

EXHIBIT B-4

Summary of Invalidity Analysis of U.S. Patent No. 10,181,931 in view of U.S. Patent No. 11,470,619 to Lee et al. (“Lee”)

U.S. Patent No. 11,470,619 to Lee et al. (“Lee”), was published on October 11, 2022 and claims priority to provisional application No. 61/863,328 filed on August 7, 2013 (“2013 Application”). The 2013 Application supports at least Claim 1 of Lee. 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.*, 2013 Application at [0001], [0002], [0008]-[0011], [0013], [0017], [0026]-[0030], [0034], [0037]-[0039], [0042], [0044]-[0048], [0050], [0057-0061], [0063]-[0066], [0068], [0072]-[0073], [0075]-[0077], [0079-0080], [0082]-[0107]. Defendants reserve the right to identify additional support. Therefore, Lee 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 Lee.

To the extent that Lee 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 Lee 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 Lee and any other prior art references, including but not limited to the other prior art identified in the cover pleading or herein, with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

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

1. Claim 1

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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, Lee discloses a method for transmitting response information of downlink data of a Machine Type Communication (MTC) terminal. For example, Lee discloses this limitation based on the following exemplary citations: Systems, methods, and instrumentalities are disclosed to describe cell selection in low cost machine type communication (LC-MTC) devices. An LTC-MC device may measure a plurality of downlink signals from a plurality of cells. The LTC-MC may detect a channel condition, e.g., by determining a cell with better uplink coverage than a downlink cell. The detection of the channel condition may include measuring an uplink pathloss. The LTC-MC may report the channel condition as a decoupled channel condition, e.g., when an uplink cell is identified with uplink coverage better than the downlink cell. The channel condition may be reported, e.g., via a set of Physical Random Access Channel (PRACH) preambles. The set of PRACH preambles may be predefined. The channel condition may be reported via a higher layer signaling. Lee at Abstract. Systems, methods, and instrumentalities are disclosed to describe cell selection in low cost machine type communication (LC-MTC) devices. An LTC-MC device may measure a plurality of downlink signals from a plurality of cells. The LTC-MC may detect a channel condition, e.g., by determining a cell with better uplink coverage than a downlink cell. The detection of the channel condition may include measuring an uplink pathloss. Lee at 1:35-32. FIG. 6 illustrates an example DL/UL decoupled system 600 in which communication of DL data and associated control may be a one node such as a Macro eNB 602 and communication of UL data and associated control may be with another node 604 such as a small cell (e.g., small cell eNB) or LPN. In this example, PDSCH may be received by a WTRU 606 from one node such as the Macro eNB 602. The WTRU 606 may receive DL grants via a PDCCH or EPDCCH from this node. The WTRU 606 may provide feedback

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		for the DL data such as HARQ ACK/NACK and CQI on a PUCCH to this node. PUSCH may be transmitted by the WTRU 606 to another node 604 such as the small cell (e.g., small cell eNB) or LPN. The WTRU 606 may receive UL grants on a PDCCH or EPDCCH from this other node 604. The WTRU 606 may receive feedback for the UL data such as HARQ ACK/NACK on a PHICH from this other node. PRACH and/or SRS may be transmitted by the WTRU 606 to at least one of the nodes. Lee at 17:12-30. A low cost machine type communication (LC-MTC) device working on an LTE network (e.g., a smart meter located in a basement of a house) may assume higher received Signal to Interference Noise Ratio (SINR) losses (e.g., up to 15 dB) as compared to some other LTE devices. The throughput and/or delay criteria for the LC-MTC may also be relaxed. A device's downlink (DL) and uplink (UL) communications may be with the same cell, e.g., in a DL/UL coupled case. Lee at 10:14-22. In a heterogeneous network environment, the LC-MTC device may be located near a low power node. The LC-MTC device may be downlink/uplink (DL/UL) coupled and/or DL/UL decoupled. FIG. 2 illustrates examples of DL/UL coupled and DL/UL decoupled cases. Lee at 10:23-27. As illustrated in FIG. 2, in a DL/UL coupled case, an LC-MTC device may communicate with a Macro cell 202 for uplink and/or downlink. In a DL/UL decoupled case, an LC-MTC device may communicate with the Macro cell 202 for downlink while transmitting an uplink signal to a low power node (LPN) 204. The uplink signal may be transmitted to the low power node 204, e.g., because of a transmission power difference between the Macro cell 202 and the low power node 204. For example, the Macro cell 202 may transmit signals at 46 dBm, whereas the low power node 204 may transmit signals at 27 dBm. This may result in different downlink coverage. The coverage for uplink may be related to the geographical distance between the WTRU and the base station so that low power node may have better uplink coverage. Lee at 10:28-42.

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		A Physical Broadcast Channel (PBCH), which may be transmitted by an eNB or cell, may carry cell information, such as a Master Information Block (MIB). The PBCH may be provided or transmitted in subframe 0 of each radio frame and may be repeated over, for example, four consecutive radio frames (e.g., 40 ms time period). The PBCH may be transmitted in the first four OFDM symbols of the second timeslot of subframe 0 and may be transmitted on the 72 center subcarriers. The MIB may provide information such as the DL bandwidth of the cell, PHICH information, and at least part of the System Frame Number (SFN), for example, the most significant 8 bits of a 10-bit SFN. Lee at 12:14-25. A WTRU may transmit uplink reference signals, including, for example, a sounding reference signal (SRS) and/or and DM-RS. The SRS may be transmitted in the last SC-FDMA symbol in a set of uplink subframes which may be configured for WTRU-specific SRS subframes, which may be a subset of cell-specific SRS subframes. The SRS may be transmitted by a WTRU periodically in the WTRU-specific SRS subframes within a configured and/or predefined frequency bandwidth. A WTRU may transmit the SRS in an aperiodic manner, for example, if the WTRU may receive an aperiodic SRS (A-SRS) transmission trigger in a DCI. A WTRU may transmit DM-RS for the PUSCH demodulation at the eNB receiver and the location of DM-RS may be in the middle of the SC-FDMA symbols (e.g., fourth SC-FDMA symbol in normal CP) in each slot for the resource blocks for which PUSCH transmission may be granted. Lee at 12:58-13:7. The base station 114 <i>b</i> in FIG. 1A may be a wireless router, Home Node B, Home eNode B, or access point, for example, and may utilize any suitable RAT for facilitating wireless connectivity in a localized area, such as a place of business, a home, a vehicle, a campus, and the like. In one embodiment, the base station 114 <i>b</i> and the WTRUs 102 <i>c</i>, 102 <i>d</i> may implement a radio technology such as IEEE 802.11 to establish a wireless local area network (WLAN). In another embodiment, the base station 114 <i>b</i> and the WTRUs 102 <i>c</i>, 102 <i>d</i> may implement a radio technology such as IEEE 802.15 to establish a wireless personal area network (WPAN). In yet another embodiment, the base station 114 <i>b</i> and the WTRUs 102 <i>c</i>, 102 <i>d</i> may utilize a cellular-based RAT (e.g., WCDMA, CDMA2000, GSM, LTE, LTE-A, etc.) to establish a picocell or femtocell. As

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		shown in FIG. 1A, the base station 114 <i>b</i> may have a direct connection to the Internet 110. Thus, the base station 114 <i>b</i> may not be required to access the Internet 110 via the core network 106/107/109. Lee at 4:20-37. A WTRU may receive user plane and/or control plane data in a PDSCH transmission from an eNB. A WTRU may receive RLC and/or MAC control information, for example, in a PDSCH transmission from an eNB. Lee at 13:31-34. Low cost machine type communication (LC-MTC) devices may enable machines to communicate with each other or with humans. Examples of LC-MTC devices may include smart meters, home automation devices, consumer products, etc. One or more LC-MTC devices may communicate with MTC servers over mobile networks using a Third Generation Partnership Project (3GPP) network. Due to various reasons, compared to regular 3GPP devices (e.g., Long Term Evolution (LTE) devices), LC-MTC devices may suffer higher received Signal to Interference Noise Ratio (SINR) losses. Mechanisms for communicating provided for connecting the regular devices may not be adequate for the LC-MTC devices. Lee at 1:19-31. When using a contention-based RA procedure, the WTRU may initiate the process by transmitting a RA preamble that it may randomly select from a common pool of preambles that may be communicated to the WTRU by the network, e.g., via broadcasted system information. The WTRU may transmit the preamble on a PRACH resource (e.g., a resource in time and frequency) that the WTRU may select from a set of allowed resources that may be communicated to the WTRU by the network, e.g., via broadcasted system information. The cell's configured set of PRACH resources may be or may include this set of allowed PRACH resources. The unit of time for the PRACH resource may be a subframe. The subframe the WTRU may select for the PRACH resource may be the next subframe configured for PRACH in which the WTRU may transmit the PRACH (e.g., based on timing, measurement, and/or other WTRU considerations). The WTRU may select a frequency aspect of the PRACH resource (e.g., the resource blocks (RBs)) in the selected subframe, for example, based on parameters communicated to the WTRU by the network,

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		e.g., via broadcasted system information. A frequency resource may be allowed for PRACH in a subframe for FDD or other cases. It may be defined by a starting (e.g., lowest) RB number that may be provided by the network, e.g., prach-FrequencyOffset, and may have a fixed bandwidth, such as six RBs. Lee at 13:37-62. As shown in FIG. 1E, the RAN 105 may include base stations 180 a, 180 b, 180 c, and an ASN gateway 182, though it will be appreciated that the RAN 105 may include any number of base stations and ASN gateways while remaining consistent with an embodiment. The base stations 180 a, 180 b, 180 c may each be associated with a particular cell (not shown) in the RAN 105 and may each include one or more transceivers for communicating with the WTRUs 102 a, 102 b, 102 c over the air interface 117. In one embodiment, the base stations 180 a, 180 b, 180 c may implement MIMO technology. Thus, the base station 180 a, for example, may use multiple antennas to transmit wireless signals to, and receive wireless signals from, the WTRU 102 a. The base stations 180 a, 180 b, 180 c may also provide mobility management functions, such as handoff triggering, tunnel establishment, radio resource management, traffic classification, quality of service (QoS) policy enforcement, and the like. The ASN gateway 182 may serve as a traffic aggregation point and may be responsible for paging, caching of subscriber profiles, routing to the core network 109, and the like. Lee at 8:66-9: 20. A low cost machine type communication (LC-MTC) device working on an LTE network (e.g., a smart meter located in a basement of a house) may assume higher received Signal to Interference Noise Ratio (SINR) losses (e.g., up to 15 dB) as compared to some other LTE devices. The throughput and/or delay criteria for the LC-MTC may also be relaxed. A device's downlink (DL) and uplink (UL) communications may be with the same cell, e.g., in a DL/UL coupled case. Lee at 10:23-27. The 2013 Application supports these disclosures. <i>See, e.g.</i>, 2013 Application at [0001], [0002], [0027], [0028], [0030], [0044], [0010], [0013], [0038], [0039], [0073], [0011].

