

EXHIBIT B-1

Summary of Invalidity Analysis of U.S. Patent No. 10,181,931 in view of U.S. Patent Publication No. 2016/0127952 to You et al. (“You”)

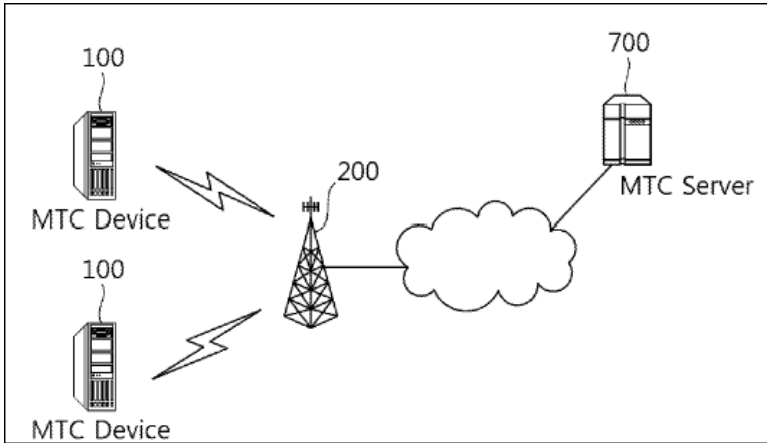
U.S. Patent Publication No. US 2016/0127952 to You et al (“You”), was published on May 5, 2016, and claims priority to provisional application No. 61/837,163 (“Provisional Application 163”) filed on June 19, 2013 and Provisional Application No. 61/843,456 filed on July 8, 2013 (“Provisional Application 456”). Provisional Application 163 and Provisional Application 456 support at least Claim 1 of You. *See, e.g.*, Provisional Application 163 at page 58 of 86, 60 of 86, 61 of 86, 63 of 86, 65 of 86, Provisional Application 456 at page 66 of 87, 68 of 87, 69 of 87. By way of example only, at least the following disclosures of the 2013 Application are sufficient to support Claim 1 of Lee. *See, e.g.*, *e.g.*, Therefore, You qualifies as prior art to the ’931 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 ’931 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 ’931 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

Invalidity of U.S. Patent 10,181,931 in view of You	
Claim Language	Exemplary Citations to You
1[pre] A method of transmitting response information of downlink data of a Machine Type Communication (MTC) terminal, the method comprising:	To the extent the preamble is limiting, at least under Pegasus's apparent infringement theory, You discloses a method for transmitting response information of downlink data of a Machine Type Communication (MTC) terminal. For example, You discloses this limitation based on the following exemplary citations: The present specification provides a reception method of a machine type communication (MTC) device. The reception method can comprise the steps of: receiving a control channel through the entire system bandwidth on first and second orthogonal frequency division multiplexing (OFDM) symbols of a subframe; and determining whether to receive a data channel only in a reduced bandwidth compared with the system bandwidth from the third symbol of the subframe. At this point, when the control channel does not continue up until a third symbol of the subframe, the data channel can be received in a reduced bandwidth compared with the system bandwidth from the third symbol of the subframe. You at Abstract. The control information transmitted through the PDCCH is denoted downlink control information (DCI). The DCI may include resource allocation of PDSCH (this is also referred to as DL (downlink) grant), resource allocation of PUSCH (this is also referred to as UL (uplink) grant), a set of transmission power control commands for individual UEs in some UE group, and/or activation of VoIP (Voice over Internet Protocol) You at [0085] The uplink control information transmitted on the PUCCH includes an HARQ (hybrid automatic repeat request), an ACK (acknowledgement)/NACK (non-acknowledgement), a CQI (channel quality indicator) indicating a downlink channel state, and an SR (scheduling request) that is an uplink radio resource allocation request. You at [0112] FIG. 11a Illustrates an example of Machine Type Communication (MTC).

Invalidity of U.S. Patent 10,181,931 in view of You	
Claim Language	Exemplary Citations to You
	You at [0150]  You at FIG. 11A The MTC device is characterized in that a transmission data amount is small and uplink/downlink data transmission/reception occurs sometimes. Therefore, it is effective to decrease a unit cost of the MTC device and to decrease battery consumption according to a low data transmission rate. The MTC device is characterized of having a small mobility, and thus is characterized in that a channel environment does almost not change. You at [0155] First, the following description is mainly about an operation to be performed by the MTC device to receive a PDCCH when the bandwidth of the downlink data channel is reduced. Although the following description focuses on the PDCCH for convenience of explanation, the content described below is also applicable to an ePDCCH. You at [0173] Provisional Application 163 supports these disclosures. <i>See, e.g.</i>, Provisional Application 163 at page 12 of 86, 58 of 86, 60 of 86, 63 of 86, 61 of 86, 62 of 86, 63 of 86, 68-69 of 86.

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		Provisional Application 456 supports these disclosures. <i>See, e.g.</i>, Provisional Application 456 at page 5 of 87, 44 of 87, 61 of 87, 64 of 87, 69 of 87. 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]	receiving structural information that contains at least one of i) information on a resource allocated to an uplink control channel for transmitting the response information and ii) start offset information on the resource allocated to the uplink control channel;	At least under Pegasus's apparent infringement theory, You discloses receiving structural information that contains at least one of i) information on a resource allocated to an uplink control channel for transmitting the response information and ii) start offset information on the resource allocated to the uplink control channel. For example, You discloses this limitation based on the following exemplary citations: The structure of the radio frame is for exemplary purposes only, and thus the number of subframes included in the radio frame or the number of slots included in the subframe may change variously. You at [0058]

Invalidity of U.S. Patent 10,181,931 in view of You																										
Claim Language		Exemplary Citations to You																								
		TABLE 3 <table><tr><th>DCI format</th><th>Contents</th></tr><tr><td>DCI format 0</td><td>Used for PUSCH scheduling</td></tr><tr><td>DCI format 1</td><td>Used for scheduling one PDSCH codeword</td></tr><tr><td>DCI format 1A</td><td>Used for compact scheduling of one PDSCH codeword and random access procedure</td></tr><tr><td>DCI format 1B</td><td>Used for compact scheduling of one PDSCH codeword including precoding information</td></tr></table> TABLE 3-continued <table><tr><th>DCI format</th><th>Contents</th></tr><tr><td>DCI format 1C</td><td>Used for very compact scheduling of one PDSCH codeword</td></tr><tr><td>DCI format 1D</td><td>Used for precoding and compact scheduling of one PDSCH codeword including power offset information</td></tr><tr><td>DCI format 2</td><td>Used for PDSCH scheduling UEs setup as closed-loop spatial multiplexing</td></tr><tr><td>DCI format 2A</td><td>Used for PDSCH scheduling UEs setup as open-loop spatial multiplexing</td></tr><tr><td>DCI format 3</td><td>Used for transmitting PUCCH having 2 bit power adjustments and TPC command of PUSCH</td></tr><tr><td>DCI format 3A</td><td>Used for transmitting PUCCH having 1 bit power adjustments and TPC command of PUSCH</td></tr></table> In order to achieve the aforementioned purpose, the present specification provides a reception method in a machine type communication (MTC) device. The method may comprise: receiving a control channel through an entire system bandwidth on first and second orthogonal frequency division multiplexing (OFDM) symbols of a subframe; and determining whether to receive a data channel only at a reduced bandwidth in comparison with the system bandwidth from a third symbol of the subframe. If the control channel is not continued up until the third symbol of the subframe, the data channel may be received on the reduced bandwidth in comparison with the system bandwidth from the third symbol of the subframe. You at [0011]	DCI format	Contents	DCI format 0	Used for PUSCH scheduling	DCI format 1	Used for scheduling one PDSCH codeword	DCI format 1A	Used for compact scheduling of one PDSCH codeword and random access procedure	DCI format 1B	Used for compact scheduling of one PDSCH codeword including precoding information	DCI format	Contents	DCI format 1C	Used for very compact scheduling of one PDSCH codeword	DCI format 1D	Used for precoding and compact scheduling of one PDSCH codeword including power offset information	DCI format 2	Used for PDSCH scheduling UEs setup as closed-loop spatial multiplexing	DCI format 2A	Used for PDSCH scheduling UEs setup as open-loop spatial multiplexing	DCI format 3	Used for transmitting PUCCH having 2 bit power adjustments and TPC command of PUSCH	DCI format 3A	Used for transmitting PUCCH having 1 bit power adjustments and TPC command of PUSCH
DCI format	Contents																									
DCI format 0	Used for PUSCH scheduling																									
DCI format 1	Used for scheduling one PDSCH codeword																									
DCI format 1A	Used for compact scheduling of one PDSCH codeword and random access procedure																									
DCI format 1B	Used for compact scheduling of one PDSCH codeword including precoding information																									
DCI format	Contents																									
DCI format 1C	Used for very compact scheduling of one PDSCH codeword																									
DCI format 1D	Used for precoding and compact scheduling of one PDSCH codeword including power offset information																									
DCI format 2	Used for PDSCH scheduling UEs setup as closed-loop spatial multiplexing																									
DCI format 2A	Used for PDSCH scheduling UEs setup as open-loop spatial multiplexing																									
DCI format 3	Used for transmitting PUCCH having 2 bit power adjustments and TPC command of PUSCH																									
DCI format 3A	Used for transmitting PUCCH having 1 bit power adjustments and TPC command of PUSCH																									

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		The PBCH (physical broadcast channel) is transmitted in the first four OFDM symbols in the second slot of the first sub-frame of the radio frame. The PBCH carries system information necessary for the wireless device to communicate with the base station, and the system information transmitted through the PBCH is denoted MIB (master information block). In comparison, System information transmitted on the PDSCH indicated by the PDCCH is denoted SIB (system information block). You at [0083] The PDCCH may carry activation of VoIP (voice over internet protocol) and a set of transmission power control commands for individual UEs in some UE group, resource allocation of an higher layer control message such as a random access response transmitted on the PDSCH, system information on DL-SCH, paging information on PCH, resource allocation information of UL-SCH (uplink shared channel), and resource allocation and transmission format of DL-SCH (downlink-shared channel). A plurality of PDCCHs may be sent in the control region, and the terminal may monitor the plurality of PDCCHs. The PDCCH is transmitted on one CCE (control channel element) or aggregation of some consecutive CCEs. The CCE is a logical allocation unit used for providing a coding rate per radio channel's state to the PDCCH. The CCE corresponds to a plurality of resource element groups. Depending on the relationship between the number of CCEs and coding rates provided by the CCEs, the format of the PDCCH and the possible number of PDCCHs are determined. You at [0084] On the other hand, downlink control information (DCI) included in the PDCCH may have several formats as described above one time. Among them, a DCI format 0 and a DCI format 1A include a resource block assignment field, and a length of the resource block assignment field is determined on the basis of a system bandwidth. A detailed description thereof is as follows. You at [0182]

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		When the MTC device receives the DCI format 0 or the DCI format 1A on the PDCCH, a length of a resource block assignment field of the DCI format 0 or the DCI format 1A is predetermined according to the following equation. You at [0183] $\lceil \log_2(N_{RB}^{DL}(N_{RB}^{DL}+1)/2) \rceil$ You at Equation 6 Provisional Application 163 supports these disclosures. <i>See, e.g.</i>, Provisional Application 163 at page 69 of 86, 15 of 86, 26 of 86, 28 of 86, 29 of 86, 31 of 86, 35-37 of 86. Provisional Application 456 supports these disclosures. <i>See, e.g.</i>, Provisional Application 456 page 77-78 of 87, 15 of 87, 27 of 87, 29 of 87, 31-32 of 87, 37 of 87. 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]	receiving downlink control information for scheduling the downlink data;	At least under Pegasus's apparent infringement theory, You discloses receiving downlink control information for scheduling the downlink data. For example, You discloses this limitation based on the following exemplary citations: Referring to FIG. 9, the base station may configure a PDCCH monitoring DL CC (monitoring CC) set. The PDCCH monitoring DL CC set consists of some of all of the

