink control information (DCI), including a field including a bit string. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[d], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art

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		references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
8[j]	wherein the bit string in the field relates to a row index of an allocation table, and	At least under Pegasus's apparent infringement theory, You discloses wherein the bit string in the field relates to a row index of an allocation table, and. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[e], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
8[k]	wherein the allocation table includes information on a starting OFDM symbol and the number of the OFDM symbols which is smaller than or equal to the number of OFDM symbols included in the slot.	At least under Pegasus's apparent infringement theory, You discloses wherein the allocation table includes information on a starting OFDM symbol and the number of the OFDM symbols which is smaller than or equal to the number of OFDM symbols included in the slot. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[f], supra.</i>

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		To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

9. Claim 9

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9[a]	The wireless device of claim 8, wherein the bit string is 3 bits in length.	At least under Pegasus's apparent infringement theory, You discloses the wireless device of claim 8, wherein the bit string is 3 bits in length. For example, You discloses this limitation based on the following exemplary citations: <i>See 2[a], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same

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		field of endeavor to address the same known problems, according to known methods which would yield predictable results.

10. Claim 10

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Claim Language		Exemplary Citations to You
10[a]	The wireless device of claim 8, wherein the DCI further includes information on one or more allocations of a frequency-domain resource.	At least under Pegasus's apparent infringement theory, You discloses the wireless device of claim 8, wherein the DCI further includes information on one or more allocations of a frequency-domain resource. For example, You discloses this limitation based on the following exemplary citations: <i>See 3[a], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

11. Claim 11

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Claim Language		Exemplary Citations to You
11[a]	The wireless device of claim 8, wherein the wireless device supports a new radio access technology (NR).	At least under Pegasus's apparent infringement theory, You discloses the wireless device of claim 8, wherein the wireless device supports a new radio access technology (NR). For example, You discloses this limitation based on the following exemplary citations: <i>See 4[a], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

12. Claim 12

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Claim Language		Exemplary Citations to You
12[a]	The wireless device of claim 8, wherein the wireless device supports different numerologies which are defined by a subcarrier spacing (SCS).	At least under Pegasus's apparent infringement theory, You discloses the wireless device of claim 8, wherein the wireless device supports different numerologies which are defined by a subcarrier spacing (SCS). For example, You discloses this limitation based on the following exemplary citations: <i>See 5[a], supra.</i>

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Claim Language		Exemplary Citations to You
		To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

13. Claim 13

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Claim Language		Exemplary Citations to You
13[pre]	The wireless device of claim 8, wherein the operations further include:	At least under Pegasus’s apparent infringement theory, You discloses the wireless device of claim 8, wherein the operations further include. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g., 6[pre], supra.</i> <i>See 13[a]–[b], infra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art

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Claim Language		Exemplary Citations to You
		references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
13[a]	receiving, from the base station, downlink data via the PDSCH; and	At least under Pegasus's apparent infringement theory, You discloses receiving, from the base station, downlink data via the PDSCH; and. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g., 6[b], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
13[b]	transmitting, to the base station, uplink data via the PUSCH.	At least under Pegasus's apparent infringement theory, You discloses transmitting, to the base station, uplink data via the PUSCH. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g., 6[a], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art

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Claim Language		Exemplary Citations to You
		references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

14. Claim 14

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Claim Language		Exemplary Citations to You
14[a]	The wireless device of claim 8, wherein the number of the OFDM symbols is a maximum of 14.	At least under Pegasus’s apparent infringement theory, You discloses the wireless device of claim 8, wherein the number of the OFDM symbols is a maximum of 14. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g., 7[a], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

15. Claim 15

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Claim Language		Exemplary Citations to You
15[pre]	An operation method of wireless device, comprising:	To the extent the preamble is limiting, at least under Pegasus’s apparent infringement theory, You discloses an operation method of wireless device, comprising. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[pre], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
15[a]	receiving, from a base station, a radio resource control (RRC) signal including information on one or more allocations of a time-domain resource,	At least under Pegasus’s apparent infringement theory, You discloses receiving, from a base station, a radio resource control (RRC) signal including information on one or more allocations of a time-domain resource. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[a]–[b], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art