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		To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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, Lee 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, Lee discloses this limitation based on the following exemplary citations: A wireless transmit/receive unit (WTRU) may include a processor that comprises processor-executable instructions. When the processor-executable instructions are executed, the WTRU may measure a downlink signal from a downlink cell. The WTRU may detect a channel condition at least in part by determining a cell with better uplink coverage than the downlink cell. The WTRU may communicate uplink data with a first node associated with the determined cell and may communicate downlink data with a second node associated with the downlink cell. Lee at 1:51-60. The term DL communication may be used herein to include certain DL channels and may also include certain (e.g., related) UL channels. DL communication may include (e.g., include use of) one or more DL channels, such as at least one of PDSCH, PDCCH (and/or EPDCCH), PHICH, and PBCH. These one or more DL channels may be transmitted by a cell or eNB and/or monitored and/or received by a WTRU. Such transmission, monitoring, and/or reception may constitute use of the channel. DL communication may include one or more UL channels which may be associated with a DL channel or transmission such as a PUCCH which may be associated with a DL channel, such as a PDSCH. A PUCCH which

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		may be associated with a PDSCH may provide feedback (e.g., ACK/NACK and/or CQI) for or which may correspond to a PDSCH transmission. These one or more UL channels may be transmitted by a WTRU and/or monitored and/or received by a cell or eNB. Such transmission, monitoring, and/or reception may constitute use of the channel. Use of a cell or eNB for DL communication may not preclude use of the cell or eNB for UL communication. WTRU use of a cell or eNB for DL communication may not preclude its use of the cell or eNB for random access for or during which the WTRU may transmit PRACH and/or PUSCH to the cell or eNB. Lee at 20:4-27. A scheduled channel or transmission may be a channel or transmission for which resources may be (or may have been) allocated such as by grant, configuration, request, or other means. A retransmission may be (e.g., considered) a scheduled transmission (e.g., of a PUSCH). One or more of PUSCH, PUCCH, SPS, and PRACH may be (e.g., considered) scheduled, a scheduled channel or a scheduled transmission. A scheduled transmission may be a planned transmission. PRACH which may be requested (e.g., by a node) or autonomously planned or initiated (e.g., by a WTRU) may be (e.g., considered) a scheduled transmission. Scheduled channel and scheduled transmission may be used interchangeably. Scheduled and allocated may be used interchangeably. Lee at 61:12-25. Each of the eNode- Bs 160 a, 160 b, 160 c may be associated with a particular cell (not shown) and may be configured to handle radio resource management decisions, handover decisions, scheduling of users in the uplink and/or downlink, and the like. As shown in FIG. 1D, the eNode- Bs 160 a, 160 b, 160 c may communicate with one another over an X2 interface. Lee at 8:4-10. As shown in FIG. 1E, the RAN 105 may include base stations 180 a, 180 b, 180 c, and an ASN gateway 182, though it will be appreciated that the RAN 105 may include any number of base stations and ASN gateways while remaining consistent with an embodiment. The base stations 180 a, 180 b, 180 c may each be associated with a particular cell (not shown) in the RAN 105 and may each include one or more transceivers for communicating with the WTRUs 102 a, 102 b, 102 c over the air interface 117. In one

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		embodiment, the base stations 180 a, 180 b, 180 c may implement MIMO technology. Thus, the base station 180 a, for example, may use multiple antennas to transmit wireless signals to, and receive wireless signals from, the WTRU 102 a. The base stations 180 a, 180 b, 180 c may also provide mobility management functions, such as handoff triggering, tunnel establishment, radio resource management, traffic classification, quality of service (QoS) policy enforcement, and the like. The ASN gateway 182 may serve as a traffic aggregation point and may be responsible for paging, caching of subscriber profiles, routing to the core network 109, and the like. Lee at 8:66-9: 20. Synchronization signals, which may include a Primary Synchronization Signal (PSS) and/or a Secondary Synchronization Signal (SSS), may be provided or transmitted, for example, by an eNB or cell. A WTRU may use such signals, for example, to acquire time and/or frequency synchronization with an eNB or cell. The PSS and/or SSS may be present in subframes 0 and/or 5 and/or may be present in every radio frame. Transmission may be on 62 subcarriers at the center of a cell's bandwidth, and five subcarriers on each side of the 62 central subcarriers may be reserved or unused. For FDD, PSS transmission may be in the last OFDM symbol and SSS in the second to last (e.g., next to last) OFDM symbol of timeslot 0 (e.g., the first timeslot of subframe 0) and timeslot 10 (e.g., the first timeslot of subframe 5) of each radio frame. For TDD, PSS transmission may be in the third OFDM symbol in subframes 1 and 6 and SSS may be transmitted in the last OFDM symbol in timeslot 1 (e.g., the second timeslot of subframe 0) and timeslot 11 (e.g., the second timeslot of subframe 5) of each radio frame. The synchronization signals may convey information regarding the physical cell identity (cell ID) of the cell. Lee at 11:59-12:13. A Physical Broadcast Channel (PBCH), which may be transmitted by an eNB or cell, may carry cell information, such as a Master Information Block (MIB). The PBCH may be provided or transmitted in subframe 0 of each radio frame and may be repeated over, for example, four consecutive radio frames (e.g., 40 ms time period). The PBCH may be transmitted in the first four OFDM symbols of the second timeslot of subframe 0 and may be transmitted on the 72 center subcarriers. The MIB may provide information such as the

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		DL bandwidth of the cell, PHICH information, and at least part of the System Frame Number (SFN), for example, the most significant 8 bits of a 10-bit SFN. Lee at 12:14-25. Downlink reference signals may include a Cell-specific Reference Signal (CRS), a Channel-State-Information Reference Signal (CSI-RS), and/or a DeModulation Reference Signal (DM-RS), and/or a Positioning Reference Signal (PRS). DL reference signals may be received and/or used by a WTRU. CRS may be used by a WTRU for channel estimation for coherent demodulation of a (e.g., any) downlink physical channel. Certain DL channels may include at least one of PMCH, EPDCCH, and PDSCH when configured with TM7, TM8, TM9, or TM10. A WTRU may use the CRS for channel state information measurements for the reporting of CQI, PMI, and/or RI, for example, if the WTRU is configured with a transmission mode using CRS for PDSCH demodulation. A WTRU may use the CRS for cell-selection and/or mobility-related measurements. The CRS may be received in certain subframes (e.g., any subframe), and multiple antenna ports (e.g., up to four antenna ports) may be supported. A WTRU may use DM-RS for demodulation of certain channels, which may include at least one of EPDCCH and PDSCH configured with TM7, TM8, TM9, or TM10. DM-RS may be used for the demodulation of a channel (e.g., EPDCCH or PDSCH) and may be transmitted in the resource blocks assigned to the channel (e.g., EPDCCH or PDSCH). A WTRU may use CSI-RS, which may be transmitted with a duty cycle, for channel state information measurements, for example, if the WTRU may be configured with a transmission mode, which may use DM-RS for PDSCH demodulation. The CSI-RS may also be used for cell-selection and mobility-related measurements, for example, if a WTRU may be configured with a transmission mode (e.g., TM10). A WTRU may use the PRS for position related measurements. Lee at 12:26-57. A WTRU may receive user plane and/or control plane data in a PDSCH transmission from an eNB. A WTRU may receive RLC and/or MAC control information, for example, in a PDSCH transmission from an eNB. Lee at 13:31-34. The parts of the random access procedure which the WTRU may perform may include one or more of UL transmission of the PRACH preamble (e.g., msg1), monitoring for and/or

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		reception of the DL RAR (e.g., msg2), UL transmission on resources which may have been allocated by the RAR (e.g., msg3) which may include a connection establishment request, and monitoring for and/or reception of a DL contention resolution message (e.g., msg4). Lee at 50:57-64. If the WTRU may transmit a PRACH preamble to an LPN, the WTRU may perform one or more UL transmissions that may be associated with the random access procedure (e.g., msg1 and/or msg3) to or with the LPN. If the WTRU may transmit a PRACH preamble to an LPN, the WTRU may receive or expect to receive one or more DL transmissions which may be associated with the random access procedure (e.g., msg2 and/or msg4) from the Macro or the LPN. Lee at 52:23-32. For a contention-based procedure, contention resolution may occur at 308 (e.g., msg4). A contention resolution message may include information (e.g., C-RNTI) that may indicate the WTRU for which the RAR may have been intended. If the WTRU may receive a contention resolution message indicating that it as the intended WTRU, the WTRU may consider the random access procedure 300 successful. If not, the WTRU may consider the random access procedure 300 a failure and may try again. Lee at 14:41-49. A resource element (RE) may be associated with a subcarrier during an OFDM symbol interval. A resource block (RB) may include twelve consecutive subcarriers during a 0.5 ms timeslot. With seven symbols per timeslot, a RB may include $12 \times 7 = 84$ REs. Lee at 10:59-63. For dynamic scheduling, a subframe may include two consecutive timeslots, which may be referred to as a RB pair. Certain subcarriers on some OFDM symbols may be allocated to carry pilot or reference signals in the time-frequency grid. A number of subcarriers at the edges of the transmission bandwidth may not be transmitted in order to comply with spectral mask criteria. Lee at 10:64-11:3.

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		One or more symbols, e.g., the first 1 to 3 OFDM symbol(s) in each subframe in the DL, may be occupied by one or more of PCFICH, PHICH, and PDCCH according to the overhead of the control channels, and the symbols occupied may be referred to as the DL control region. The PCFICH may be transmitted, for example, in the first OFDM symbol (e.g., symbol 0) in each subframe and/or may indicate the number of OFDM symbols used for the DL control region in the subframe. A WTRU may detect a Control Format Indicator (CFI) from a PCFICH, and the DL control region may be defined in the subframe according to the CFI value. The PCFICH may be skipped if a subframe may be defined as a non-PDSCH supportable subframe. DL symbols that are not part of a DL control region may be referred to as the data or PDSCH region. Enhanced PDCCH (EPDCCH) may be provided and/or used in the PDSCH region. The location of an EPDCCH in that region may be signaled, for example, via higher layer signaling such as Radio Resource Control (RRC) signaling, to a WTRU that may (or may be expected to) monitor, receive, or otherwise use that EPDCCH. The PDCCH and/or EPDCCH may provide control information, resource allocations (e.g., grants) for UL and/or DL transmission, and the like. 11:25-47. DL signals and/or channels may be provided or transmitted by an eNB and/or may be received and/or used by a WTRU. UL signals and/or channels may be provided or transmitted by a WTRU and/or may be received and/or used by an eNB. Lee at 11:47-52.

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TABLE 1

Example TDD LTE Uplink-downlink configurations.

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

Lee at Table 1.