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		aggregated DL CCs, and if cross-carrier scheduling is configured, the user equipment performs PDCCH monitoring/decoding only on the DL CCs included in the PDCCH monitoring DL CC set. In other words, the base station transmits a PDCCH for PDSCH/PUSCH that is subject to scheduling only through the DL CCs included in the PDCCH monitoring DL CC set. The PDCCH monitoring DL CC set may be configured UE-specifically, UE group-specifically, or cell-specifically. You at [0131] The control information transmitted through the PDCCH is denoted downlink control information (DCI). The DCI may include resource allocation of PDSCH (this is also referred to as DL (downlink) grant), resource allocation of PUSCH (this is also referred to as UL (uplink) grant), a set of transmission power control commands for individual UEs in some UE group, and/or activation of VoIP (Voice over Internet Protocol). You at [0085] On the other hand, downlink control information (DCI) included in the PDCCH may have several formats as described above one time. Among them, a DCI format 0 and a DCI format 1A include a resource block assignment field, and a length of the resource block assignment field is determined on the basis of a system bandwidth. A detailed description thereof is as follows. You at [0182] A usage of the DCI format is classified as shown in the following table. You at [0095]

Invalidity of U.S. Patent 10,181,931 in view of You

Claim Language

Exemplary Citations to You

TABLE 3

DCI format	Contents
DCI format 0	Used for PUSCH scheduling
DCI format 1	Used for scheduling one PDSCH codeword
DCI format 1A	Used for compact scheduling of one PDSCH codeword and random access procedure
DCI format 1B	Used for compact scheduling of one PDSCH codeword including precoding information

TABLE 3-continued

DCI format	Contents
DCI format 1C	Used for very compact scheduling of one PDSCH codeword
DCI format 1D	Used for precoding and compact scheduling of one PDSCH codeword including power offset information
DCI format 2	Used for PDSCH scheduling UEs setup as closed-loop spatial multiplexing
DCI format 2A	Used for PDSCH scheduling UEs setup as open-loop spatial multiplexing
DCI format 3	Used for transmitting PUCCH having 2 bit power adjustments and TPC command of PUSCH
DCI format 3A	Used for transmitting PUCCH having 1 bit power adjustments and TPC command of PUSCH

Provisional Application 163 supports these disclosures. *See, e.g.*, Provisional Application 163 at page 27 of 86, 14 of 86, 27 of 86, 28 of 86, 39 of 86, 45 of 86, 51 of 86, 56 of 86, 45, 62 of 86.

Provisional Application 456 supports these disclosures. *See, e.g.*, Provisional Application 456 at page 37 of 87, 40 of 87, 45 of 87.

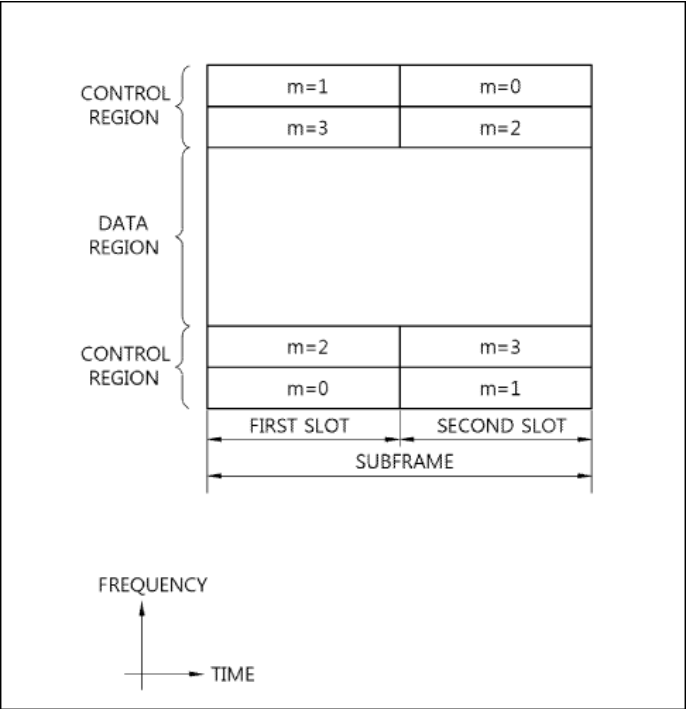
To the extent it is found that You does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that You does not anticipate this claim, You renders it obvious, either alone, in combination with the knowledge of a person of ordinary

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		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]	receiving the downlink data; and	At least under Pegasus's apparent infringement theory, You discloses receiving the downlink data. For example, You discloses this limitation based on the following exemplary citations: Next, the following description focuses on an operation to be taken by an MTC device to receive a PDSCH when a bandwidth of a downlink data channel is reduced. You at [0196] When the MTC device must receive a cell-common PDSCH, the MTC device first searches for a downlink grant through a common search space (CSS) region of a PDCCH. In this case, cell-specific data (e.g., SIB) to be transmitted by a BS to the MTC device may be different in content from cell-specific data to be transmitted by the BS to a legacy UE. In addition, even if MTC devices have the same type, cell specific data required for an MTC device located in a cover age extension region may be different in content from cell specific data required for an MTC device located in a region other than the coverage extension region. You at [0197] For example, as shown in FIG. 14, the frequency location of the PDSCH may be maintained without alteration during a duration of subframes in which a bundle of first PDSCHs is transmitted. For example, in a first subfarme in which transmission of a PDSCH bundle starts, a frequency location of the PDSCHbundle may be maintained until transmission of the PDSCH bundle ends. Therefore, an MTC device may assume that a frequency location of a first Subframe is continuously maintained during the same PDSCH

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		bundle is received. However, when a second PDSCH bundle is transmitted, it may be transmitted on a frequency location different from that first PDSCH bundle. You at [0209] The diagram shows two groups of subcarriers, each labeled 'bundle of 1st PDSCHs' and 'bundle of 2nd PDSCHs'. Each bundle contains multiple PDSCH blocks. The first bundle shows three PDSCH blocks in the first subcarrier, followed by two in the second, and then an ellipsis. The second bundle shows three PDSCH blocks in the first subcarrier, followed by two in the second, and then an ellipsis. This illustrates that PDSCH bundles can be transmitted on different frequency locations. You at FIG. 14 FIG. 9 illustrates an example in which three DL CCs (DL CC A, DL CC B, and DL CC C) are aggregated, and DL CC A is set as a PDCCH monitoring DL CC. The user equipment may receive a DL grant for the PDSCH of DL CC A, DL CC B, and DL CC C through the PDCCH of DL CC A. The DCI transmitted through the PDCCH of DL CC A contains a CIF so that it may indicate which DL CC the DCI is for. You at [0132] The diagram shows a subframe structure for three aggregated DL CCs: FIRST DL CC (PDCCH MONITORING DLCC), SECOND DL CC, and THIRD DL CC. The subframe is divided into a PDCCH region and a PDSCH region. The PDCCH region contains a DCI block with a CIF (Cross-Carrier Indicator Field) that points to the PDSCH region of the FIRST DL CC. The PDSCH region contains PDSCH blocks for each of the three DL CCs. Arrows indicate the mapping from the PDCCH region to the PDSCH region for each DL CC. You at Fig. 9. Provisional Application 163 supports these disclosures. <i>See, e.g.</i>, Provisional Application 163 at page 14 of 86, 30 of 86, 32 of 86.

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		Provisional Application 456 supports these disclosures. <i>See, e.g.</i>, Provisional Application 456 at page 53 of 87, 55 of 87, 60 of 87. 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 the response information on the downlink data by using the resource allocated to the uplink control channel,	At least under Pegasus's apparent infringement theory, You discloses transmitting the response information on the downlink data by using the resource allocated to the uplink control channel. For example, You discloses this limitation based on the following exemplary citations: The uplink control information transmitted on the PUCCH includes an HARQ (hybrid automatic repeat request), an ACK (acknowledgement)/NACK (non-acknowledgement), a CQI (channel quality indicator) indicating a downlink channel state, and an SR (scheduling request) that is an uplink radio resource allocation request. You at [0112] The PDCCH may carry activation of VoIP (voice over internet protocol) and a set of transmission power control commands for individual UEs in some UE group, resource allocation of an higher layer control message such as a random access response transmitted on the PDSCH, system information on DL-SCH, paging information on PCH, resource allocation information of UL-SCH (uplink shared channel), and resource allocation and transmission format of DL-SCH (downlink-shared channel). A plurality of PDCCHs may be sent in the control region, and the terminal may monitor the plurality of PDCCHs. The

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		PDCCH is transmitted on one CCE (control channel element) or aggregation of some consecutive CCEs. The CCE is a logical allocation unit used for providing a coding rate per radio channel's state to the PDCCH. The CCE corresponds to a plurality of resource element groups. Depending on the relationship between the number of CCEs and coding rates provided by the CCEs, the format of the PDCCH and the possible number of PDCCHs are determined. You at [0084] The control information transmitted through the PDCCH is denoted downlink control information (DCI). The DCI may include resource allocation of PDSCH (this is also referred to as DL (downlink) grant), resource allocation of PUSCH (this is also referred to as UL (uplink) grant), a set of transmission power control commands for individual UEs in some UE group, and/or activation of VoIP (Voice over Internet Protocol). You at [0085] Referring to FIG. 7, the uplink sub-frame may be separated into a control region and a data region in the frequency domain. The control region is assigned a PUCCH (physical uplink control channel) for transmission of uplink control information. The data region is assigned a PUSCH (physical uplink shared channel) for transmission of data (in some cases, control information may also be transmitted). You at [0109]

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		 Diagram illustrating a subframe structure in the frequency-time plane. The vertical axis is labeled "FREQUENCY" and the horizontal axis is labeled "TIME". The subframe is divided into two slots: "FIRST SLOT" and "SECOND SLOT". The top two rows are labeled "CONTROL REGION" and contain resource blocks m=1, m=0 in the first slot and m=3, m=2 in the second slot. The middle section is labeled "DATA REGION". The bottom two rows are also labeled "CONTROL REGION" and contain resource blocks m=2, m=3 in the first slot and m=0, m=1 in the second slot. A bracket at the bottom indicates the entire duration is a "SUBFRAME". You at FIG. 7 The PUCCH for one terminal is assigned in resource block (RB) pair in the sub-frame. The resource blocks in the resource block pair take up different sub-carriers in each of the first and second slots. The frequency occupied by the resource blocks in the resource block pair assigned to the PUCCH is varied with respect to a slot boundary. This is referred to as the RB pair assigned to the PUCCH having been frequency-hopped at the slot boundary. You at [0110] The terminal may obtain a frequency diversity gain by transmitting uplink control information through different sub-carriers over time. m is a location index that indicates a

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		logical frequency domain location of a resource block pair assigned to the PUCCH in the sub-frame. You at [0111] Provisional Application 163 supports these disclosures. <i>See, e.g.</i>, Provisional Application 163 at page 36 of 86, 43 of 86, 33 of 86, 31 of 86. Provisional Application 456 supports these disclosures. <i>See, e.g.</i>, Provisional Application 456 at page 73 of 87, 46 of 87, 50 of 87. 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[e]	wherein the resource allocated to the uplink control channel is determined based on at least one of: i) information on a resource of a downlink control channel for scheduling the downlink data; ii) the information on the resource allocated to the uplink control channel; and iii) the start offset information on the resource allocated to the uplink control channel;	At least under Pegasus's apparent infringement theory, You discloses the resource allocated to the uplink control channel is determined based on at least one of: i) information on a resource of a downlink control channel for scheduling the downlink data; ii) the information on the resource allocated to the uplink control channel; and iii) the start offset information on the resource allocated to the uplink control channel. For example, You discloses this limitation based on the following exemplary citations: When a UE monitors the PDCCH based on the C-RNTI, the DCI format and the search space which is to be monitored are determined according to the transmission mode of the PDSCH. The table below represents an example of the PDCCH monitoring in which the C-RNTI is setup. You at [0094]