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Claim Language		Exemplary Citations to You
		references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
15[b]	wherein the time-domain resource includes at least one or more orthogonal frequency-division multiplexing (OFDM) symbols,	At least under Pegasus's apparent infringement theory, You discloses wherein the time-domain resource includes at least one or more orthogonal frequency-division multiplexing (OFDM) symbols. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[a], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
15[c]	wherein, based on the information, a number of OFDM symbols are determined for a physical downlink shared channel (PDSCH) or a physical uplink shared channel (PUSCH), and	At least under Pegasus's apparent infringement theory, You discloses wherein, based on the information, a number of OFDM symbols are determined for a physical downlink shared channel (PDSCH) or a physical uplink shared channel (PUSCH), and. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[b], supra.</i>

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Claim Language		Exemplary Citations to You
		To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
15[d]	wherein the determined number of OFDM symbols is smaller than or equal to a number of OFDM symbols included in a slot; and	At least under Pegasus's apparent infringement theory, You discloses wherein the determined number of OFDM symbols is smaller than or equal to a number of OFDM symbols included in a slot; and. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[c], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
15[e]	receiving, from the base station, downlink control	At least under Pegasus's apparent infringement theory, You discloses receiving, from the base station, downlink control information (DCI), including a field including a bit

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Claim Language		Exemplary Citations to You
	information (DCI), including a field including a bit string,	string. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[d], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
15[f]	wherein the bit string in the field relates to a row index of an allocation table, and	At least under Pegasus’s apparent infringement theory, You discloses wherein the bit string in the field relates to a row index of an allocation table, and. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[e], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

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Claim Language		Exemplary Citations to You
15[g]	wherein the allocation table includes information on a starting OFDM symbol and the number of the OFDM symbols which is smaller than or equal to the number of OFDM symbols included in the slot.	At least under Pegasus's apparent infringement theory, You discloses wherein the allocation table includes information on a starting OFDM symbol and the number of the OFDM symbols which is smaller than or equal to the number of OFDM symbols included in the slot. For example, You discloses this limitation based on the following exemplary citations: <i>See 1[f], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

16. Claim 16

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Claim Language		Exemplary Citations to You
16[a]	The method of claim 15, wherein the bit string is 3 bits in length.	At least under Pegasus's apparent infringement theory, You discloses the method of claim 15, wherein the bit string is 3 bits in length. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g., 2[a], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate

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Claim Language		Exemplary Citations to You
		this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

17. Claim 17

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Claim Language		Exemplary Citations to You
17[a]	The method of claim 15, wherein the DCI further includes information on one or more allocations of a frequency-domain resource.	At least under Pegasus’s apparent infringement theory, You discloses the method of claim 15, wherein the DCI further includes information on one or more allocations of a frequency-domain resource. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g., 3[a], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

18. Claim 18

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Claim Language		Exemplary Citations to You
18[a]	The method of claim 15, wherein the wireless device supports a new radio access technology (NR).	At least under Pegasus's apparent infringement theory, You discloses the method of claim 15, wherein the wireless device supports a new radio access technology (NR). For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g., 4[a], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

19. Claim 19

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Claim Language		Exemplary Citations to You
19[a]	The method of claim 18, wherein the wireless device supports different numerologies which are defined by a subcarrier spacing (SCS).	At least under Pegasus's apparent infringement theory, You discloses the method of claim 18, wherein the wireless device supports different numerologies which are defined by a subcarrier spacing (SCS). For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g., 5[a], supra.</i>

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Claim Language		Exemplary Citations to You
		To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

20. Claim 20

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Claim Language		Exemplary Citations to You
20[pre]	The method of claim 18, further comprising:	At least under Pegasus’s apparent infringement theory, You discloses the method of claim 18, further comprising. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g., 6[pre], supra.</i> <i>See 13[a]–[b], infra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of

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Claim Language		Exemplary Citations to You
		success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
20[a]	receiving, from the base station, downlink data via the PDSCH; and	At least under Pegasus’s apparent infringement theory, You discloses receiving, from the base station, downlink data via the PDSCH; and. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g., 6[b], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
20[b]	transmitting, to the base station, uplink data via the PUSCH.	At least under Pegasus’s apparent infringement theory, You discloses transmitting, to the base station, uplink data via the PUSCH. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g., 6[a], supra.</i> To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the

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Claim Language		Exemplary Citations to You
		art would have been motivated to combine You with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.