When using a contention-based RA procedure, the WTRU may initiate the process by transmitting a RA preamble that it may randomly select from a common pool of preambles that may be communicated to the WTRU by the network, e.g., via broadcasted system information. The WTRU may transmit the preamble on a PRACH resource (e.g., a resource in time and frequency) that the WTRU may select from a set of allowed resources that may be communicated to the WTRU by the network, e.g., via broadcasted system information. The cell's configured set of PRACH resources may be or may include this set of allowed PRACH resources. The unit of time for the PRACH resource may be a subframe. The subframe the WTRU may select for the PRACH resource may be the next subframe configured for PRACH in which the WTRU may transmit the PRACH (e.g., based on timing, measurement, and/or other WTRU considerations). The WTRU may select a frequency aspect of the PRACH resource (e.g., the resource blocks (RBs)) in the selected subframe, for example, based on parameters communicated to the WTRU by the network,

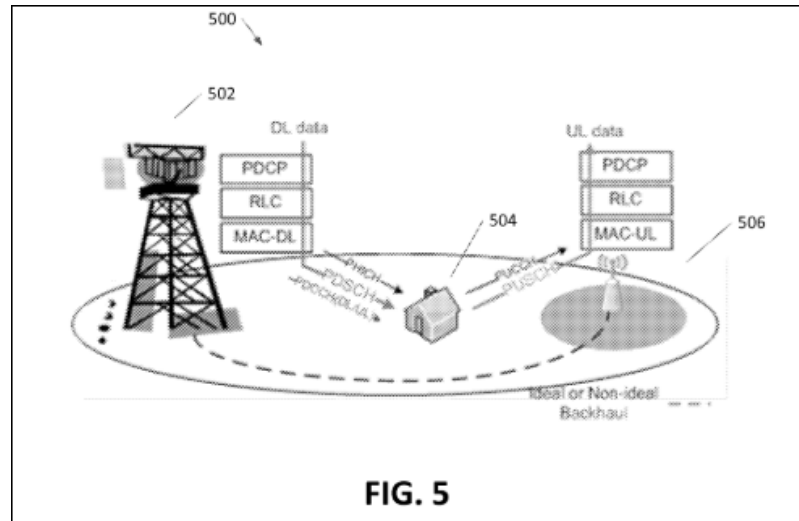
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		e.g., via broadcasted system information. A frequency resource may be allowed for PRACH in a subframe for FDD or other cases. It may be defined by a starting (e.g., lowest) RB number that may be provided by the network, e.g., prach-FrequencyOffset, and may have a fixed bandwidth, such as six RBs. Lee at 13:38-63. In UL transmissions, a WTRU may perform power control based on a number of factors that may include one or more of measured pathloss on the DL carrier, transmit power control (TPC) commands (e.g., from the eNB), the number of resource blocks on which it may transmit, and/or other static or semi-static parameters, among others. The TPC command may be provided in physical layer signaling such as in a DCI format, e.g., in a DCI format that may grant UL resources or one that may be used for TPC commands. A WTRU may modify, increase, and/or decrease its UL transmit power on one or more channels based on a received TPC command. The modification may be at a certain time after the receipt of the TPC command. Lee at 14:50-62. The static or semi-static parameters may be provided by the eNB or other network resources. The parameters and/or the power control formula and/or the power control procedure may be established based on or found in, for example, LTE or LTE-A standards. Lee at 14:63-67. A WTRU may synchronize its reception and/or transmission timing to the received frame timing of a reference cell. The timing of received frame boundaries may vary over time due to WTRU motion and/or other factors (e.g., oscillator drift), and a WTRU may autonomously adjust its timing accordingly. The WTRU may apply a timing advance (TA) to the transmitted signals. For example, the WTRU may start transmission of a given UL subframe some amount of time (e.g., the applied TA) before the start of the corresponding DL subframe. The eNB may provide TA commands to a WTRU (e.g., each WTRU) that may communicate with it in the UL or that may be under its control, and the eNB may provide such commands with the intent that UL transmissions from the WTRUs in any given subframe intended for a certain cell arrive at the certain cell at nominally the same

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		time. The WTRU may also autonomously adjust its uplink timing according to the received downlink frame of the reference cell, and that timing may change. Lee at 5:1-18. Mobility for a WTRU in an idle mode may include cell selection and/or cell reselection. A WTRU may perform cell selection to find a suitable cell for normal camping and connectivity. A WTRU may perform cell selection for initial access to the network, for transitions from connected mode to IDLE mode, and/or for recovery from connectivity failures, such as radio link failures. A WTRU with no prior knowledge of the network or cells may perform initial cell selection, and a WTRU with some previously stored information about the network and cells may perform stored information cell selection. In order for a WTRU to deem a cell as a suitable cell, the RSRP and RSRQ measurements of the cell may (e.g., may need to) meet certain cell selection criteria. Parameters for the selection criteria may be provided by the eNB, e.g., in system information that may be broadcast. If a WTRU may find or detect a cell and the cell may fail to meet the criteria, the WTRU may perform the same check on the next found or detected cell until the criteria is met and a suitable cell is found. Lee at 15:19-37. FIG. 5 illustrates an example DL/UL decoupled system 500 in which communication of DL data and control may be with a node such as a Macro eNB 502. The node 502 may transmit and/or a WTRU 504 may receive the DL channels. The DL channels may include one or more of a physical DL shared channel (PDSCH), a physical DL control channel (PDCCH), an enhanced PDCCH (EPDCCH), and/or a physical hybrid automatic repeat request (ARQ) indicator channel (PHICH). The PDCCH (or EPDCCH) may provide UL and/or DL grants to the WTRU 504. Communication of UL data and control may be with another node 506 such as a small cell (e.g., small cell eNB) or LPN. The WTRU 504 may transmit and/or the node 506 may receive the UL channels. The UL channels may include one or more of a physical UL shared channel (PUSCH), a physical UL control channel (PUCCH), a physical random access channel (PRACH) (not shown in FIG. 5), and/or a sounding reference signal (SRS) (not shown in FIG. 5). PDCCH and EPDCCH may be used interchangeably. Lee at 16:61-17:12.

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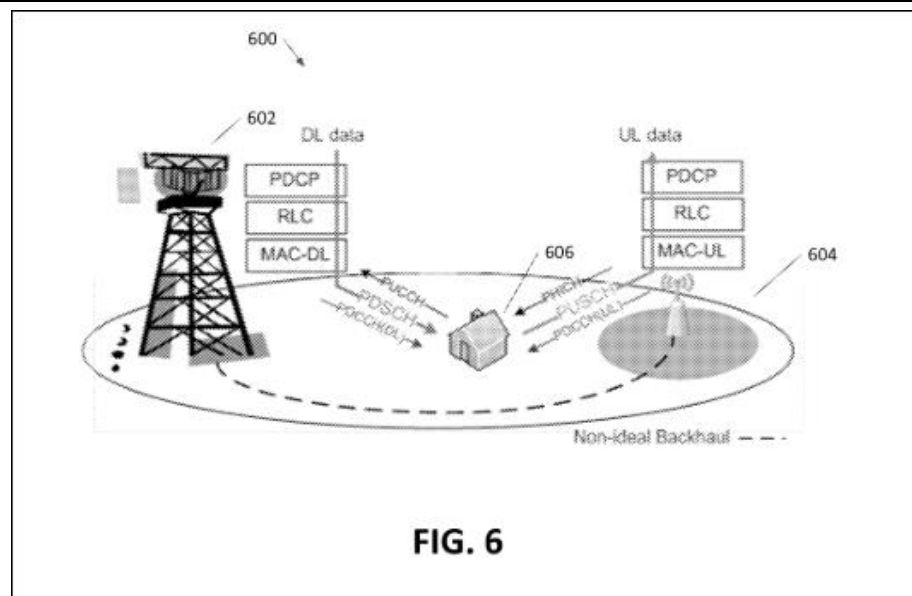
Lee at FIG. 5.

FIG. 6 illustrates an example DL/UL decoupled system 600 in which communication of DL data and associated control may be a one node such as a Macro eNB 602 and communication of UL data and associated control may be with another node 604 such as a small cell (e.g., small cell eNB) or LPN. In this example, PDSCH may be received by a WTRU 606 from one node such as the Macro eNB 602. The WTRU 606 may receive DL grants via a PDCCH or EPDCCH from this node. The WTRU 606 may provide feedback for the DL data such as HARQ ACK/NACK and CQI on a PUCCH to this node. PUSCH may be transmitted by the WTRU 606 to another node 604 such as the small cell (e.g., small cell eNB) or LPN. The WTRU 606 may receive UL grants on a PDCCH or EPDCCH from this other node 604. The WTRU 606 may receive feedback for the UL data such as HARQ ACK/NACK on a PHICH from this other node. PRACH and/or SRS may be transmitted by the WTRU 606 to at least one of the nodes. Lee at 17:13-30.

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Lee at FIG. 6.

WTRU communication in the DL with a node or cell may include receiving DL data and/or control channels from the node or cell, which may include one or more of PDSCH, PDCCH, ePDCCH, which may carry UL and/or DL grants, and/or PHICH. WTRU communication in the UL with a node or cell may include transmitting UL data and/or control channels to the node or cell, which may include one or more of PUSCH and PUCCH. Lee at 19:19-26.

A WTRU may receive, for example, in broadcast signaling such as system information (e.g., in one or more SIBs) of a cell (e.g., the Macro cell), information related to cell selection and/or reselection for UL communication or access to that cell (e.g., the Macro cell). For example, the WTRU may receive at least one of a pathloss threshold (e.g., minimum pathloss threshold) and an offset. A WTRU may, for example, based at least on this information, determine if the cell is suitable for UL communication or access.

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		Determining whether a cell is suitable for UL communication or access may be referred to as performing an UL suitability check. Pathloss may refer to UL or DL pathloss. Lee at 23:65-24:9. A PDCCH (or EPDCCH) may be monitored/received (e.g., by a WTRU) from either cell-A (e.g., Macro) or cell-B (e.g., LPN) according to the DCI format which may be carried by the PDCCH (or EPDCCH). In an example, if a WTRU may attempt to decode a DCI format which may be related to uplink grant (e.g. DCI formats 0 and/or 4), the WTRU may monitor PDCCH (or EPDCCH) based on the configuration of the cell-B (e.g., LPN). The WTRU may monitor PDCCH (or EPDCCH) based on the configuration of the cell-A (e.g., Macro) if the WTRU may attempt to decode a DCI format which may be related to downlink grant. Lee at 27:60-28:4. The configuration of a cell for PDCCH (or EPDCCH) monitoring may include a Physical cell-ID (PCI); CRS configurations, such as the number of CRS port and v-shift; a MBSFN pattern; and/or EPDCCH configurations, which may include one or more of resource allocation, mode of operation (e.g., localized or distributed), and EPDCCH starting symbol. Lee at 28:5-11. The resources may be predefined or provided by the selected DL cell (e.g., the Macro) and the WTRU may transmit the PRACH to the selected DL cell (e.g., the Macro) using at least one of those resources. The WTRU may indicate it has decoupled channel conditions to the selected DL cell, for example, by using these resources. Lee at 35:57-62. The resources to use on the selected UL cell (e.g., the LPN) may be predefined, provided by the selected DL cell (e.g., the Macro), or provided by the selected UL cell (e.g., the LPN), and the WTRU may transmit the PRACH to the selected UL cell (e.g., the LPN) using at least one of those resources. The WTRU may indicate it has decoupled channel conditions to the selected UL cell, for example by using these resources. Lee at 34:63-35:3.