Invalidity of U.S. Patent 10,181,931 in view of You

Claim Language

Exemplary Citations to You

TABLE 2			
Transmission mode	DCI format	Search space	Transmission mode of PDSCH according to PDCCH
Mode 1	DCI format 1A	Common and UE-specific	Single antenna port, port 0
	DCI format 1	UE-specific	Single antenna port, port 0
Mode 2	DCI format 1A	Common and UE-specific	Transmission diversity
	DCI format 1	UE-specific	Transmission diversity
Mode 3	DCI format 1A	Common and UE-specific	Transmission diversity
	DCI format 2A	UE-specific	CDD (Cyclic Delay Diversity) or Transmission diversity
Mode 4	DCI format 1A	Common and UE-specific	Transmission diversity
	DCI format 2	UE-specific	Closed-loop spatial multiplexing
Mode 5	DCI format 1A	Common and UE-specific	Transmission diversity
	DCI format 1D	UE-specific	MU-MIMO (Multi-user Multiple Input Multiple Output)
Mode 6	DCI format 1A	Common and UE-specific	Transmission diversity
	DCI format 1B	UE-specific	Closed-loop spatial multiplexing
Mode 7	DCI format 1A	Common and UE-specific	Single antenna port, port 0 if the number of PDSCH transmission ports is 1, otherwise Transmission diversity
	DCI format 1	UE-specific	Single antenna port, port 5
Mode 8	DCI format 1A	Common and UE-specific	Single antenna port, port 0 if the number of PDSCH transmission ports is 1, otherwise Transmission diversity
	DCI format 2B	UE-specific	Dual layer transmission (port 7 or 8), or single antenna port, port 7 or 8

You at Table 2.

Meanwhile, a UE is unable to know that the PDCCH of its own is transmitted on which position within control region and using which CCE aggregation level or DCI format. Since a plurality of PDCCHs may be transmitted in one subframe, the UE monitors a plurality of PDCCHs in every subframe. Here, the monitoring is referred to try to decode the PDCCH by the UE according to the PDCCH format.

You at [0092]

The PUCCH for one terminal is assigned in resource block (RB) pair in the sub-frame. The resource blocks in the resource block pair take up different sub-carriers in each of the first and second slots. The frequency occupied by the resource blocks in the resource block pair assigned to the PUCCH is varied with respect to a slot boundary. This is referred to as the RB pair assigned to the PUCCH having been frequency-hopped at the slot boundary.

You at [0110]

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		The terminal may obtain a frequency diversity gain by transmitting uplink control information through different sub-carriers over time. m is a location index that indicates a logical frequency domain location of a resource block pair assigned to the PUCCH in the sub-frame. You at [0111] When the MTC device receives the DCI format 0 or the DCI format 1A on the PDCCH, a length of a resource block assignment field of the DCI format 0 or the DCI format 1A is predetermined according to the following equation. You at [0183] $\lceil \log_2(N_{RB}^{DL}(N_{RB}^{DL}+1)/2) \rceil$ You at Equation 6 Provisional Application 163 supports these disclosures. <i>See, e.g.</i>, Provisional Application 163 at page 15 of 86, 29 of 86, 31 of 86, 32 of 86. Provisional Application 456 supports these disclosures. <i>See, e.g.</i>, Provisional Application 456 page 77-78 of 87, 15 of 87, 27 of 87, 29 of 87, 31-32 of 87, 37 of 87. 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.

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
1[f]	wherein the start offset information of the resource allocated to the uplink control channel is configured separated from start offset information for a terminal different from the MTC terminal;	At least under Pegasus's apparent infringement theory, You discloses the start offset information of the resource allocated to the uplink control channel is configured separated from start offset information for a terminal different from the MTC terminal. For example, You discloses this limitation based on the following exemplary citations: Meanwhile, the wireless communication system may be generally divided into a frequency division duplex (FDD) type and a time division duplex (TDD) type. According to the FDD type, uplink transmission and downlink transmission are achieved while occupying different frequency bands. According to the TDD type, the uplink transmission and the downlink transmission are achieved at different time while occupying the same frequency band. A channel response of the TDD type is substantially reciprocal. This means that a downlink channel response and an uplink channel response are approximately the same as each other in a given frequency area. Accordingly, in the TDD based wireless communication system, the downlink channel response may be acquired from the uplink channel response. In the TDD type, since an entire frequency band is time-divided in the uplink transmission and the downlink transmission, the downlink transmission by the base station and the uplink transmission by the terminal may not be performed simultaneously. In the TDD system in which the uplink transmission and the downlink transmission are divided by the unit of a subframe, the uplink transmission and the downlink transmission are performed in different subframes. You at [0053] Accordingly, it is proposed that the MTC device for receiving the data channel on the reduced bandwidth attempts to perform reception at an entire system bandwidth as to all OFDM symbols during DwPTS on special subframes which are set to special subframe configurations 0 and 5. In this case, the BS may transmit a CSI-RS or the like on the entire bandwidth during DwPTS, so that the MTC device can perform a CSI measurement on the entire bandwidth during DwPTS. You at [0233]

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		For this, one disclosure of the present specification proposes to differentiate a CSS region for the MTC device from a CSS region for the legacy UE. Herein, the CSS region may be an RE resource, PRB resource, and/or subframe region, or the like of the CSS. Further, one disclosure of the present specification proposes to differentiate the CSS region for the MTC device located in the coverage extension region from a CSS region for other MTC devices. You at [0198] Provisional Application 163 supports these disclosures. <i>See, e.g.</i>, Provisional Application 163 at page 12 of 86, 58 of 86, 60 of 86, 63 of 86, 61 of 86, 62 of 86, 63 of 86, 68-69 of 86. Provisional Application 456 supports these disclosures. <i>See, e.g.</i>, Provisional Application 456 at page 5 of 87, 44 of 87, 61 of 87, 64 of 87, 69 of 87. 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[g]	wherein a plurality of pieces of start offset information of the resource allocated to the uplink control channel are provided, and the plurality of pieces of start offset information are received through cell-specific high layer signaling for the MTC terminal from a base station;	At least under Pegasus's apparent infringement theory, You discloses a plurality of pieces of start offset information of the resource allocated to the uplink control channel are provided, and the plurality of pieces of start offset information are received through cell-specific high layer signaling for the MTC terminal from a base station. For example, You discloses this limitation based on the following exemplary citations: Resource block (RB) is a resource allocation unit and includes a plurality of sub-carriers in one slot. For example, if one slot includes seven OFDM symbols in the time domain and

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		the resource block includes 12 sub-carriers in the frequency domain, one resource block may include 7×12 resource elements (REs). You at [0065] The PDCCH may carry activation of VoIP (voice over internet protocol) and a set of transmission power control commands for individual UEs in some UE group, resource allocation of an higher layer control message such as a random access response transmitted on the PDSCH, system information on DL-SCH, paging information on PCH, resource allocation information of UL-SCH (uplink shared channel), and resource allocation and transmission format of DL-SCH (downlink-shared channel). A plurality of PDCCHs may be sent in the control region, and the terminal may monitor the plurality of PDCCHs. The PDCCH is transmitted on one CCE (control channel element) or aggregation of some consecutive CCEs. The CCE is a logical allocation unit used for providing a coding rate per radio channel's state to the PDCCH. The CCE corresponds to a plurality of resource element groups. Depending on the relationship between the number of CCEs and coding rates provided by the CCEs, the format of the PDCCH and the possible number of PDCCHs are determined. You at [0084] Meanwhile, one slot may include a plurality of OFDM symbols. The number of OFDM symbols included in one slot may vary depending on a cyclic prefix (CP). You at [0059] Further, in another method, in order for the MTC device not to monitor a CSS PDSCH, the BS may report this to the MTC device through a higher layer signal or may report this to the MTC device through an MIB or the like, or may predetermine this for the MTC device. In this case, in order for the MTC device to read information such as the SIB or the like, the MIB may include necessary configuration information, and information regarding RNTI or the like which has to read the SIB may be included in the MIB. Herein, one embodiment may consider a method in which an SIB can be transmitted without a PDCCH

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		similarly to a PBCH including an MIB. Furthermore, an RNTI may be used separately for the MTC device located in the coverage extension region and the MTC device located in the region other than the coverage extension region, and if each RNTI is reported to the MTC device through the MIB or each PBCH is transmitted separately, it may be assumed that the RNTI is configured according to a feature of the PBCH to be read. For example, when the PBCH is transmitted for the low-cost MTC device, an included RNTI may be used to read a CSS PDSCH or SIB of the low-cost MTC device, and when the PBCH is transmitted to the MTC device located in the coverage extension region, the included RNTI may be used in SIB transmission of the MTC device. In this case, the RNTI may be considered as a USS. In this case, in order to decrease the number of RNTIs on which each MTC device must perform blind decoding, the RNTI which must be read for each subframe for each MTC device may be reported to the MTC device through a higher layer signal, or may be predetermined. For example, the MTC device may decode an SIB or a CSS PDSCH on subframes #0 and #5 by using a dedicated RNTI, and may decode the SIB or the CSS PDSCH on other subframes by using a normal RNTI. For this, a BS of a corresponding cell may report a subframe in which the MTC device reads the CSS PDSCH or the SIB to the MTC device in a form of a bitmap, or may report this in a form of a period/offset. Alternatively, on the contrary, the BS of the cell may report a subframe for reading the USS PDSCH. You at [0203] In order to perform an aperiodic CSI report to a BS, an MTC device of which a bandwidth of a data channel is reduced must receive an instruction for reporting an aperiodic CSI through a CSI request field in a PDCCH (including an uplink grant). At present, the CSI request field consists of 1 bit or 2 bits. In this case, according to one embodiment of the present invention, the CQI request field for the MTC device may always consist of 1 bit. Meanwhile, the BS may report or predetermine a sub-band in which a measurement will be performed for the CSI report to the MTC device in advance through a higher layer signal, or may deliver the sub-band by including it into the aperiodic CSI request. Then, the MTC device may perform a measurement by using a CRS or CSI-RS received on a corresponding sub-band. From a time aspect, if the PDCCH including the CSI request field

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		is received on a subframe A, the MTC device performs a measurement on the subframe A. However, on the subframe for receiving the PDCCH including the CSI request field, a sub-band configured to perform the measurement is not included in the reduced bandwidth of the data channel received by the MTC device, and thus there may be a case where the measurement cannot be performed on the configured sub-band. In order to avoid such a problem, the subframe on which the measurement is performed may be separated by k from the subframe A on which the PDCCH including the CSI request field is received. That is, the subframe on which the measurement is performed may be determined to A+k. You at [0205] Provisional Application 163 supports these disclosures. <i>See, e.g.</i>, Provisional Application 163 at page 30 of 86, 32 of 86, 33 of 86, 38 of 86, 45 of 86, 47 of 86, 43 of 86, 63 of 86. Provisional Application 456 supports these disclosures. <i>See, e.g.</i>, Provisional Application 456 at page 28 of 87, 34 of 87, 19 of 87, 56 of 87, 60 of 87, 64 of 87. 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[h]	wherein the start offset information on the resource allocated to the uplink control channel is determined based on a coverage level; and	At least under Pegasus's apparent infringement theory, You discloses the start offset information on the resource allocated to the uplink control channel is determined based on a coverage level. For example, You discloses this limitation based on the following exemplary citations:

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		The BS determines the number of CCEs used in transmission of the PDCCH according to a channel state. For example, a wireless device having a good DL channel state can use one CCE in PDCCH transmission. A wireless device having a poor DL channel state can use 8 CCEs in PDCCH transmission. You at [0090] Alternatively, when the DCI format 1A or other DCI formats are received through the PDCCH, the MTC device located in the coverage extension region among the several MTC devices may interpret NRB DL as the number of RBs of the bandwidth at which the data channel can be received, and other MTC devices may interpret NRB DL not as the number of RBs of the bandwidth at which the data channel can be received but as the number of RBs of the system bandwidth. That is, the MTC device located in the coverage extension region may assume that the number of bits of the DCI format 1A is equal to N_1A_short, and other MTC devices may assume that the number of bits of the DCI format 1A is equal to N_1A_long. Further, the MTC device located in the coverage extension region may assume that the number of bits of the DCI format 0 is equal to N_0_short, and other MTC devices may assume that the number of bits of the DCI format 0 is equal to N_0_long. You at [0190] For this, one disclosure of the present specification proposes to differentiate a CSS region for the MTC device from a CSS region for the legacy UE. Herein, the CSS region may be an RE resource, PRB resource, and/or subframe region, or the like of the CSS. Further, one disclosure of the present specification proposes to differentiate the CSS region for the MTC device located in the coverage extension region from a CSS region for other MTC devices. You at [0198] FIG. 11b illustrates an example of cell coverage extension for an MTC device. You at [0033]

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		The diagram shows two overlapping ovals. The inner, unshaded oval is labeled 'Basic Coverage'. The outer, hatched oval is labeled 'Coverage Extension Region'. A base station, represented by a tower icon and labeled '200', is positioned within the Basic Coverage region. An MTC device, represented by a mobile phone icon and labeled '100', is positioned within the Coverage Extension Region, which is the area between the two ovals. You at FIG. 11B In order to solve the aforementioned problem, the BS may repetitively transmit the PDSCH and the PDCCH to the MTC device 100 located in the coverage extension region on several Subframes (e.g., bundle subframes). You at [0160] Alternatively, the MTC device may interpret N_{DL}^{RB} not as the number of RBs of the bandwidth at which the data channel can be transmitted but as the number of RBs of the system bandwidth in a PDCCH received by using SI-RNTI (or cell-common RNTI, e.g., RA-RNTI, P-RNTI, SI-RNTI), and may interpret N_{DL}^{RB} as the number of RBs of the bandwidth at which the data channel can be transmitted in a downlink environment in a PDCCH received by using C-RNTI (or different UE-specific RNTI). That is, one disclosure of the present specification proposes that the MTC device of which the bandwidth capable of receiving the data channel is reduced to a value smaller than the system bandwidth assumes that the number of bits of the DCI format 1A is equal to N_{1A_long} in the PDCCH received on the CSS, and the number of bits of the DCI format 1A is equal to N_{1A_short} in the PDCCH transmitted on the USS. Further, when the MTC device of which the bandwidth capable of receiving the data channel is reduced to the value smaller than the system bandwidth, if the PDCCH is received on the CSS, the MTC device may assume that the number of bits of the DCI format 0 is equal to N_{0_long}, and if the

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		PDCCH is received on the USS, the MTC device may assume that the number of bits of the DCI format 0 is equal to N_{0_short}. In other words, when a BS transmits the DCI format 1A on the CSS to an MTC device located in a coverage extension region among several MTC devices, N_{DL}^{RB} may be determined to denote the number of RBs of the system bandwidth, and in order to make the number of bits of the DCI format 1A equal to the number of bits of the DCI format 0, zero padding may be performed on a DCI format having a smaller number of bits so that the number of bits of the DCI format 1A is N_{1A_long}. Further, if the BS transmits the DCI format 0 on the CSS to the MTC device located in the coverage extension region among the several MTC devices, in order to make the number of bits of the DCI format 1A equal to the number of bits of the DCI format 0, zero padding may be performed on the DCI formats having the small number of bits so that the number of bits of the DCI format 0 is N_{0_long}. Further, when the BS transmits the DCI format 1A on the USS to the MTC device located in the coverage extension region, N_{DL}^{RB} may denote the number of RBs of the bandwidth at which the data channel can be transmitted, and the number of bits may be determined to N_{1A_short} without having to perform zero padding on the DCI format 1A. Further, when the BS transmits the DCI format 0 on the USS to the MTC device located in the coverage extension region, the number of bits may be determined to N_{0_short} without having to perform zero padding on the DCI format 0. You at [0189] When the MTC device must receive a cell-common PDSCH, the MTC device first searches for a downlink grant through a common search space (CSS) region of a PDCCH. In this case, cell-specific data (e.g., SIB) to be transmitted by a BS to the MTC device may be different in content from cell-specific data to be transmitted by the BS to a legacy UE. In addition, even if MTC devices have the same type, cell-specific data required for an MTC device located in a coverage extension region may be different in content from cell-specific data required for an MTC device located in a region other than the coverage extension region. You at [0197]

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		Further, in another method, in order for the MTC device not to monitor a CSS PDSCH, the BS may report this to the MTC device through a higher layer signal or may report this to the MTC device through an MIB or the like, or may predetermine this for the MTC device. In this case, in order for the MTC device to read information such as the SIB or the like, the MIB may include necessary configuration information, and information regarding RNTI or the like which has to read the SIB may be included in the MIB. Herein, one embodiment may consider a method in which an SIB can be transmitted without a PDCCH similarly to a PBCH including an MIB. Furthermore, an RNTI may be used separately for the MTC device located in the coverage extension region and the MTC device located in the region other than the coverage extension region, and if each RNTI is reported to the MTC device through the MIB or each PBCH is transmitted separately, it may be assumed that the RNTI is configured according to a feature of the PBCH to be read. For example, when the PBCH is transmitted for the low-cost MTC device, an included RNTI may be used to read a CSS PDSCH or SIB of the low-cost MTC device, and when the PBCH is transmitted to the MTC device located in the coverage extension region, the included RNTI may be used in SIB transmission of the MTC device. In this case, the RNTI may be considered as a USS. In this case, in order to decrease the number of RNTIs on which each MTC device must perform blind decoding, the RNTI which must be read for each subframe for each MTC device may be reported to the MTC device through a higher layer signal, or may be predetermined. For example, the MTC device may decode an SIB or a CSS PDSCH on subframes #0 and #5 by using a dedicated RNTI, and may decode the SIB or the CSS PDSCH on other subframes by using a normal RNTI. For this, a BS of a corresponding cell may report a subframe in which the MTC device reads the CSS PDSCH or the SIB to the MTC device in a form of a bitmap, or may report this in a form of a period/offset. Alternatively, on the contrary, the BS of the cell may report a subframe for reading the USS PDSCH. You at [0203] Provisional Application 163 supports these disclosures. <i>See, e.g.</i>, Provisional Application 163 at page 58 of 86, 60 of 86, 63 of 86, 63 of 86, 58 of 86.

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		Provisional Application 456 supports these disclosures. <i>See, e.g.</i>, Provisional Application 456 at page 27-28 of 87, 59 of 87, 60 of 87, 62 of 87, 63-64 of 87. 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[i]	wherein when the response information of the downlink data of the MTC terminal is repeatedly transmitted, the repeated transmission is performed using a same uplink control channel resource in each uplink subframe in which the uplink control channel is repeatedly transmitted.	At least under Pegasus's apparent infringement theory, You discloses when the response information of the downlink data of the MTC terminal is repeatedly transmitted, the repeated transmission is performed using a same uplink control channel resource in each uplink subframe in which the uplink control channel is repeatedly transmitted. For example, You discloses this limitation based on the following exemplary citations: The uplink control information transmitted on the PUCCH includes an HARQ (hybrid automatic repeat request), an ACK (acknowledgement)/NACK (non-acknowledgement), a CQI (channel quality indicator) indicating a downlink channel state, and an SR (scheduling request) that is an uplink radio resource allocation request. You at [0112] The PUSCH is mapped with a UL-SCH that is a transport channel. The uplink data transmitted on the PUSCH may be a transport block that is a data block for the UL-SCH transmitted for the TTI. The transport block may be user information. Or, the uplink data may be multiplexed data. The multiplexed data may be data obtained by multiplexing the transport block for the UL-SCH and control information. For example, the control information multiplexed with the data may include a CQI, a PMI (precoding matrix

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		indicator), an HARQ, and an RI (rank indicator). Or, the uplink data may consist only of control information. You at [0113] The PHICH carries an ACK (positive-acknowledgement)/NACK (negative-acknowledgement) signal for a UL HARQ (hybrid automatic repeat request). The ACK/NACK signal for UL (uplink) data on the PUSCH transmitted by the wireless device is sent on the PHICH. You at [0082] The uplink control information transmitted on the PUCCH includes an HARQ (hybrid automatic repeat request), an ACK (acknowledgement)/NACK (non-acknowledgement), a CQI (channel quality indicator) indicating a downlink channel state, and an SR (scheduling request) that is an uplink radio resource allocation request. You at [0112] The PUSCH is mapped with a UL-SCH that is a transport channel. The uplink data transmitted on the PUSCH may be a transport block that is a data block for the UL-SCH transmitted for the TTI. The transport block may be user information. Or, the uplink data may be multiplexed data. The multiplexed data may be data obtained by multiplexing the transport block for the UL-SCH and control information. For example, the control information multiplexed with the data may include a CQI, a PMI (precoding matrix indicator), an HARQ, and an RI (rank indicator). Or, the uplink data may consist only of control information. You at [0113] Provisional Application 163 supports these disclosures. <i>See, e.g.</i>, Provisional Application 163 at page 73 of 86, 72 of 86, 50 of 86, 43 of 86. Provisional Application 456 supports these disclosures. <i>See, e.g.</i>, Provisional Application 456 at page 32 of 87, 33 of 87, 37 of 87.

Invalidity of U.S. Patent 10,181,931 in view of You		
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.

2. Claim 2

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
2	The method of claim 1, wherein: at least one of the plurality of pieces of start offset information is applied according to a corresponding coverage level of the MTC terminal.	At least under Pegasus's apparent infringement theory, You discloses at least one of the plurality of pieces of start offset information is applied according to a corresponding coverage level of the MTC terminal. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.,</i> limitation 1[h]. The BS determines the number of CCEs used in transmission of the PDCCH according to a channel state. For example, a wireless device having a good DL channel state can use one CCE in PDCCH transmission. A wireless device having a poor DL channel state can use 8 CCEs in PDCCH transmission. You at [0090] Alternatively, when the DCI format 1A or other DCI formats are received through the PDCCH, the MTC device located in the coverage extension region among the several MTC devices may interpret NRB DL as the number of RBs of the bandwidth at which the data

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		channel can be received, and other MTC devices may interpret NRB DL not as the number of RBs of the bandwidth at which the data channel can be received but as the number of RBs of the system bandwidth. That is, the MTC device located in the coverage extension region may assume that the number of bits of the DCI format 1A is equal to N_1A_short, and other MTC devices may assume that the number of bits of the DCI format 1A is equal to N_1A_long. Further, the MTC device located in the coverage extension region may assume that the number of bits of the DCI format 0 is equal to N_0_short, and other MTC devices may assume that the number of bits of the DCI format 0 is equal to N_0_long. You at [0190] For this, one disclosure of the present specification proposes to differentiate a CSS region for the MTC device from a CSS region for the legacy UE. Herein, the CSS region may be an RE resource, PRB resource, and/or subframe region, or the like of the CSS. Further, one disclosure of the present specification proposes to differentiate the CSS region for the MTC device located in the coverage extension region from a CSS region for other MTC devices. You at [0198] FIG. 11b illustrates an example of cell coverage extension for an MTC device. You at [0033] The diagram illustrates a cell coverage extension for an MTC device. It features a central base station (labeled 200) and a mobile terminal (labeled 100). The base station is surrounded by two overlapping regions: a 'Basic Coverage' region, represented by an unshaded oval, and a 'Coverage Extension Region', represented by a hatched oval. The mobile terminal (100) is positioned within the Coverage Extension Region. A legend at the bottom of the diagram identifies the two regions: 'Basic Coverage' (unshaded) and 'Coverage Extension Region' (hatched). You at FIG. 11B

Invalidity of U.S. Patent 10,181,931 in view of You		
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.