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		One or more of frequency (e.g., UL or DL frequency or carrier frequency) selection, usage, or assignment may be limited to frequencies that a WTRU may use in order to have an appropriate or usable DL-UL separation, e.g., at least the nominal band value that may be based on the DL frequency band. Lee at 36:37-42. A node (e.g., a Macro) may provide (e.g., broadcast) a list of cells or LPNs that may be used for uplink cell selection and may include frequency (or frequency band) information, for example with or in the list. Lee at 38:3-6. To determine the UL and DL subframe configuration, for example, a rule (e.g., a predefined rule) may be applied to define uplink and downlink subframes. For example, at least certain subframe numbers (e.g., one or more of 0, 4, 5, and 9) may be defined as downlink subframes and the others may be considered as uplink subframes. The MBSFN subframe configuration may be used so that the subframes configured as MBSFN subframes may be considered as uplink subframes and the others may be considered as downlink subframes. The uplink and downlink subframes may be configured via higher layer signaling. There may be default downlink (and/or UL) subframes that may be used (e.g., may always be used) as downlink (and/or UL) subframes. For subframes with a default direction, configuration may not be provided or used. For data channels, uplink and downlink subframes may be dynamically configured based on one or more HARQ process aspects (e.g., HARQ process timing). For example, if a WTRU may receive a downlink assignment in subframe n then the n+4 subframe or the subframe for the HARQ ACK/NACK feedback (e.g., subframe n+4) may become an uplink subframe (e.g., automatically). Lee at 41:1-30. The WTRU may avoid transmitting feedback and/or measurements, or may delay such transmission, while monitoring DL control channels or being scheduled for reception (or in subframes in which it may be scheduled for reception). The WTRU may store its feedback and/or measurements, for example, in case the scheduled time for the feedback and/or measurements may overlap with a DL monitoring and/or reception. The WTRU may drop the feedback and/or measurements that may be considered obsolete and may restart the

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		process until the next feedback or measurement reporting occasion. The eNB may request aperiodic feedback and/or measurements (e.g., for certain feedback and/or measurements), for example, in case the WTRU may have skipped the period occasion(s) for the feedback and/or measurements (e.g., the certain feedback and/or measurements). Lee at 41:23-30. Mutually exclusive uplink resources may be configured for two or more cells. For example, a set or subset of uplink resources may be assigned to (or used in) a cell-A (e.g., LPN), and another set or subset of uplink resources that may be non-overlapped with the uplink resources assigned to (or used in) a cell-A may be assigned to (or used in) a cell-B (e.g., Macro). Lee at 42:19-25. The set (or subset) of uplink resources may be defined as a subset of the uplink subframes available. The subframe set {0, 2, 4, 6, 8} may be assigned to (or used in) the cell-A, and another subframe set {1, 3, 5, 7, 9} may be assigned to (or used in) the cell-B. The set (or subset) of uplink resources may be defined as a subset of PRB-pairs in a subframe. The even-numbered PRB-pair may be assigned to (or used in) the cell-A, and the odd-numbered PRB-pair may be assigned to (or used in) the cell-B. Lee at 42:26-34. The assignment (or use) of the resource sets (or subsets) may be WTRU-specific and may apply in decoupled mode. The assignment (or use) of the resource sets (or subsets) may be applicable in scenarios in which the cells (e.g., cell-A and cell-B) may operate in or with the same frequency band. Lee at 42:35-39. The Macro cell may provide a list of LPN configurations to the WTRU. Such a list may include, e.g., for each LPN, one or more of an identity (or index) for the LPN, reference signal (RS) configuration, time and/or frequency offset (e.g., with respect to the time and/or frequency of the Macro cell), RACH parameters, WTRU identity (such as one or more of C-RNTI, RA-RNTI, SI-RNTI, P-RNTI) to use with the (or each) LPN, UL bandwidth, frame timing (possibly as an offset), system frame number (possibly as an offset), and cell identity. An offset may be an offset with respect to the Macro parameter or value. Some of the parameters that may be provided or configured may be as described in

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		solutions or examples herein. The WTRU may or may be configured to use or maintain an identity (such as C-RNTI) for the LPN (e.g., for communication with the LPN), which may be separate from or independent of the identity (e.g., C-RNTI) which may be used by or with the Macro cell, e.g., for DL transmissions or communication that may be between the WTRU and the Macro. The WTRU may determine an identity (e.g., C-RNTI) to be used by (or for communication with) the LPN as a function or an offset value of the identity (e.g., C-RNTI) that may be used by (or for communication with) the Macro cell. Lee at 43:20-42. The list of LPN cells along with their parameters may be provided by system information (e.g., System Information Block (SIB)) and/or PBCH transmission from the Macro cell. Such information may be broadcast by the Macro cell. This may enable UL access to LPN cells by WTRUs that may be unable to obtain UL access to the Macro cell. Lee at 51-56. System information (e.g., one of the SIBs) of the Macro cell may (or may also) indicate a set of triggers and/or measurement states that a WTRU may use to determine that (or whether) it should attempt decoupled operation. Lee at 43:57-60. A WTRU may be configured by a Macro to take measurements on a LPN (or on multiple LPNs). Such measurements may be enabled by the configuration of appropriate or certain reference signals (RS). For example, a Macro cell may indicate to a WTRU a CRS configuration. This configuration may include, for example, cell ID, time and/or frequency location, subframe periodicity, subframe offset, RS sequence, RS sequence initialization, v-shift, and/or transmission power. A Macro cell may indicate to a WTRU a CSI-RS configuration that may be used for measurements. This configuration may include, for example, cell ID, RE mapping, subframe periodicity, subframe offset, RS sequence, RS sequence initialization, and/or transmission power. A WTRU may be configured to make measurements on a new RS transmitted by LPNs to enable measurements by WTRUs that may be unable to use legacy cell discovery mechanisms. Such a configuration may include, for example, a coarse (or fine) RE mapping, a subframe periodicity and offset (possibly based on the subframe timing of the Macro cell), an RS sequence, an RS sequence initialization (possibly based on a cell ID), and/or transmission power. For any of the RS

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		configurations, the Macro may also provide timing and/or frequency offset value to enable appropriate measurements by the WTRU. Lee at 48:55-13. The WTRU may transmit a PRACH preamble successfully to a Macro and, for example as part of or included in the RAR which may be transmitted by the Macro, the Macro may provide one or more of the following to the WTRU: a grant (or allocation) for resources for UL transmission (e.g., msg3) which may be resources of another cell such as an LPN, indication that the resources are for another cell, information regarding the other cell such as cell ID or an index or indication which may correspond to a list (e.g., which may provide cell information) which may be provided separately such as via system information which may be broadcast, and an indication to operate in decouple mode. A WTRU may transmit in the UL (e.g., msg3), for example to the LPN and/or on the resources indicated. Lee at 52:45-58. A Macro cell may configure (or provide configuration to) one or more LPNs with the appropriate parameters to receive (e.g., which may enable it or them to receive) a PRACH (e.g., broadcasted PRACH) preamble from a WTRU that may be experiencing poor UL coverage to the Macro cell. Such a configuration may be provided over an X2 interface. The contents of the configuration may include one or more of a set of preambles, time and/or frequency resources, and transmission power characteristics (e.g., transmission power). An LPN (or LPNs) may indicate to a Macro cell what PRACH configurations may be used by WTRUs, for example, for PRACH transmission such as broadcasted PRACH preamble transmission that may be or may be intended to be received by the LPN (or one or more of the LPNs). Lee at 53:65-54:12. A WTRU may receive a timing advance command that may be transmitted by the Macro cell and may understand that the command may be used or may be intended to be used as an adjustment (e.g., offset value) that may be applied to certain transmissions, for example, when the WTRU may maintain separate timing and/or frequency synchronization and/or offsets for UL and DL transmissions (or UL and DL communication or Macro and LPN communication). The WTRU may apply the adjustment to the certain transmissions. The

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		certain transmissions may be, for example, transmissions that may be based on the WTRU's (e.g., current) UL (e.g., UL communication) or LPN synchronization. Lee at 57:35-46. A scheduled channel or transmission may be a channel or transmission for which resources may be (or may have been) allocated such as by grant, configuration, request, or other means. A retransmission may be (e.g., considered) a scheduled transmission (e.g., of a PUSCH). One or more of PUSCH, PUCCH, SPS, and PRACH may be (e.g., considered) scheduled, a scheduled channel or a scheduled transmission. A scheduled transmission may be a planned transmission. PRACH which may be requested (e.g., by a node) or autonomously planned or initiated (e.g., by a WTRU) may be (e.g., considered) a scheduled transmission. Scheduled channel and scheduled transmission may be used interchangeably. Scheduled and allocated may be used interchangeably. Lee at 61:12-25. When an eNB may send a PDSCH to a WTRU, it may expect the WTRU to provide an ACK/NACK feedback, e.g., via PUCCH and/or PUSCH, in response to that PDSCH. The eNB may expect the ACK/NACK in a specific frequency and/or time location that may be relative to the frequency and/or time location of the PDSCH. The eNB may expect to receive a PUCCH in that specific resource location from that specific WTRU. When the eNB may detect or receive a PUCCH, it may know from which WTRU it may be coming. The resource location and/or timing of the PUCCH transmission may (e.g., implicitly) identify at least in part the identity of the WTRU which may (or may have) transmit the PUCCH. In an UL/DL decoupled scenario the LPN may not be aware of Macro eNB PDSCH transmission and may not at least one of expect, detect, and/or look for the corresponding PUCCH. Lee at 61:52-67. A WTRU may bundle the HARQ ACK/NACK bits corresponding to one or more PDSCH, received in a time window, into one or more ACK/NACK bits. The WTRU may receive a configuration of the HARQ bundling time window through higher layer signaling, e.g., from eNB. The HARQ bundling window may be represented with one or more parameters such as window size (possibly represented in number of subframes, e.g., n), window offset

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		(possibly represented in number of subframes, e.g., m), etc. As an example of window size, it may be set to the same value as the number of subframes between two consecutive configured SR resources. As an example for window offset, it may be defined and/or configured as a number of subframes (e.g., m=4) before the subframe including the next SR resource (e.g., the SR resource to be used to carry the corresponding PDSCH HARQ ACK/NACK bits). For example, for a WTRU with n=10 and m=4, the WTRU may receive certain (e.g., all) potential PDSCHs in a window with the size of 10 subframes which may end 4 subframes before the next SR resource. The WTRU may determine the PDSCH HARQ ACK/NACK bits for certain (e.g., all the) received PDSCH data within the window. The WTRU may bundle all those bits into a single ACK/NACK bit, and it may send the bundled ACK/NACK bit using the next SR resource (e.g., to the eNB). Lee at 62:43-67. The WTRU may not send PDSCH HARQ ACK/NACK bits (e.g., via PUCCH) in an (e.g., every) UL subframe. The WTRU may receive a configuration parameter indicating which subframes the WTRU may use to send PDSCH HARQ ACK/NACK bits (e.g., via PUCCH). The WTRU may receive a configuration parameter r that may indicate that every r-th subframe may include PUCCH resources allocated to the WTRU and/or the WTRU may only transmit PDSCH HARQ ACK/NACK bits (e.g., via PUCCH) in those subframes. Different WTRUs may be configured by the same PUCCH resources and/or the same PUCCH indexes. Different WTRUs may be configured to potentially send PDSCH HARQ ACK/NACK bits (e.g., via PUCCH) in different subframes. Lee at 64:4-18. PUSCH-based HARQ ACK/NACK may be provided. A WTRU may transmit a PUSCH carrying the corresponding PDSCH HARQ ACK/NACK bit(s), e.g., when the WTRU receives one or more PDSCH. The WTRU may not transmit a PUCCH including the corresponding PDSCH HARQ ACK/NACK bits, when the WTRU receives one or more PDSCHs. The WTRU may transmit the PDSCH HARQ ACK/NACK bit(s) of one or more PDSCHs in the same PUSCH. For example, the WTRU may transmit the HARQ ACK/NACK bit(s) of each PDSCH received in a certain period of time, e.g., a time window, in the same PUSCH. This window may be referred to as HARQ bundling

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		window. A PUSCH may carry PDSCH HARQ ACK/NACK bit(s) and/or information regarding the corresponding PDSCH(s). For example, the PUSCH may carry indications of the DL HARQ processes of the corresponding PDSCH(s). The PUSCH may carry indications of the frequency and/or time locations the corresponding PDSCH(s) may be received. The WTRU may receive one or more configuration parameters defining the HARQ bundling window, e.g., window size. The size of the bundling window may be a value equal or greater than one. The WTRU may receive one or more UL grants for each window to carry the PDSCH HARQ ACK/NACK bits of the corresponding window. The WTRU may derive the frequency, time location and/or other transmission parameters of the PUSCH carrying the PDSCH HARQ ACK/NACK bits based on one or more DL grants of the PDSCH and/or PDSCH in the corresponding HARQ bundling window. For example, the transmission parameters of the PUSCH carrying the PDSCH HARQ ACK/NACK bits may be derived based on the characteristics of the first (or last) PDSCH grant in the corresponding bundling window. The WTRU may derive the frequency, time location and/or other parameters of the PUSCH carrying the PDSCH HARQ ACK/NACK bits, e.g., based on the boundaries of the bundling window. For example, the related PUSCH may be transmitted in n subframes after the end of the bundling window. Lee at 64:19-56. At Message 2, the WTRU may receive or expect to receive a Random Access Response (RAR) from a network node. The RAR message may indicate uplink grant and the timing advance to be used by the WTRU for transmission of subsequent messages. The RAR message may indicate the identity of the network node for subsequent transmissions. For example, the RAR message may have the identifier of the LPN node and the timing advance that the WTRU may use for uplink for subsequent transmissions. Lee at 71:31-39. The 2013 Application supports these disclosures. <i>See, e.g.</i>, 2013 Application at [0042], [0017], [0038], [0060], [0011], [0080], [0082], [0030], [0065], [0083], [0084], [0085], [0059], [0066], [0092], [0103], [0044], [0059], [0063], [0072], [0075], [0077], [0082], [0089], [0034], [0079], [0104], [0060], [0085], [0083].