3. Claim 3

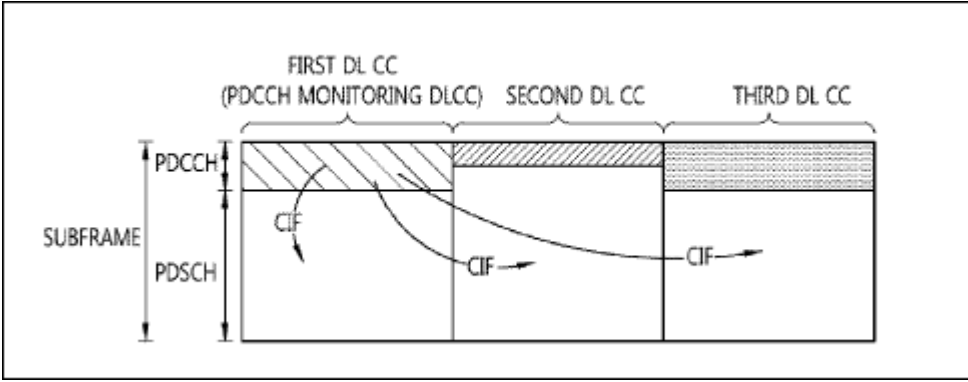
Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
3[pre]	A method of configuring a resource of response information of downlink data for a Machine Type Communication (MTC) terminal in a base station, the method comprising:	To the extent the preamble is limiting, at least under Pegasus's apparent infringement theory, You discloses a method of configuring a resource of response information of downlink data for a Machine Type Communication (MTC) terminal in a base station. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.,</i> limitation 1[pre]; You at Abstract, Paras. [0085], [0155], [0173]; FIG. 11A. The uplink control information transmitted on the PUCCH includes an HARQ (hybrid automatic repeat request), an ACK (acknowledgement)/NACK (non-acknowledgement), a CQI (channel quality indicator) indicating a downlink channel state, and an SR (scheduling request) that is an uplink radio resource allocation request. You at [0112] Hereinafter, a downlink means communication from the base station 20 to the terminal 10 and an uplink means communication from the terminal 10 to the base station 20. In the downlink, a transmitter may be a part of the base station 20 and a receiver may be a part of

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		the terminal 10. In the uplink, the transmitter may be a part of the terminal 10 and the receiver may be a part of the base station 20. You at [0051] 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.
3[a]	transmitting structural information that contains at least one of i) information on a resource allocated to an uplink control channel for transmitting the response information and ii) start offset information on the resource allocated to the uplink control channel;	At least under Pegasus's apparent infringement theory, You discloses transmitting structural information that contains at least one of i) information on a resource allocated to an uplink control channel for transmitting the response information and ii) start offset information on the resource allocated to the uplink control channel. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.,</i> limitation 1[a]; You at [0112], [0084], [0085] Referring to FIG. 7, the uplink sub-frame may be separated into a control region and a data region in the frequency domain. The control region is assigned a PUCCH (physical uplink control channel) for transmission of uplink control information. The data region is assigned a PUSCH (physical uplink shared channel) for transmission of data (in some cases, control information may also be transmitted). You at [0109]

Invalidity of U.S. Patent 10,181,931 in view of You										
Claim Language		Exemplary Citations to You								
		CONTROL REGION { <table><tr><td>m=1</td><td>m=0</td></tr><tr><td>m=3</td><td>m=2</td></tr></table> DATA REGION { <table><tr><td>m=2</td><td>m=3</td></tr><tr><td>m=0</td><td>m=1</td></tr></table> CONTROL REGION { FIRST SLOT SECOND SLOT SUBFRAME FREQUENCY TIME You at FIG. 7 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.	m=1	m=0	m=3	m=2	m=2	m=3	m=0	m=1
m=1	m=0									
m=3	m=2									
m=2	m=3									
m=0	m=1									

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
3[b]	transmitting downlink control information for scheduling the downlink data; and	At least under Pegasus's apparent infringement theory, You discloses transmitting downlink control information for scheduling the downlink data. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.</i>, limitation 1[b]; You at [0085], [0182], [0095]. Referring to FIG. 9, the base station may configure a PDCCH monitoring DL CC (monitoring CC) set. The PDCCH monitoring DL CC set consists of some of all of the aggregated DL CCs, and if cross-carrier scheduling is configured, the user equipment performs PDCCH monitoring/decoding only on the DL CCs included in the PDCCH monitoring DL CC set. In other words, the base station transmits a PDCCH for PDSCH/PUSCH that is subject to scheduling only through the DL CCs included in the PDCCH monitoring DL CC set. The PDCCH monitoring DL CC set may be configured UE-specifically, UE group-specifically, or cell-specifically. You at [0131] The control information transmitted through the PDCCH is denoted downlink control information (DCI). The DCI may include resource allocation of PDSCH (this is also referred to as DL (downlink) grant), resource allocation of PUSCH (this is also referred to as UL (uplink) grant), a set of transmission power control commands for individual UEs in some UE group, and/or activation of VoIP (Voice over Internet Protocol). You at [0085]. The base station determines a PDCCH format according to the DCI to be sent to the terminal and adds a CRC (cyclic redundancy check) to control information. The CRC is masked with a unique identifier (RNTI; radio network temporary identifier) depending on the owner or purpose of the PDCCH. In case the PDCCH is for a specific terminal, the terminal's unique identifier, such as C-RNTI (cell-RNTI), may be masked to the CRC. Or, if the PDCCH is for a paging message, a paging indicator, for example, P-RNTI (paging-RNTI) may be masked to the CRC. If the PDCCH is for a system information block (SIB), a system information identifier, SI-RNTI (system information-RNTI), may be masked to

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		the CRC. In order to indicate a random access response that is a response to the terminal's transmission of a random access preamble, an RA-RNTI (random access-RNTI) may be masked to the CRC. You at [0086]. 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.
3[c]	transmitting the downlink data,	At least under Pegasus's apparent infringement theory, You discloses transmitting the downlink data. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.</i>, limitation 1[c]; You at [0196], [0197], [0209], [0132]. Referring to FIG. 9, the base station may configure a PDCCH monitoring DL CC (monitoring CC) set. The PDCCH monitoring DL CC set consists of some of all of the aggregated DL CCs, and if cross-carrier scheduling is configured, the user equipment performs PDCCH monitoring/decoding only on the DL CCs included in the PDCCH monitoring DL CC set. In other words, the base station transmits a PDCCH for PDSCH/PUSCH that is subject to scheduling only through the DL CCs included in the PDCCH monitoring DL CC set. The PDCCH monitoring DL CC set may be configured UE-specifically, UE group-specifically, or cell-specifically. You at [0132]

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		 You at FIG. 9. 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.
3[d]	wherein the resource of the uplink control channel for transmitting the response information of the downlink data is determined based on at least one piece of information on i) a resource of a downlink control channel for scheduling the downlink data; ii) the information on the resource allocated to the uplink control channel; and iii) the start offset information on the resource allocated to the uplink control channel. For example, You discloses this limitation based on the following exemplary citations:	At least under Pegasus's apparent infringement theory, You discloses the resource of the uplink control channel for transmitting the response information of the downlink data is determined based on at least one piece of information on i) a resource of a downlink control channel for scheduling the downlink data; ii) the information on the resource allocated to the uplink control channel; and iii) the start offset information on the resource allocated to the uplink control channel. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g., limitation 1[e]; You at [0094], [0092], [0110], [0111], [0183].</i>

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
	allocated to the uplink control channel; and iii) the start offset information on the resource allocated to the uplink control channel;	When the MTC device receives the DCI format 0 or the DCI format 1A on the PDCCH, a length of a resource block assignment field of the DCI format 0 or the DCI format 1A is predetermined according to the following equation. You at [0183] $\lceil \log_2(N_{RB}^{DL}(N_{RB}^{DL}+1)/2) \rceil$ You at Equation 6 In the equation above, N_{RB}^{DL} denotes a downlink bandwidth, and is expressed by the number of RBs. You at [0184] Since N_{RB}^{DL} denotes the number of RBs of a system bandwidth, the number of bits of the DCI format 1A may be set to be equal to the number of bits of the DCI format 0. In order for the number of bits of the DCI format 1A to have the same number of bits of the DCI format 0, zero padding may be performed on a DCI format having a smaller number of bits. As such, in order to make the number of bits of the DCI format 1A equal to the number of bits of the DCI format 0, the number of bits of the DCI format 1A is denoted by N_{1A_long} when the zero padding is performed on the DCI format 1A, and the number of bits is denoted by N_{0_long} when the zero padding is performed on the DCI format 0. In this case, N_{1A_long} and N_{0_long} have the same value. You at [0185] 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

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
3[e]	wherein the start offset information of the resource allocated to the uplink control channel is configured separated from offset information on a terminal different from the MTC terminal;	At least under Pegasus's apparent infringement theory, You discloses the start offset information of the resource allocated to the uplink control channel is configured separated from offset information on a terminal different from the MTC terminal. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.,</i> claim limitation 1[f]; You at [0053], [0233]. For this, one disclosure of the present specification proposes to differentiate a CSS region for the MTC device from a CSS region for the legacy UE. Herein, the CSS region may be an RE resource, PRB resource, and/or subframe region, or the like of the CSS. Further, one disclosure of the present specification proposes to differentiate the CSS region for the MTC device located in the coverage extension region from a CSS region for other MTC devices. You at [0198] 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.
3[f]	wherein a plurality of pieces of start offset information on the resource allocated to the uplink control channel are provided, and the plurality of pieces of	At least under Pegasus's apparent infringement theory, You discloses a plurality of pieces of start offset information on the resource allocated to the uplink control channel are provided, and the plurality of pieces of start offset information are transmitted through cell-specific high layer signaling for the MTC terminal to the MTC terminal. For example, You discloses this limitation based on the following exemplary citations:

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
	start offset information are transmitted through cell-specific high layer signaling for the MTC terminal to the MTC terminal;	<i>See, e.g.,</i> limitation 1[g], You at [0065], [0084], [0059], [0203], [0205]. As described above one time, a next-generation system considers a method of repetitively transmitting (i.e., bundling transmission) a channel such as a PDSCH, a PDCCH, or the like when cell coverage is extended for the MTC device. In this case, an existing channel such as a PCFICH, a PHICH, or the like may not be transmitted for the MTC device. As such, in order for the MTC device not to necessarily receive the PCFICH, the number of OFDM symbols on which the PDCCH is transmitted may be always set to 3 symbols. Alternatively, information regarding the number of OFDM symbols on which the PDCCH is transmitted may be reported to the MTC device through a PSS/SSS or through a PBCH, instead of the existing PCFICH. In addition, also in case of an MTC device which is not located in a cell coverage extension region, it is assumed that an entire system bandwidth to be assumed for data buffering is used to store resource elements across an entire band on first three OFDM symbols in a normal CP case, and is used to store resource elements for 6 PRBs or a reduced data bandwidth on the remaining OFDM symbols. In addition, when the entire band is assumed for first several OFDM symbols, information regarding the number of OFDM symbols may be signaled through a higher layer, or may be reported to the MTC device through a PBCH or the like, or may be predetermined in association with a cell ID so as to be known to the MTC device without additional signaling. In addition, when the MTC device performs a cell search, it may be unconditionally assumed that the number of OFDM symbols on which the entire system band is used is 0. Therefore, the MTC device may perform buffering only on data of a resource element for 6 PRBs. You at [0175] 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