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		To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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, Lee discloses receiving downlink control information for scheduling the downlink data. For example, Lee discloses this limitation based on the following exemplary citations: A PUCCH may be associated with both cell-A (e.g., LPN) and cell-B (e.g., Macro) according to the information type (e.g., HARQ-ACK, CSI, SR) that may be carried by the PUCCH. A PUCCH that may include HARQ-ACK that may correspond to a PDSCH may be sent to cell-B (e.g., Macro), while a PUCCH that may include SR may be sent to cell-A (e.g., LPN). In another example, (E)PDCCH may be associated with both cell-A (e.g., LPN) and cell-B (e.g., Macro) according to the DCI format (e.g., DCI format 0 and DCI format 1A). A WTRU may monitor/receive a (E)PDCCH that may include a DCI format such as DCI format 1A from a cell-B (e.g., Macro), for example since it may be related to downlink assignment. A WTRU may monitor/receive (E)PDCCH that may include a DCI format such as DCI format 0 from a cell-A (e.g., LPN), for example, since it may be related to uplink grant. Lee at 24:14-29. One or more symbols, e.g., the first 1 to 3 OFDM symbol(s) in each subframe in the DL, may be occupied by one or more of PCFICH, PHICH, and PDCCH according to the overhead of the control channels, and the symbols occupied may be referred to as the DL control region. The PCFICH may be transmitted, for example, in the first OFDM symbol (e.g., symbol 0) in each subframe and/or may indicate the number of OFDM symbols used for the DL control region in the subframe. A WTRU may detect a Control Format Indicator

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		(CFI) from a PCFICH, and the DL control region may be defined in the subframe according to the CFI value. The PCFICH may be skipped if a subframe may be defined as a non-PDSCH supportable subframe. DL symbols that are not part of a DL control region may be referred to as the data or PDSCH region. Enhanced PDCCH (EPDCCH) may be provided and/or used in the PDSCH region. The location of an EPDCCH in that region may be signaled, for example, via higher layer signaling such as Radio Resource Control (RRC) signaling, to a WTRU that may (or may be expected to) monitor, receive, or otherwise use that EPDCCH. The PDCCH and/or EPDCCH may provide control information, resource allocations (e.g., grants) for UL and/or DL transmission, and the like. Lee at 11:25-47. DL signals and/or channels may be provided or transmitted by an eNB and/or may be received and/or used by a WTRU. UL signals and/or channels may be provided or transmitted by a WTRU and/or may be received and/or used by an eNB. Lee at 11:48-52. A WTRU may receive user plane and/or control plane data in a PDSCH transmission from an eNB. A WTRU may receive RLC and/or MAC control information, for example, in a PDSCH transmission from an eNB. Lee at 13:31-34. The parts of the random access procedure which the WTRU may perform may include one or more of UL transmission of the PRACH preamble (e.g., msg1), monitoring for and/or reception of the DL RAR (e.g., msg2), UL transmission on resources which may have been allocated by the RAR (e.g., msg3) which may include a connection establishment request, and monitoring for and/or reception of a DL contention resolution message (e.g., msg4). Lee at 50:57-64. If the WTRU may transmit a PRACH preamble to an LPN, the WTRU may perform one or more UL transmissions that may be associated with the random access procedure (e.g., msg1 and/or msg3) to or with the LPN. If the WTRU may transmit a PRACH preamble to an LPN, the WTRU may receive or expect to receive one or more DL transmissions which

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		may be associated with the random access procedure (e.g., msg2 and/or msg4) from the Macro or the LPN. Lee at 52:23-32. For a contention-based procedure, contention resolution may occur at 308 (e.g., msg4). A contention resolution message may include information (e.g., C-RNTI) that may indicate the WTRU for which the RAR may have been intended. If the WTRU may receive a contention resolution message indicating that it as the intended WTRU, the WTRU may consider the random access procedure 300 successful. If not, the WTRU may consider the random access procedure 300 a failure and may try again. Lee at 14:41-49. Each of the eNode- Bs 160 a, 160 b, 160 c may be associated with a particular cell (not shown) and may be configured to handle radio resource management decisions, handover decisions, scheduling of users in the uplink and/or downlink, and the like. As shown in FIG. 1D, the eNode- Bs 160 a, 160 b, 160 c may communicate with one another over an X2 interface. Lee at 8:4-10. For dynamic scheduling, a subframe may include two consecutive timeslots, which may be referred to as a RB pair. Certain subcarriers on some OFDM symbols may be allocated to carry pilot or reference signals in the time-frequency grid. A number of subcarriers at the edges of the transmission bandwidth may not be transmitted in order to comply with spectral mask criteria. Lee at 10:64-11:3. Downlink channels that may be provided and/or used may include Physical Downlink Shared Channel (PDSCH) and/or downlink control channels, which may include one or more of Physical Control Format Indicator Channel (PCFICH), Physical Hybrid-ARQ Indicator Channel (PHICH), Physical Downlink Control Channel (PDCCH), and/or Enhanced PDCCH (EPDCCH). Lee at 11:18-24. One or more symbols, e.g., the first 1 to 3 OFDM symbol(s) in each subframe in the DL, may be occupied by one or more of PCFICH, PHICH, and PDCCH according to the overhead of the control channels, and the symbols occupied may be referred to as the DL

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		control region. The PCFICH may be transmitted, for example, in the first OFDM symbol (e.g., symbol 0) in each subframe and/or may indicate the number of OFDM symbols used for the DL control region in the subframe. A WTRU may detect a Control Format Indicator (CFI) from a PCFICH, and the DL control region may be defined in the subframe according to the CFI value. The PCFICH may be skipped if a subframe may be defined as a non-PDSCH supportable subframe. DL symbols that are not part of a DL control region may be referred to as the data or PDSCH region. Enhanced PDCCH (EPDCCH) may be provided and/or used in the PDSCH region. The location of an EPDCCH in that region may be signaled, for example, via higher layer signaling such as Radio Resource Control (RRC) signaling, to a WTRU that may (or may be expected to) monitor, receive, or otherwise use that EPDCCH. The PDCCH and/or EPDCCH may provide control information, resource allocations (e.g., grants) for UL and/or DL transmission, and the like. Lee at 11:25-47. DL signals and/or channels may be provided or transmitted by an eNB and/or may be received and/or used by a WTRU. UL signals and/or channels may be provided or transmitted by a WTRU and/or may be received and/or used by an eNB. Lee at 11:47-52. In UL transmissions, a WTRU may perform power control based on a number of factors that may include one or more of measured pathloss on the DL carrier, transmit power control (TPC) commands (e.g., from the eNB), the number of resource blocks on which it may transmit, and/or other static or semi-static parameters, among others. The TPC command may be provided in physical layer signaling such as in a DCI format, e.g., in a DCI format that may grant UL resources or one that may be used for TPC commands. A WTRU may modify, increase, and/or decrease its UL transmit power on one or more channels based on a received TPC command. The modification may be at a certain time after the receipt of the TPC command. Lee at 14:50-62. The static or semi-static parameters may be provided by the eNB or other network resources. The parameters and/or the power control formula and/or the power control

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		procedure may be established based on or found in, for example, LTE or LTE-A standards. Lee at 14:63-67. FIG. 5 illustrates an example DL/UL decoupled system 500 in which communication of DL data and control may be with a node such as a Macro eNB 502. The node 502 may transmit and/or a WTRU 504 may receive the DL channels. The DL channels may include one or more of a physical DL shared channel (PDSCH), a physical DL control channel (PDCCH), an enhanced PDCCH (EPDCCH), and/or a physical hybrid automatic repeat request (ARQ) indicator channel (PHICH). The PDCCH (or EPDCCH) may provide UL and/or DL grants to the WTRU 504. Communication of UL data and control may be with another node 506 such as a small cell (e.g., small cell eNB) or LPN. The WTRU 504 may transmit and/or the node 506 may receive the UL channels. The UL channels may include one or more of a physical UL shared channel (PUSCH), a physical UL control channel (PUCCH), a physical random access channel (PRACH) (not shown in FIG. 5), and/or a sounding reference signal (SRS) (not shown in FIG. 5). PDCCH and EPDCCH may be used interchangeably. Lee at 16:61-17:12. FIG. 5

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Lee at FIG. 5.

FIG. 6 illustrates an example DL/UL decoupled system 600 in which communication of DL data and associated control may be a one node such as a Macro eNB 602 and communication of UL data and associated control may be with another node 604 such as a small cell (e.g., small cell eNB) or LPN. In this example, PDSCH may be received by a WTRU 606 from one node such as the Macro eNB 602. The WTRU 606 may receive DL grants via a PDCCH or EPDCCH from this node. The WTRU 606 may provide feedback for the DL data such as HARQ ACK/NACK and CQI on a PUCCH to this node. PUSCH may be transmitted by the WTRU 606 to another node 604 such as the small cell (e.g., small cell eNB) or LPN. The WTRU 606 may receive UL grants on a PDCCH or EPDCCH from this other node 604. The WTRU 606 may receive feedback for the UL data such as HARQ ACK/NACK on a PHICH from this other node. PRACH and/or SRS may be transmitted by the WTRU 606 to at least one of the nodes. Lee at 17:13-30.