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		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.
3[g]	wherein the start offset information on the resource allocated to the uplink control channel is determined based on a coverage level; and	At least under Pegasus's apparent infringement theory, You discloses the start offset information on the resource allocated to the uplink control channel is determined based on a coverage level. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.</i>, limitation 1[h]; You at [0190], [0198], [0033], [0160] [0189], [0197], [0203]. The BS determines the number of CCEs used in transmission of the PDCCH according to a channel state. For example, a wireless device having a good DL channel state can use one CCE in PDCCH transmission. A wireless device having a poor DL channel state can use 8 CCEs in PDCCH transmission. You at [0090] As described above one time, a next-generation system considers a method of repetitively transmitting (i.e., bundling transmission) a channel such as a PDSCH, a PDCCH, or the like when cell coverage is extended for the MTC device. In this case, an existing channel such as a PCFICH, a PHICH, or the like may not be transmitted for the MTC device. As such, in order for the MTC device not to necessarily receive the PCFICH, the number of OFDM symbols on which the PDCCH is transmitted may be always set to 3 symbols. Alternatively, information regarding the number of OFDM symbols on which the PDCCH is transmitted may be reported to the MTC device through a PSS/SSS or through a PBCH, instead of the existing PCFICH. In addition, also in case of an MTC device which is not located in a cell coverage extension region, it is assumed that an entire system bandwidth to be assumed for data buffering is used to store resource elements across an entire band on first three OFDM symbols in a normal CP case, and is used to store resource elements for 6 PRBs or a reduced data bandwidth on the remaining OFDM symbols. In addition, when the entire band is assumed for first several OFDM symbols, information regarding the number of OFDM symbols may be signaled through a higher layer, or may be reported to the MTC

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		device through a PBCH or the like, or may be predetermined in association with a cell ID so as to be known to the MTC device without additional signaling. In addition, when the MTC device performs a cell search, it may be unconditionally assumed that the number of OFDM symbols on which the entire system band is used is 0. Therefore, the MTC device may perform buffering only on data of a resource element for 6 PRBs. You at [0175] 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.
3[h]	wherein when the response information of the downlink data of the MTC terminal is repeatedly transmitted, the repeated transmission is performed using a same uplink control channel resource in each uplink subframe in which the uplink control channel is repeatedly transmitted.	At least under Pegasus's apparent infringement theory, You discloses when the response information of the downlink data of the MTC terminal is repeatedly transmitted, the repeated transmission is performed using a same uplink control channel resource in each uplink subframe in which the uplink control channel is repeatedly transmitted. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.</i>, limitation 1[i]; You at [0090], [0113], [0190], [0198], [0033], [0160], [0189], [0203]. The uplink control information transmitted on the PUCCH includes an HARQ (hybrid automatic repeat request), an ACK (acknowledgement)/NACK (non-acknowledgement), a CQI (channel quality indicator) indicating a downlink channel state, and an SR (scheduling request) that is an uplink radio resource allocation request. You at [0112].

Invalidity of U.S. Patent 10,181,931 in view of You		
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.

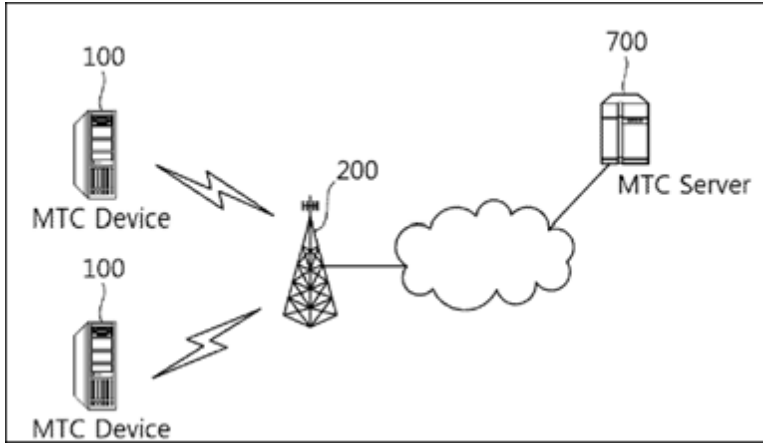
4. Claim 4

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
4	The method of claim 3, wherein: at least one of the plurality of pieces of start offset information is applied according to a corresponding coverage level of the MTC terminal.	At least under Pegasus's apparent infringement theory, You discloses at least one of the plurality of pieces of start offset information is applied according to a corresponding coverage level of the MTC terminal. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.</i>, each limitation of claim 3, claim 2, limitation 1[h]; You at You at [0190], [0198], [0033], [0160] [0189], [0197], [0203]. The BS determines the number of CCEs used in transmission of the PDCCH according to a channel state. For example, a wireless device having a good DL channel state can use one CCE in PDCCH transmission. A wireless device having a poor DL channel state can use 8 CCEs in PDCCH transmission. You at [0090] As described above one time, a next-generation system considers a method of repetitively transmitting (i.e., bundling transmission) a channel such as a PDSCH, a PDCCH, or the like when cell coverage is extended for the MTC device. In this case, an existing channel such

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		as a PCFICH, a PHICH, or the like may not be transmitted for the MTC device. As such, in order for the MTC device not to necessarily receive the PCFICH, the number of OFDM symbols on which the PDCCH is transmitted may be always set to 3 symbols. Alternatively, information regarding the number of OFDM symbols on which the PDCCH is transmitted may be reported to the MTC device through a PSS/SSS or through a PBCH, instead of the existing PCFICH. In addition, also in case of an MTC device which is not located in a cell coverage extension region, it is assumed that an entire system bandwidth to be assumed for data buffering is used to store resource elements across an entire band on first three OFDM symbols in a normal CP case, and is used to store resource elements for 6 PRBs or a reduced data bandwidth on the remaining OFDM symbols. In addition, when the entire band is assumed for first several OFDM symbols, information regarding the number of OFDM symbols may be signaled through a higher layer, or may be reported to the MTC device through a PBCH or the like, or may be predetermined in association with a cell ID so as to be known to the MTC device without additional signaling. In addition, when the MTC device performs a cell search, it may be unconditionally assumed that the number of OFDM symbols on which the entire system band is used is 0. Therefore, the MTC device may perform buffering only on data of a resource element for 6 PRBs. You at [0175] 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

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
5[pre]	A Machine Type Communication (MTC) terminal for transmitting response information of downlink data to a base station, the terminal comprising:	To the extent the preamble is limiting, at least under Pegasus's apparent infringement theory, You discloses a Machine Type Communication (MTC) terminal for transmitting response information of downlink data to a base station. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.,</i> limitation 1[pre]; You at [0085], [0112], [0155], [0173]. The present specification provides a reception method of a machine type communication (MTC) device. The reception method can comprise the steps of: receiving a control channel through the entire system bandwidth on first and second orthogonal frequency division multiplexing (OFDM) symbols of a subframe; and determining whether to receive a data channel only in a reduced bandwidth compared with the system bandwidth from the third symbol of the subframe. At this point, when the control channel does not continue up until a third symbol of the subframe, the data channel can be received in a reduced bandwidth compared with the system bandwidth from the third symbol of the subframe. You at Abstract. FIG. 11a Illustrates an example of Machine Type Communication (MTC). You at [0150]

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		 You at FIG. 11A 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[a]	a receiving unit configured to receive structural information that contains at least one piece of i) information on a resource allocated to an uplink control channel for transmitting the response information and ii) start offset information on the	At least under Pegasus’s apparent infringement theory, You discloses a receiving unit configured to receive structural information that contains at least one piece of i) information on a resource allocated to an uplink control channel for transmitting the response information and ii) start offset information on the resource to which the uplink control channel is allocated, configured to receive downlink control information for scheduling the downlink data, and configured to receive the downlink data. For example, You discloses this limitation based on the following exemplary citations:

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
	resource to which the uplink control channel is allocated, configured to receive downlink control information for scheduling the downlink data, and configured to receive the downlink data;	<i>See, e.g.</i>, limitations 1[a], 1[b], 1[c]; You at [0058], [0011], [0083], [0182], [0183], [0182], [0095]. The PDCCH may carry activation of VoIP (voice over internet protocol) and a set of transmission power control commands for individual UEs in some UE group, resource allocation of an higher layer control message such as a random access response transmitted on the PDSCH, system information on DL-SCH, paging information on PCH, resource allocation information of UL-SCH (uplink shared channel), and resource allocation and transmission format of DL-SCH (downlink-shared channel). A plurality of PDCCHs may be sent in the control region, and the terminal may monitor the plurality of PDCCHs. The PDCCH is transmitted on one CCE (control channel element) or aggregation of some consecutive CCEs. The CCE is a logical allocation unit used for providing a coding rate per radio channel's state to the PDCCH. The CCE corresponds to a plurality of resource element groups. Depending on the relationship between the number of CCEs and coding rates provided by the CCEs, the format of the PDCCH and the possible number of PDCCHs are determined. You at [0084] Referring to FIG. 9, the base station may configure a PDCCH monitoring DL CC (monitoring CC) set. The PDCCH monitoring DL CC set consists of some of all of the aggregated DL CCs, and if cross-carrier scheduling is configured, the user equipment performs PDCCH monitoring/decoding only on the DL CCs included in the PDCCH monitoring DL CC set. In other words, the base station transmits a PDCCH for PDSCH/PUSCH that is subject to scheduling only through the DL CCs included in the PDCCH monitoring DL CC set. The PDCCH monitoring DL CC set may be configured UE-specifically, UE group-specifically, or cell-specifically. You at [0131] The control information transmitted through the PDCCH is denoted downlink control information (DCI). The DCI may include resource allocation of PDSCH (this is also referred to as DL (downlink) grant), resource allocation of PUSCH (this is also referred to

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		as UL (uplink) grant), a set of transmission power control commands for individual UEs in some UE group, and/or activation of VoIP (Voice over Internet Protocol). You at [0085]. The base station determines a PDCCH format according to the DCI to be sent to the terminal and adds a CRC (cyclic redundancy check) to control information. The CRC is masked with a unique identifier (RNTI; radio network temporary identifier) depending on the owner or purpose of the PDCCH. In case the PDCCH is for a specific terminal, the terminal's unique identifier, such as C-RNTI (cell-RNTI), may be masked to the CRC. Or, if the PDCCH is for a paging message, a paging indicator, for example, P-RNTI (paging-RNTI) may be masked to the CRC. If the PDCCH is for a system information block (SIB), a system information identifier, SI-RNTI (system information-RNTI), may be masked to the CRC. In order to indicate a random access response that is a response to the terminal's transmission of a random access preamble, an RA-RNTI (random access-RNTI) may be masked to the CRC. You at [0086]. 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[b]	a controller configured to determine a resource allocated to the uplink control channel for transmitting the response information of the downlink	At least under Pegasus's apparent infringement theory, You discloses a controller configured to determine a resource allocated to the uplink control channel for transmitting the response information of the downlink data based on at least one of i) information on a resource of a downlink control channel for scheduling the downlink data, ii) the information on the resource allocated to the uplink control channel, and iii) the start offset information

Invalidity of U.S. Patent 10,181,931 in view of You	
Claim Language	Exemplary Citations to You
data based on at least one of i) information on a resource of a downlink control channel for scheduling the downlink data, ii) the information on the resource allocated to the uplink control channel, and iii) the start offset information on the resource allocated to the uplink control channel; and	on the resource allocated to the uplink control channel. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.,</i> limitation 1[e]; You at [0094], [0092], [0110], [0111], [0183]. When the MTC device receives the DCI format 0 or the DCI format 1A on the PDCCH, a length of a resource block assignment field of the DCI format 0 or the DCI format 1A is predetermined according to the following equation. You at [0183] $\lceil \log_2(N_{RB}^{DL}(N_{RB}^{DL}+1)/2) \rceil$ You at Equation 6 In the equation above, N_{RB}^{DL} denotes a downlink bandwidth, and is expressed by the number of RBs. You at [0184] Since N_{RB}^{DL} denotes the number of RBs of a system bandwidth, the number of bits of the DCI format 1A may be set to be equal to the number of bits of the DCI format 0. In order for the number of bits of the DCI format 1A to have the same number of bits of the DCI format 0, zero padding may be performed on a DCI format having a smaller number of bits. As such, in order to make the number of bits of the DCI format 1A equal to the number of bits of the DCI format 0, the number of bits of the DCI format 1A is denoted by N_{1A_long} when the zero padding is performed on the DCI format 1A, and the number of bits is denoted by N_{0_long} when the zero padding is performed on the DCI format 0. In this case, N_{1A_long} and N_{0_long} have the same value. You at [0185]

Invalidity of U.S. Patent 10,181,931 in view of You		
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.
5[c]	a transmitting unit configured to transmit the response information of the downlink data by using the determined resource of the uplink control channel,	At least under Pegasus’s apparent infringement theory, You discloses a transmitting unit configured to transmit the response information of the downlink data by using the determined resource of the uplink control channel. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.</i>, limitation 1[d]; You at [0112], [0084], [0085], [0109].

Invalidity of U.S. Patent 10,181,931 in view of You										
Claim Language		Exemplary Citations to You								
		CONTROL REGION { <table><tr><td>m=1</td><td>m=0</td></tr><tr><td>m=3</td><td>m=2</td></tr></table> DATA REGION { <table><tr><td>m=2</td><td>m=3</td></tr><tr><td>m=0</td><td>m=1</td></tr></table> CONTROL REGION { FIRST SLOT SECOND SLOT SUBFRAME FREQUENCY TIME You at FIG. 7 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.	m=1	m=0	m=3	m=2	m=2	m=3	m=0	m=1
m=1	m=0									
m=3	m=2									
m=2	m=3									
m=0	m=1									

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
5[d]	wherein the start offset information of the resource allocated to the uplink control channel is configured separated from offset information on a terminal different from the MTC terminal;	At least under Pegasus's apparent infringement theory, You discloses the start offset information of the resource allocated to the uplink control channel is configured separated from offset information on a terminal different from the MTC terminal. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.,</i> claim limitation 1[f]; You at [0053], [0233]. For this, one disclosure of the present specification proposes to differentiate a CSS region for the MTC device from a CSS region for the legacy UE. Herein, the CSS region may be an RE resource, PRB resource, and/or subframe region, or the like of the CSS. Further, one disclosure of the present specification proposes to differentiate the CSS region for the MTC device located in the coverage extension region from a CSS region for other MTC devices. You at [0198] 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[e]	wherein a plurality of pieces of start offset information on the resource allocated to the uplink control channel are provided, and the plurality of pieces of start offset information are received through cell-specific high layer signaling for the	At least under Pegasus's apparent infringement theory, You discloses a plurality of pieces of start offset information on the resource allocated to the uplink control channel are provided, and the plurality of pieces of start offset information are received through cell-specific high layer signaling for the MTC terminal from the base station. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.,</i> limitation 1[g], You at [0065], [0084], [0059], [0203], [0205].

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
	MTC terminal from the base station;	As described above one time, a next-generation system considers a method of repetitively transmitting (i.e., bundling transmission) a channel such as a PDSCH, a PDCCH, or the like when cell coverage is extended for the MTC device. In this case, an existing channel such as a PCFICH, a PHICH, or the like may not be transmitted for the MTC device. As such, in order for the MTC device not to necessarily receive the PCFICH, the number of OFDM symbols on which the PDCCH is transmitted may be always set to 3 symbols. Alternatively, information regarding the number of OFDM symbols on which the PDCCH is transmitted may be reported to the MTC device through a PSS/SSS or through a PBCH, instead of the existing PCFICH. In addition, also in case of an MTC device which is not located in a cell coverage extension region, it is assumed that an entire system bandwidth to be assumed for data buffering is used to store resource elements across an entire band on first three OFDM symbols in a normal CP case, and is used to store resource elements for 6 PRBs or a reduced data bandwidth on the remaining OFDM symbols. In addition, when the entire band is assumed for first several OFDM symbols, information regarding the number of OFDM symbols may be signaled through a higher layer, or may be reported to the MTC device through a PBCH or the like, or may be predetermined in association with a cell ID so as to be known to the MTC device without additional signaling. In addition, when the MTC device performs a cell search, it may be unconditionally assumed that the number of OFDM symbols on which the entire system band is used is 0. Therefore, the MTC device may perform buffering only on data of a resource element for 6 PRBs. You at [0175] 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.

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
5[f]	wherein the start offset information on the resource allocated to the uplink control channel is determined based on a coverage level; and	At least under Pegasus's apparent infringement theory, You discloses the start offset information on the resource allocated to the uplink control channel is determined based on a coverage level. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.</i>, limitation 1[h]; You at [0190], [0198], [0033], [0160] [0189], [0197], [0203]. The BS determines the number of CCEs used in transmission of the PDCCH according to a channel state. For example, a wireless device having a good DL channel state can use one CCE in PDCCH transmission. A wireless device having a poor DL channel state can use 8 CCEs in PDCCH transmission. You at [0090] As described above one time, a next-generation system considers a method of repetitively transmitting (i.e., bundling transmission) a channel such as a PDSCH, a PDCCH, or the like when cell coverage is extended for the MTC device. In this case, an existing channel such as a PCFICH, a PHICH, or the like may not be transmitted for the MTC device. As such, in order for the MTC device not to necessarily receive the PCFICH, the number of OFDM symbols on which the PDCCH is transmitted may be always set to 3 symbols. Alternatively, information regarding the number of OFDM symbols on which the PDCCH is transmitted may be reported to the MTC device through a PSS/SSS or through a PBCH, instead of the existing PCFICH. In addition, also in case of an MTC device which is not located in a cell coverage extension region, it is assumed that an entire system bandwidth to be assumed for data buffering is used to store resource elements across an entire band on first three OFDM symbols in a normal CP case, and is used to store resource elements for 6 PRBs or a reduced data bandwidth on the remaining OFDM symbols. In addition, when the entire band is assumed for first several OFDM symbols, information regarding the number of OFDM symbols may be signaled through a higher layer, or may be reported to the MTC device through a PBCH or the like, or may be predetermined in association with a cell ID so as to be known to the MTC device without additional signaling. In addition, when the MTC device performs a cell search, it may be unconditionally assumed that the number of

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		OFDM symbols on which the entire system band is used is 0. Therefore, the MTC device may perform buffering only on data of a resource element for 6 PRBs. You at [0175] 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[g]	wherein when the response information of the downlink data of the MTC terminal is repeatedly transmitted, the repeated transmission is performed using a same uplink control channel resource in each uplink subframe in which the uplink control channel is repeatedly transmitted.	At least under Pegasus's apparent infringement theory, You discloses when the response information of the downlink data of the MTC terminal is repeatedly transmitted, the repeated transmission is performed using a same uplink control channel resource in each uplink subframe in which the uplink control channel is repeatedly transmitted. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.</i>, limitation 1[i]; You at [0090], [0113], [0190], [0198], [0033], [0160], [0189], [0203]. The uplink control information transmitted on the PUCCH includes an HARQ (hybrid automatic repeat request), an ACK (acknowledgement)/NACK (non-acknowledgement), a CQI (channel quality indicator) indicating a downlink channel state, and an SR (scheduling request) that is an uplink radio resource allocation request. You at [0112]. 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

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		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

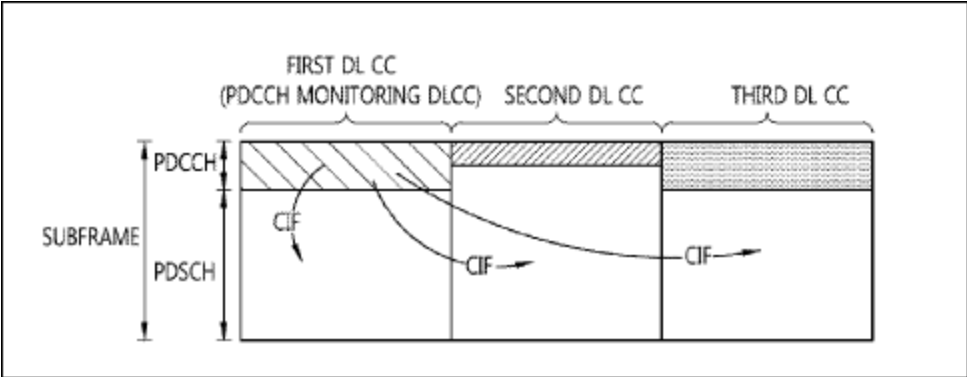
Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
6	The MTC terminal of claim 5, wherein: at least one of the plurality of pieces of start offset information is applied according to a corresponding coverage level of the MTC terminal.	At least under Pegasus’s apparent infringement theory, You discloses at least one of the plurality of pieces of start offset information is applied according to a corresponding coverage level of the MTC terminal. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.,</i> every limitation of claim 5, claim 2, limitation 1[h]; You at You at [0190], [0198], [0033], [0160] [0189], [0197], [0203]. The BS determines the number of CCEs used in transmission of the PDCCH according to a channel state. For example, a wireless device having a good DL channel state can use one CCE in PDCCH transmission. A wireless device having a poor DL channel state can use 8 CCEs in PDCCH transmission. You at [0090] As described above one time, a next-generation system considers a method of repetitively transmitting (i.e., bundling transmission) a channel such as a PDSCH, a PDCCH, or the like when cell coverage is extended for the MTC device. In this case, an existing channel such as a PCFICH, a PHICH, or the like may not be transmitted for the MTC device. As such, in order for the MTC device not to necessarily receive the PCFICH, the number of OFDM symbols on which the PDCCH is transmitted may be always set to 3 symbols.