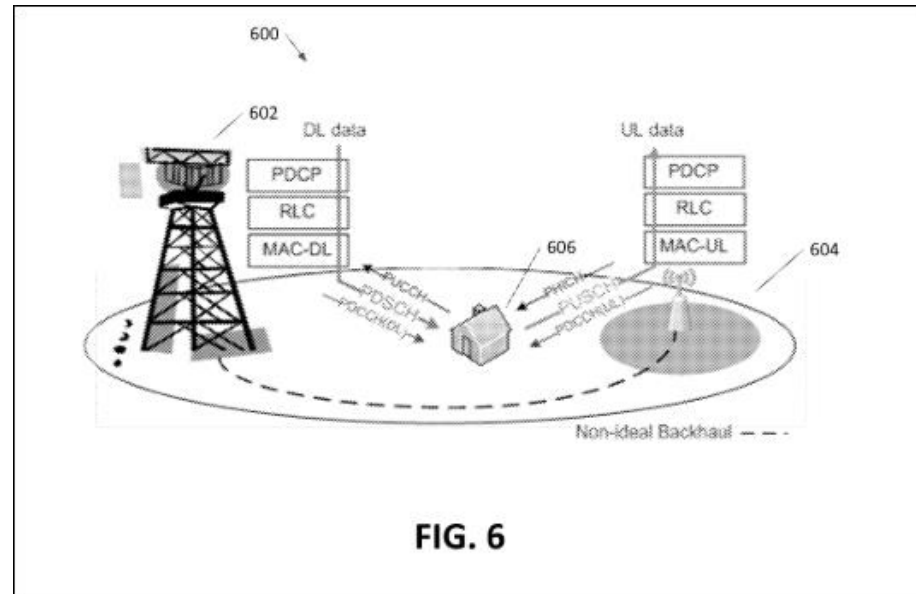


FIG. 6

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		Lee at FIG. 6. WTRU communication in the DL with a node or cell may include receiving DL data and/or control channels from the node or cell, which may include one or more of PDSCH, PDCCH, ePDCCH, which may carry UL and/or DL grants, and/or PHICH. WTRU communication in the UL with a node or cell may include transmitting UL data and/or control channels to the node or cell, which may include one or more of PUSCH and PUCCH. Lee at 19:19-26. The term DL communication may be used herein to include certain DL channels and may also include certain (e.g., related) UL channels. DL communication may include (e.g., include use of) one or more DL channels, such as at least one of PDSCH, PDCCH (and/or EPDCCH), PHICH, and PBCH. These one or more DL channels may be transmitted by a cell or eNB and/or monitored and/or received by a WTRU. Such transmission, monitoring, and/or reception may constitute use of the channel. DL communication may include one or more UL channels which may be associated with a DL channel or transmission such as a PUCCH which may be associated with a DL channel, such as a PDSCH. A PUCCH which may be associated with a PDSCH may provide feedback (e.g., ACK/NACK and/or CQI) for or which may correspond to a PDSCH transmission. These one or more UL channels may be transmitted by a WTRU and/or monitored and/or received by a cell or eNB. Such transmission, monitoring, and/or reception may constitute use of the channel. Use of a cell or eNB for DL communication may not preclude use of the cell or eNB for UL communication. WTRU use of a cell or eNB for DL communication may not preclude its use of the cell or eNB for random access for or during which the WTRU may transmit PRACH and/or PUSCH to the cell or eNB. Lee at 20:4-27. A WTRU may receive and/or monitor (E)PDCCH associated with PDSCH (e.g., DL assignment) from the first cell. A WTRU may assume that the PDSCH, (E)PDCCH associated with the PDSCH, and/or HARQ-ACK corresponding to the PDSCH are from/to a quasi-collocated transmission point. The same time/frequency offset may be used for demodulation (e.g., of one or more of these channels). For HARQ-ACK transmission, the

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		timing advance may be applied (e.g., by the WTRU) according to a downlink timing reference, which may be of (or determined from the DL timing of) the first cell. Lee at 26:7-14. If a WTRU may have or may be scheduled for UCI and UL unicast traffic together (e.g., in the same subframe or TTI) the WTRU may drop the unicast traffic and may (e.g., may only) transmit the UCI. If a WTRU may have or be scheduled for UCI and UL unicast traffic together (e.g., in the same subframe or TTI) a WTRU may consider this as an error case. A WTRU may transmit one of the types of traffic to one of the cells or may not transmit PUSCH (e.g., any PUSCH). If a PUCCH may include a UCI including HARQ-ACK, a WTRU may transmit HARQ-ACK (e.g., may only transmit HARQ-ACK). A WTRU may use at least one of PUCCH or PUSCH for HARQ-ACK transmission, e.g., if a WTRU may have HARQ-ACK to transmit. Lee at 27:33-45. A PDCCH (or EPDCCH) may be monitored/received (e.g., by a WTRU) from either cell-A (e.g., Macro) or cell-B (e.g., LPN) according to the DCI format which may be carried by the PDCCH (or EPDCCH). In an example, if a WTRU may attempt to decode a DCI format which may be related to uplink grant (e.g. DCI formats 0 and/or 4), the WTRU may monitor PDCCH (or EPDCCH) based on the configuration of the cell-B (e.g., LPN). The WTRU may monitor PDCCH (or EPDCCH) based on the configuration of the cell-A (e.g., Macro) if the WTRU may attempt to decode a DCI format which may be related to downlink grant. Lee at 27:60-28:4. A CE level dependent C-RNTI may be used. For example, C-RNTI-1 may be used to indicate CE level-1, C-RNTI-2 may be used to indicate CE-level-2, and so on. There may be a one-to-one mapping between C-RNTI and CE level. The (E)PDCCH search space may be partitioned, and each partition may correspond to a certain CE level. If a WTRU may receive an uplink grant in a certain (E)PDCCH search space partition, the partition may implicitly indicate the CE level for the PUSCH transmission. Two or more (E)PDCCH search spaces may be configured for uplink communication, and each (E)PDCCH search space may correspond to (or may be configured with) a certain CE level. If a WTRU may

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		receive a DCI for uplink communication, the CE level for the PUSCH transmission may be determined based on the search space from which the WTRU received the DCI. The CE level of the associated (E)PDCCH for the uplink grant may be used as the CE level for the PUSCH transmission. Lee at 32:28-44. The CE level for a (E)PDCCH transmission may be determined based on the DCI format, which may be carried in the (E)PDCCH. The CE level for one or more DCI formats that may be associated with the downlink communication (e.g., DCI format 1A/2/2A/2B/2C) may be determined based on the CE level for the cell-B (e.g., Macro). The CE level for one or more DCI formats that may be associated with the uplink communication (e.g., DCI format 0/4) may be determined based on the CE level for the cell-A (e.g., LPN). The CE level for one or more DCI formats that may be associated with the downlink communication may be determined by the cell-B (e.g., Macro). The CE level for one or more DCI formats that may be associated with the uplink communication may be determined by the cell-A (e.g., LPN). The CE level for one or more DCI formats that may be associated with the downlink communication may be determined during a RACH procedure. For example, the CE level which may be used by a WTRU for the PRACH preamble transmission for which the WTRU may receive a RAR successfully may be or may determine the CE level for the DCI formats which may be associated with the downlink (or UL) communication. The CE level for one or more DCI formats which may be associated with the uplink (or DL) communication may be configured via higher layer signaling. Lee at 33:3-27. A scheduled channel or transmission may be a channel or transmission for which resources may be (or may have been) allocated such as by grant, configuration, request, or other means. A retransmission may be (e.g., considered) a scheduled transmission (e.g., of a PUSCH). One or more of PUSCH, PUCCH, SPS, and PRACH may be (e.g., considered) scheduled, a scheduled channel or a scheduled transmission. A scheduled transmission may be a planned transmission. PRACH which may be requested (e.g., by a node) or autonomously planned or initiated (e.g., by a WTRU) may be (e.g., considered) a

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		scheduled transmission. Scheduled channel and scheduled transmission may be used interchangeably. Scheduled and allocated may be used interchangeably. Lee at 61:12-25. The 2013 Application supports these disclosures. <i>See, e.g.</i>, 2013 Application at [0038], [0060], [0042], [0044], [0046], [0102], [0107]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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, Lee discloses receiving the downlink data. For example, Lee discloses this limitation based on the following exemplary citations: A WTRU may bundle the HARQ ACK/NACK bits corresponding to one or more PDSCH, received in a time window, into one or more ACK/NACK bits. The WTRU may receive a configuration of the HARQ bundling time window through higher layer signaling, e.g., from eNB. The HARQ bundling window may be represented with one or more parameters such as window size (possibly represented in number of subframes, e.g., n), window offset (possibly represented in number of subframes, e.g., m), etc. As an example of window size, it may be set to the same value as the number of subframes between two consecutive configured SR resources. As an example for window offset, it may be defined and/or configured as a number of subframes (e.g., m=4) before the subframe including the next SR resource (e.g., the SR resource to be used to carry the corresponding PDSCH HARQ ACK/NACK bits). For example, for a WTRU with n=10 and m=4, the WTRU may receive certain (e.g., all) potential PDSCHs in a window with the size of 10 subframes which may

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		end 4 subframes before the next SR resource. The WTRU may determine the PDSCH HARQ ACK/NACK bits for certain (e.g., all the) received PDSCH data within the window. The WTRU may bundle all those bits into a single ACK/NACK bit, and it may send the bundled ACK/NACK bit using the next SR resource (e.g., to the eNB). Lee at 62:43-67. The channel condition may be reported as a partially decoupled channel condition when control (e.g., a Physical Downlink Control Channel (PDCCH)) associated with the uplink data is used in the first node. The channel condition may be reported as a fully decoupled channel condition when control associated with the uplink data is used in the second node. The uplink data may include a Physical Uplink Shared Channel (PUSCH), a Physical Hybrid Automatic Repeat Request Indicator Channel (PHICH), and/or a PDCCH. The downlink data may include a Physical Downlink Shared Channel (PDSCH), a Physical Uplink Control Channel (PUCCH), and/or a PDCCH. A low power node (LPN) may be discovered using a LPN list and/or a PRACH preamble. Hybrid automatic repeat request (HARQ) feedback may be sent to an LPN. The channel condition may be reported using a higher layer signaling. Lee at 1:61-2:9. The transmit/receive element 122 may be configured to transmit signals to, or receive signals from, a base station (e.g., the base station 114 a) over the air interface 115/116/117. For example, in one embodiment, the transmit/receive element 122 may be an antenna configured to transmit and/or receive RF signals. In another embodiment, the transmit/receive element 122 may be an emitter/detector configured to transmit and/or receive IR, UV, or visible light signals, for example. In yet another embodiment, the transmit/receive element 122 may be configured to transmit and receive both RF and light signals. It will be appreciated that the transmit/receive element 122 may be configured to transmit and/or receive any combination of wireless signals. Lee at 5:50-62. One or more symbols, e.g., the first 1 to 3 OFDM symbol(s) in each subframe in the DL, may be occupied by one or more of PCFICH, PHICH, and PDCCH according to the overhead of the control channels, and the symbols occupied may be referred to as the DL

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		control region. The PCFICH may be transmitted, for example, in the first OFDM symbol (e.g., symbol 0) in each subframe and/or may indicate the number of OFDM symbols used for the DL control region in the subframe. A WTRU may detect a Control Format Indicator (CFI) from a PCFICH, and the DL control region may be defined in the subframe according to the CFI value. The PCFICH may be skipped if a subframe may be defined as a non-PDSCH supportable subframe. DL symbols that are not part of a DL control region may be referred to as the data or PDSCH region. Enhanced PDCCH (EPDCCH) may be provided and/or used in the PDSCH region. The location of an EPDCCH in that region may be signaled, for example, via higher layer signaling such as Radio Resource Control (RRC) signaling, to a WTRU that may (or may be expected to) monitor, receive, or otherwise use that EPDCCH. The PDCCH and/or EPDCCH may provide control information, resource allocations (e.g., grants) for UL and/or DL transmission, and the like. Lee at 11:25-47. DL signals and/or channels may be provided or transmitted by an eNB and/or may be received and/or used by a WTRU. UL signals and/or channels may be provided or transmitted by a WTRU and/or may be received and/or used by an eNB. Lee at 11:48-52. The parts of the random access procedure which the WTRU may perform may include one or more of UL transmission of the PRACH preamble (e.g., msg1), monitoring for and/or reception of the DL RAR (e.g., msg2), UL transmission on resources which may have been allocated by the RAR (e.g., msg3) which may include a connection establishment request, and monitoring for and/or reception of a DL contention resolution message (e.g., msg4). Lee at 50:57-64. If the WTRU may transmit a PRACH preamble to an LPN, the WTRU may perform one or more UL transmissions that may be associated with the random access procedure (e.g., msg1 and/or msg3) to or with the LPN. If the WTRU may transmit a PRACH preamble to an LPN, the WTRU may receive or expect to receive one or more DL transmissions which may be associated with the random access procedure (e.g., msg2 and/or msg4) from the Macro or the LPN. Lee at 52:23-32.

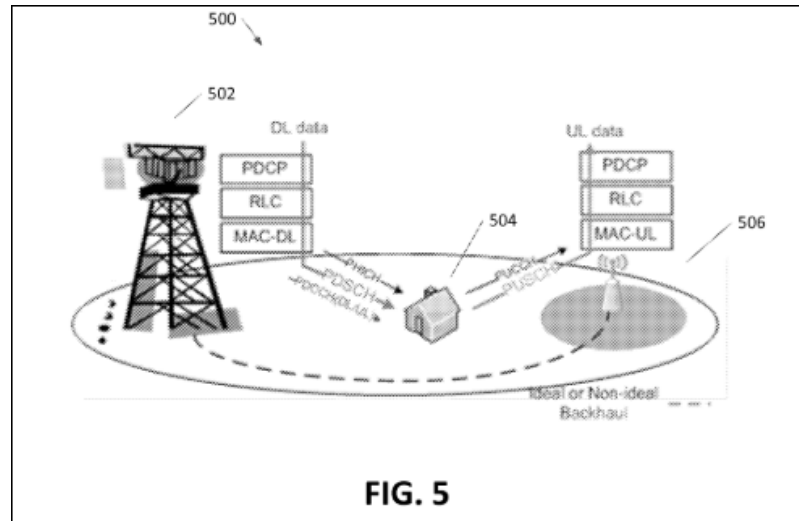
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		For a contention-based procedure, contention resolution may occur at 308 (e.g., msg4). A contention resolution message may include information (e.g., C-RNTI) that may indicate the WTRU for which the RAR may have been intended. If the WTRU may receive a contention resolution message indicating that it as the intended WTRU, the WTRU may consider the random access procedure 300 successful. If not, the WTRU may consider the random access procedure 300 a failure and may try again. Lee at 14:41-49. Downlink channels that may be provided and/or used may include Physical Downlink Shared Channel (PDSCH) and/or downlink control channels, which may include one or more of Physical Control Format Indicator Channel (PCFICH), Physical Hybrid-ARQ Indicator Channel (PHICH), Physical Downlink Control Channel (PDCCH), and/or Enhanced PDCCH (EPDCCH). Lee at 11:18-24. One or more symbols, e.g., the first 1 to 3 OFDM symbol(s) in each subframe in the DL, may be occupied by one or more of PCFICH, PHICH, and PDCCH according to the overhead of the control channels, and the symbols occupied may be referred to as the DL control region. The PCFICH may be transmitted, for example, in the first OFDM symbol (e.g., symbol 0) in each subframe and/or may indicate the number of OFDM symbols used for the DL control region in the subframe. A WTRU may detect a Control Format Indicator (CFI) from a PCFICH, and the DL control region may be defined in the subframe according to the CFI value. The PCFICH may be skipped if a subframe may be defined as a non-PDSCH supportable subframe. DL symbols that are not part of a DL control region may be referred to as the data or PDSCH region. Enhanced PDCCH (EPDCCH) may be provided and/or used in the PDSCH region. The location of an EPDCCH in that region may be signaled, for example, via higher layer signaling such as Radio Resource Control (RRC) signaling, to a WTRU that may (or may be expected to) monitor, receive, or otherwise use that EPDCCH. The PDCCH and/or EPDCCH may provide control information, resource allocations (e.g., grants) for UL and/or DL transmission, and the like. Lee at 11:25-47.

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		DL signals and/or channels may be provided or transmitted by an eNB and/or may be received and/or used by a WTRU. UL signals and/or channels may be provided or transmitted by a WTRU and/or may be received and/or used by an eNB. Lee at 11:47-52. A WTRU may receive user plane and/or control plane data in a PDSCH transmission from an eNB. A WTRU may receive RLC and/or MAC control information, for example, in a PDSCH transmission from an eNB. Lee at 13:31-34. FIG. 5 illustrates an example DL/UL decoupled system 500 in which communication of DL data and control may be with a node such as a Macro eNB 502. The node 502 may transmit and/or a WTRU 504 may receive the DL channels. The DL channels may include one or more of a physical DL shared channel (PDSCH), a physical DL control channel (PDCCH), an enhanced PDCCH (EPDCCH), and/or a physical hybrid automatic repeat request (ARQ) indicator channel (PHICH). The PDCCH (or EPDCCH) may provide UL and/or DL grants to the WTRU 504. Communication of UL data and control may be with another node 506 such as a small cell (e.g., small cell eNB) or LPN. The WTRU 504 may transmit and/or the node 506 may receive the UL channels. The UL channels may include one or more of a physical UL shared channel (PUSCH), a physical UL control channel (PUCCH), a physical random access channel (PRACH) (not shown in FIG. 5), and/or a sounding reference signal (SRS) (not shown in FIG. 5). PDCCH and EPDCCH may be used interchangeably. Lee at 16:61-17:12.

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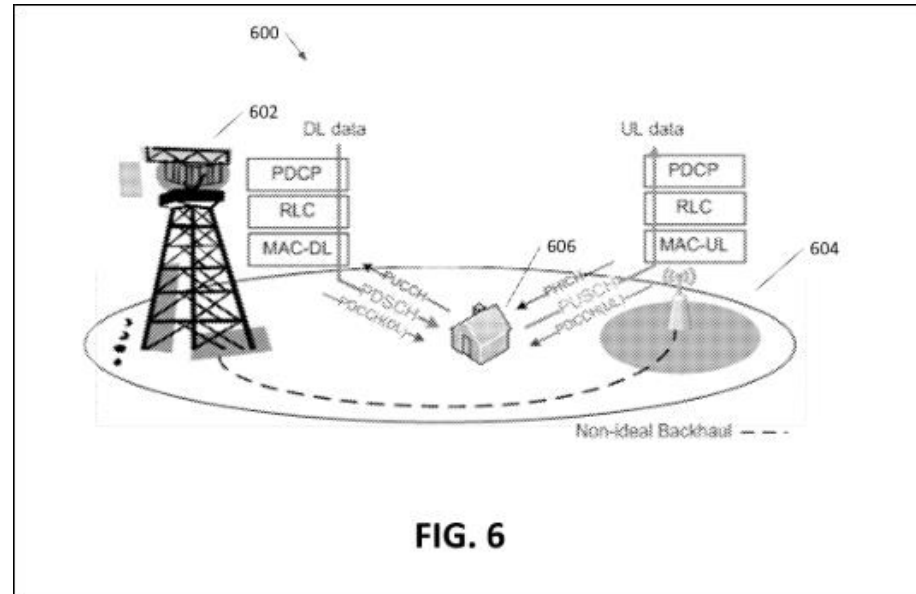
Lee at FIG. 5.

FIG. 6 illustrates an example DL/UL decoupled system 600 in which communication of DL data and associated control may be a one node such as a Macro eNB 602 and communication of UL data and associated control may be with another node 604 such as a small cell (e.g., small cell eNB) or LPN. In this example, PDSCH may be received by a WTRU 606 from one node such as the Macro eNB 602. The WTRU 606 may receive DL grants via a PDCCH or EPDCCH from this node. The WTRU 606 may provide feedback for the DL data such as HARQ ACK/NACK and CQI on a PUCCH to this node. PUSCH may be transmitted by the WTRU 606 to another node 604 such as the small cell (e.g., small cell eNB) or LPN. The WTRU 606 may receive UL grants on a PDCCH or EPDCCH from this other node 604. The WTRU 606 may receive feedback for the UL data such as HARQ ACK/NACK on a PHICH from this other node. PRACH and/or SRS may be transmitted by the WTRU 606 to at least one of the nodes. Lee at 17:13-30.

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Lee at FIG. 6.

DL system signals, such one or more of primary synchronization signal (PSS), secondary synchronization signal (SSS), physical broadcast channel (PBCH), and cell specific reference signals (CRS) may be received by the WTRU from one or both of the nodes (e.g., eNBs). PDSCH carrying system signals, such as paging and/or system information (e.g., in one or more system information blocks (SIBs)) may be received by the WTRU from one or both of the nodes (e.g., eNBs). Lee at 17:31-39.

WTRU communication in the DL with a node or cell may include receiving DL data and/or control channels from the node or cell, which may include one or more of PDSCH, PDCCH, ePDCCH, which may carry UL and/or DL grants, and/or PHICH. WTRU communication in the UL with a node or cell may include transmitting UL data and/or control channels to the node or cell, which may include one or more of PUSCH and PUCCH. Lee at 19:19-26.

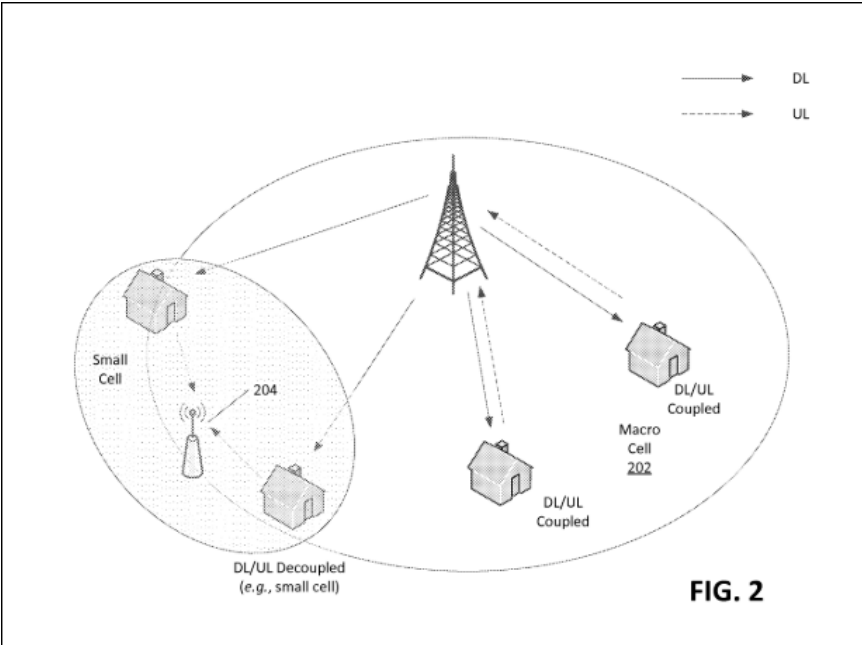
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		The term DL communication may be used herein to include certain DL channels and may also include certain (e.g., related) UL channels. DL communication may include (e.g., include use of) one or more DL channels, such as at least one of PDSCH, PDCCH (and/or EPDCCH), PHICH, and PBCH. These one or more DL channels may be transmitted by a cell or eNB and/or monitored and/or received by a WTRU. Such transmission, monitoring, and/or reception may constitute use of the channel. DL communication may include one or more UL channels which may be associated with a DL channel or transmission such as a PUCCH which may be associated with a DL channel, such as a PDSCH. A PUCCH which may be associated with a PDSCH may provide feedback (e.g., ACK/NACK and/or CQI) for or which may correspond to a PDSCH transmission. These one or more UL channels may be transmitted by a WTRU and/or monitored and/or received by a cell or eNB. Such transmission, monitoring, and/or reception may constitute use of the channel. Use of a cell or eNB for DL communication may not preclude use of the cell or eNB for UL communication. WTRU use of a cell or eNB for DL communication may not preclude its use of the cell or eNB for random access for or during which the WTRU may transmit PRACH and/or PUSCH to the cell or eNB. Lee at 20:4-27. Downlink communication (e.g., by a WTRU) may include one or more of receiving PDSCH, monitoring (E)PDCCH associated with the PDSCH, and/or sending HARQ-ACK corresponding to the PDSCH. Receiving downlink signals and sending HARQ-ACK corresponding to the downlink signals may be from and/or to (or based on) the first cell (e.g., Macro). Lee at 26:7-14. A WTRU may receive and/or monitor (E)PDCCH associated with PDSCH (e.g., DL assignment) from the first cell. A WTRU may assume that the PDSCH, (E)PDCCH associated with the PDSCH, and/or HARQ-ACK corresponding to the PDSCH are from/to a quasi-collocated transmission point. The same time/frequency offset may be used for demodulation (e.g., of one or more of these channels). For HARQ-ACK transmission, the timing advance may be applied (e.g., by the WTRU) according to a downlink timing