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		Alternatively, information regarding the number of OFDM symbols on which the PDCCH is transmitted may be reported to the MTC device through a PSS/SSS or through a PBCH, instead of the existing PCFICH. In addition, also in case of an MTC device which is not located in a cell coverage extension region, it is assumed that an entire system bandwidth to be assumed for data buffering is used to store resource elements across an entire band on first three OFDM symbols in a normal CP case, and is used to store resource elements for 6 PRBs or a reduced data bandwidth on the remaining OFDM symbols. In addition, when the entire band is assumed for first several OFDM symbols, information regarding the number of OFDM symbols may be signaled through a higher layer, or may be reported to the MTC device through a PBCH or the like, or may be predetermined in association with a cell ID so as to be known to the MTC device without additional signaling. In addition, when the MTC device performs a cell search, it may be unconditionally assumed that the number of OFDM symbols on which the entire system band is used is 0. Therefore, the MTC device may perform buffering only on data of a resource element for 6 PRBs. You at [0175] 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

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
7[pre]	A base station for configuring a resource of response information of downlink data for a Machine Type Communication (MTC) terminal, the base station comprising:	To the extent the preamble is limiting, at least under Pegasus’s apparent infringement theory, You discloses A base station for configuring a resource of response information of downlink data for a Machine Type Communication (MTC) terminal. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.</i>, limitation 1[pre] and 3[pre]; You at Abstract, Paras. [0085], [0155], [0173]; FIG. 11A. The uplink control information transmitted on the PUCCH includes an HARQ (hybrid automatic repeat request), an ACK (acknowledgement)/NACK (non-acknowledgement), a CQI (channel quality indicator) indicating a downlink channel state, and an SR (scheduling request) that is an uplink radio resource allocation request. You at [0112] Hereinafter, a downlink means communication from the base station 20 to the terminal 10 and an uplink means communication from the terminal 10 to the base station 20. In the downlink, a transmitter may be a part of the base station 20 and a receiver may be a part of the terminal 10. In the uplink, the transmitter may be a part of the terminal 10 and the receiver may be a part of the base station 20. You at [0051] 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

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
7[a]	a transmitting unit configured to transmit structural information, downlink control information for scheduling the downlink data, and the downlink data,	At least under Pegasus's apparent infringement theory, You discloses a transmitting unit configured to transmit structural information, downlink control information for scheduling the downlink data, and the downlink data. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.</i>, limitation 1[a], 1[b], 1[c], 3[a], 3[b], 3[c]; You at [0058], [0011], [0083], [0182], [0183], [0131], [0182], [0095], [0196], [0197], [0209], [0132], [0086]. The PDCCH may carry activation of VoIP (voice over internet protocol) and a set of transmission power control commands for individual UEs in some UE group, resource allocation of an higher layer control message such as a random access response transmitted on the PDSCH, system information on DL-SCH, paging information on PCH, resource allocation information of UL-SCH (uplink shared channel), and resource allocation and transmission format of DL-SCH (downlink-shared channel). A plurality of PDCCHs may be sent in the control region, and the terminal may monitor the plurality of PDCCHs. The PDCCH is transmitted on one CCE (control channel element) or aggregation of some consecutive CCEs. The CCE is a logical allocation unit used for providing a coding rate per radio channel's state to the PDCCH. The CCE corresponds to a plurality of resource element groups. Depending on the relationship between the number of CCEs and coding rates provided by the CCEs, the format of the PDCCH and the possible number of PDCCHs are determined. You at [0084] The control information transmitted through the PDCCH is denoted downlink control information (DCI). The DCI may include resource allocation of PDSCH (this is also referred to as DL (downlink) grant), resource allocation of PUSCH (this is also referred to as UL (uplink) grant), a set of transmission power control commands for individual UEs in some UE group, and/or activation of VoIP (Voice over Internet Protocol). You at [0085].

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		Referring to FIG. 9, the base station may configure a PDCCH monitoring DL CC (monitoring CC) set. The PDCCH monitoring DL CC set consists of some of all of the aggregated DL CCs, and if cross-carrier scheduling is configured, the user equipment performs PDCCH monitoring/decoding only on the DL CCs included in the PDCCH monitoring DL CC set. In other words, the base station transmits a PDCCH for PDSCH/PUSCH that is subject to scheduling only through the DL CCs included in the PDCCH monitoring DL CC set. The PDCCH monitoring DL CC set may be configured UE-specifically, UE group-specifically, or cell-specifically. You at [0132]  You at FIG. 9. 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

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
7[b]	wherein the structural information contains at least one piece of i) information on a resource allocated to an uplink control channel for transmitting the response information and ii) start offset information on the resource allocated to the uplink control channel;	At least under Pegasus's apparent infringement theory, You discloses a the structural information contains at least one piece of i) information on a resource allocated to an uplink control channel for transmitting the response information and ii) start offset information on the resource allocated to the uplink control channel. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.,</i> limitation 1[a] and 3[a]; You at [0058], [0011], [0083], [0182], [0183]. The PDCCH may carry activation of VoIP (voice over internet protocol) and a set of transmission power control commands for individual UEs in some UE group, resource allocation of an higher layer control message such as a random access response transmitted on the PDSCH, system information on DL-SCH, paging information on PCH, resource allocation information of UL-SCH (uplink shared channel), and resource allocation and transmission format of DL-SCH (downlink-shared channel). A plurality of PDCCHs may be sent in the control region, and the terminal may monitor the plurality of PDCCHs. The PDCCH is transmitted on one CCE (control channel element) or aggregation of some consecutive CCEs. The CCE is a logical allocation unit used for providing a coding rate per radio channel's state to the PDCCH. The CCE corresponds to a plurality of resource element groups. Depending on the relationship between the number of CCEs and coding rates provided by the CCEs, the format of the PDCCH and the possible number of PDCCHs are determined. You at [0084] 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

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		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[c]	wherein the resource of the uplink control channel for transmitting the response information of the downlink data is determined based on at least one piece of i) information on a resource of a downlink control channel for scheduling the downlink data, ii) the information on the resource allocated to the uplink control channel, and iii) the start offset information of the resource allocated to the uplink control channel;	At least under Pegasus's apparent infringement theory, You discloses the resource of the uplink control channel for transmitting the response information of the downlink data is determined based on at least one piece of i) information on a resource of a downlink control channel for scheduling the downlink data, ii) the information on the resource allocated to the uplink control channel, and iii) the start offset information of the resource allocated to the uplink control channel. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.,</i> limitation 1[e]; You at [0094], [0092], [0110], [0111], [0183]. When the MTC device receives the DCI format 0 or the DCI format 1A on the PDCCH, a length of a resource block assignment field of the DCI format 0 or the DCI format 1A is predetermined according to the following equation. You at [0183] $\lceil \log_2(N_{RB}^{DL}(N_{RB}^{DL}+1)/2) \rceil$ You at Equation 6 In the equation above, N_{RB}^{DL} denotes a downlink bandwidth, and is expressed by the number of RBs. You at [0184] Since N_{RB}^{DL} denotes the number of RBs of a system bandwidth, the number of bits of the DCI format 1A may be set to be equal to the number of bits of the DCI format 0. In

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		order for the number of bits of the DCI format 1A to have the same number of bits of the DCI format 0, zero padding may be performed on a DCI format having a smaller number of bits. As such, in order to make the number of bits of the DCI format 1A equal to the number of bits of the DCI format 0, the number of bits of the DCI format 1A is denoted by N_1A_long when the zero padding is performed on the DCI format 1A, and the number of bits is denoted by N_0_long when the zero padding is performed on the DCI format 0. In this case, N_1_A long and N_0_long have the same value. You at [0185] 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[d]	wherein the start offset information of the resource allocated to the uplink control channel is configured separated from offset information on a terminal different from the MTC terminal;	At least under Pegasus's apparent infringement theory, You discloses the start offset information of the resource allocated to the uplink control channel is configured separated from offset information on a terminal different from the MTC terminal. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.,</i> limitation 1[f]; You at [0053], [0233]. For this, one disclosure of the present specification proposes to differentiate a CSS region for the MTC device from a CSS region for the legacy UE. Herein, the CSS region may be an RE resource, PRB resource, and/or subframe region, or the like of the CSS. Further, one disclosure of the present specification proposes to differentiate the CSS region for the MTC device located in the coverage extension region from a CSS region for other MTC devices.

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		You at [0198] 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[e]	wherein a plurality of pieces of start offset information on the resource allocated to the uplink control channel are provided, and the plurality of pieces of start offset information are transmitted through cell-specific high layer signaling for the MTC terminal to the MTC terminal;	At least under Pegasus's apparent infringement theory, You discloses a plurality of pieces of start offset information on the resource allocated to the uplink control channel are provided, and the plurality of pieces of start offset information are transmitted through cell-specific high layer signaling for the MTC terminal to the MTC terminal. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.,</i> limitation 1[g], You at [0065], [0084], [0059], [0203], [0205]. As described above one time, a next-generation system considers a method of repetitively transmitting (i.e., bundling transmission) a channel such as a PDSCH, a PDCCH, or the like when cell coverage is extended for the MTC device. In this case, an existing channel such as a PCFICH, a PHICH, or the like may not be transmitted for the MTC device. As such, in order for the MTC device not to necessarily receive the PCFICH, the number of OFDM symbols on which the PDCCH is transmitted may be always set to 3 symbols. Alternatively, information regarding the number of OFDM symbols on which the PDCCH is transmitted may be reported to the MTC device through a PSS/SSS or through a PBCH, instead of the existing PCFICH. In addition, also in case of an MTC device which is not located in a cell coverage extension region, it is assumed that an entire system bandwidth to be assumed for data buffering is used to store resource elements across an entire band on first three OFDM symbols in a normal CP case, and is used to store resource elements

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		for 6 PRBs or a reduced data bandwidth on the remaining OFDM symbols. In addition, when the entire band is assumed for first several OFDM symbols, information regarding the number of OFDM symbols may be signaled through a higher layer, or may be reported to the MTC device through a PBCH or the like, or may be predetermined in association with a cell ID so as to be known to the MTC device without additional signaling. In addition, when the MTC device performs a cell search, it may be unconditionally assumed that the number of OFDM symbols on which the entire system band is used is 0. Therefore, the MTC device may perform buffering only on data of a resource element for 6 PRBs. You at [0175] 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[f]	wherein the start offset information of the resource allocated to the uplink control channel is determined based on a coverage level; and	At least under Pegasus's apparent infringement theory, You discloses the start offset information of the resource allocated to the uplink control channel is determined based on a coverage level. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.,</i> limitation 1[h]; You at [0190], [0198], [0033], [0160] [0189], [0197], [0203]. The BS determines the number of CCEs used in transmission of the PDCCH according to a channel state. For example, a wireless device having a good DL channel state can use one CCE in PDCCH transmission. A wireless device having a poor DL channel state can use 8 CCEs in PDCCH transmission.

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		You at [0090] As described above one time, a next-generation system considers a method of repetitively transmitting (i.e., bundling transmission) a channel such as a PDSCH, a PDCCH, or the like when cell coverage is extended for the MTC device. In this case, an existing channel such as a PCFICH, a PHICH, or the like may not be transmitted for the MTC device. As such, in order for the MTC device not to necessarily receive the PCFICH, the number of OFDM symbols on which the PDCCH is transmitted may be always set to 3 symbols. Alternatively, information regarding the number of OFDM symbols on which the PDCCH is transmitted may be reported to the MTC device through a PSS/SSS or through a PBCH, instead of the existing PCFICH. In addition, also in case of an MTC device which is not located in a cell coverage extension region, it is assumed that an entire system bandwidth to be assumed for data buffering is used to store resource elements across an entire band on first three OFDM symbols in a normal CP case, and is used to store resource elements for 6 PRBs or a reduced data bandwidth on the remaining OFDM symbols. In addition, when the entire band is assumed for first several OFDM symbols, information regarding the number of OFDM symbols may be signaled through a higher layer, or may be reported to the MTC device through a PBCH or the like, or may be predetermined in association with a cell ID so as to be known to the MTC device without additional signaling. In addition, when the MTC device performs a cell search, it may be unconditionally assumed that the number of OFDM symbols on which the entire system band is used is 0. Therefore, the MTC device may perform buffering only on data of a resource element for 6 PRBs. You at [0175] 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

Invalidity of U.S. Patent 10,181,931 in view of You		
Claim Language		Exemplary Citations to You
		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[g]	wherein when the response information of the downlink data of the MTC terminal is repeatedly transmitted, the repeated transmission is performed using a same uplink control channel resource in each uplink subframe in which the uplink control channel is repeatedly transmitted.	At least under Pegasus's apparent infringement theory, You discloses when the response information of the downlink data of the MTC terminal is repeatedly transmitted, the repeated transmission is performed using a same uplink control channel resource in each uplink subframe in which the uplink control channel is repeatedly transmitted. For example, You discloses this limitation based on the following exemplary citations: <i>See, e.g.,</i> limitation 1[i]; You at [0090], [0113], [0190], [0198], [0033], [0160], [0189], [0203]. The uplink control information transmitted on the PUCCH includes an HARQ (hybrid automatic repeat request), an ACK (acknowledgement)/NACK (non-acknowledgement), a CQI (channel quality indicator) indicating a downlink channel state, and an SR (scheduling request) that is an uplink radio resource allocation request. You at [0112]. 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.