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		reference, which may be of (or determined from the DL timing of) the first cell. Lee at 26:7-14. A WTRU may be configured by a Macro to take measurements on a LPN (or on multiple LPNs). Such measurements may be enabled by the configuration of appropriate or certain reference signals (RS). For example, a Macro cell may indicate to a WTRU a CRS configuration. This configuration may include, for example, cell ID, time and/or frequency location, subframe periodicity, subframe offset, RS sequence, RS sequence initialization, v-shift, and/or transmission power. A Macro cell may indicate to a WTRU a CSI-RS configuration that may be used for measurements. This configuration may include, for example, cell ID, RE mapping, subframe periodicity, subframe offset, RS sequence, RS sequence initialization, and/or transmission power. A WTRU may be configured to make measurements on a new RS transmitted by LPNs to enable measurements by WTRUs that may be unable to use legacy cell discovery mechanisms. Such a configuration may include, for example, a coarse (or fine) RE mapping, a subframe periodicity and offset (possibly based on the subframe timing of the Macro cell), an RS sequence, an RS sequence initialization (possibly based on a cell ID), and/or transmission power. For any of the RS configurations, the Macro may also provide timing and/or frequency offset value to enable appropriate measurements by the WTRU. Lee at 48:55-13. When an eNB may send a PDSCH to a WTRU, it may expect the WTRU to provide an ACK/NACK feedback, e.g., via PUCCH and/or PUSCH, in response to that PDSCH. The eNB may expect the ACK/NACK in a specific frequency and/or time location that may be relative to the frequency and/or time location of the PDSCH. The eNB may expect to receive a PUCCH in that specific resource location from that specific WTRU. When the eNB may detect or receive a PUCCH, it may know from which WTRU it may be coming. The resource location and/or timing of the PUCCH transmission may (e.g., implicitly) identify at least in part the identity of the WTRU which may (or may have) transmit the PUCCH. In an UL/DL decoupled scenario the LPN may not be aware of Macro eNB PDSCH transmission and may not at least one of expect, detect, and/or look for the corresponding PUCCH. Lee at 61:52-67.

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		A WTRU may be indicated with UL grant information that may be included in a MAC CE received from the network. A WTRU may use the included UL grant to transmit the corresponding HARQ feedback of received MAC CE information on the allocated PUSCH. The WTRU may be allocated with PUSCH for the purpose of HARQ feedback rather than using PUCCH in the decoupled UL/DL scenario. For example, a WTRU may receive MAC CE with UL grant information for each scheduled PDSCH reception of data, which may be used by the WTRU to transmit the corresponding HARQ feedback for reception of PDSCH data on PUSCH. The WTRU may receive reduced UL grant information in the MAC CE. The MAC CE UL grant may include RB assignment and/or modulation and coding scheme. The WTRU may receive the UL resources for HARQ A/N transmission, or may include resources for UL data and/or for other UL control information. Lee at 67:38-54. The 2013 Application supports these disclosures. <i>See, e.g.</i>, 2013 Application at [0092], [0083], [0084], [0085], [0086], [0087], [0089], [0091], [0094], [0097], [0104], [0038], [0044], [0096], [0008], [0039], [0059], [0060]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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, Lee discloses transmitting the response information on the downlink data by using the resource allocated to the uplink control channel. For example, Lee discloses this limitation based on the following exemplary citations:

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		The transmit/receive element 122 may be configured to transmit signals to, or receive signals from, a base station (e.g., the base station 114 a) over the air interface 115/116/117. For example, in one embodiment, the transmit/receive element 122 may be an antenna configured to transmit and/or receive RF signals. In another embodiment, the transmit/receive element 122 may be an emitter/detector configured to transmit and/or receive IR, UV, or visible light signals, for example. In yet another embodiment, the transmit/receive element 122 may be configured to transmit and receive both RF and light signals. It will be appreciated that the transmit/receive element 122 may be configured to transmit and/or receive any combination of wireless signals. Lee at 5:50-62. Uplink channels that may be provided and/or used may include Physical UL Shared Channel (PUSCH) and/or Physical UL Control Channel (PUCCH). Control information, which may be referred to as UL Control Information (UCI), may be transmitted by a WTRU, for example in a subframe, on the PUSCH or the PUCCH, or part may be transmitted on the PUCCH and part on the PUSCH. UCI may include one or more of hybrid automatic repeat request (HARQ) ACK/NACK, scheduling request (SR), and/or Channel State Information (CSI) which may include one or more of Channel Quality Indicator (CQI), Precoding Matrix Indicator (PMI), and Rank Indicator (RI). Resources that may be allocated for PUCCH transmission may be located at or near the edges of the UL band. Lee at 11:4-17. DL signals and/or channels may be provided or transmitted by an eNB and/or may be received and/or used by a WTRU. UL signals and/or channels may be provided or transmitted by a WTRU and/or may be received and/or used by an eNB. Lee at 11:48-52. A WTRU may transmit uplink reference signals, including, for example, a sounding reference signal (SRS) and/or and DM-RS. The SRS may be transmitted in the last SC-FDMA symbol in a set of uplink subframes which may be configured for WTRU-specific SRS subframes, which may be a subset of cell-specific SRS subframes. The SRS may be transmitted by a WTRU periodically in the WTRU-specific SRS subframes within a

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		configured and/or predefined frequency bandwidth. A WTRU may transmit the SRS in an aperiodic manner, for example, if the WTRU may receive an aperiodic SRS (A-SRS) transmission trigger in a DCI. A WTRU may transmit DM-RS for the PUSCH demodulation at the eNB receiver and the location of DM-RS may be in the middle of the SC-FDMA symbols (e.g., fourth SC-FDMA symbol in normal CP) in each slot for the resource blocks for which PUSCH transmission may be granted. Lee at 12:58-13:7. The parts of the random access procedure which the WTRU may perform may include one or more of UL transmission of the PRACH preamble (e.g., msg1), monitoring for and/or reception of the DL RAR (e.g., msg2), UL transmission on resources which may have been allocated by the RAR (e.g., msg3) which may include a connection establishment request, and monitoring for and/or reception of a DL contention resolution message (e.g., msg4). Lee at 50:57-64. If the WTRU may transmit a PRACH preamble to an LPN, the WTRU may perform one or more UL transmissions that may be associated with the random access procedure (e.g., msg1 and/or msg3) to or with the LPN. If the WTRU may transmit a PRACH preamble to an LPN, the WTRU may receive or expect to receive one or more DL transmissions which may be associated with the random access procedure (e.g., msg2 and/or msg4) from the Macro or the LPN. Lee at 52:23-32. For a contention-based procedure, contention resolution may occur at 308 (e.g., msg4). A contention resolution message may include information (e.g., C-RNTI) that may indicate the WTRU for which the RAR may have been intended. If the WTRU may receive a contention resolution message indicating that it as the intended WTRU, the WTRU may consider the random access procedure 300 successful. If not, the WTRU may consider the random access procedure 300 a failure and may try again. Lee at 14:41-49. As illustrated in FIG. 2, in a DL/UL coupled case, an LC-MTC device may communicate with a Macro cell 202 for uplink and/or downlink. In a DL/UL decoupled case, an LC-MTC device may communicate with the Macro cell 202 for downlink while transmitting an

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		uplink signal to a low power node (LPN) 204. The uplink signal may be transmitted to the low power node 204, e.g., because of a transmission power difference between the Macro cell 202 and the low power node 204. For example, the Macro cell 202 may transmit signals at 46 dBm, whereas the low power node 204 may transmit signals at 27 dBm. This may result in different downlink coverage. The coverage for uplink may be related to the geographical distance between the WTRU and the base station so that low power node may have better uplink coverage. Lee at 10:28-42.  Lee at FIG. 2. DL signals and/or channels may be provided or transmitted by an eNB and/or may be received and/or used by a WTRU. UL signals and/or channels may be provided or transmitted by a WTRU and/or may be received and/or used by an eNB. Lee at 11:47-52.

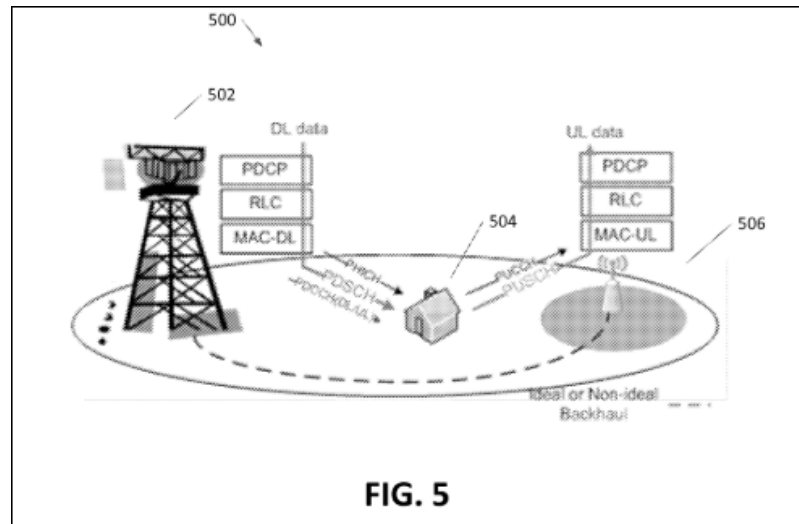
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		A WTRU may transmit uplink reference signals, including, for example, a sounding reference signal (SRS) and/or and DM-RS. The SRS may be transmitted in the last SC-FDMA symbol in a set of uplink subframes which may be configured for WTRU-specific SRS subframes, which may be a subset of cell-specific SRS subframes. The SRS may be transmitted by a WTRU periodically in the WTRU-specific SRS subframes within a configured and/or predefined frequency bandwidth. A WTRU may transmit the SRS in an aperiodic manner, for example, if the WTRU may receive an aperiodic SRS (A-SRS) transmission trigger in a DCI. A WTRU may transmit DM-RS for the PUSCH demodulation at the eNB receiver and the location of DM-RS may be in the middle of the SC-FDMA symbols (e.g., fourth SC-FDMA symbol in normal CP) in each slot for the resource blocks for which PUSCH transmission may be granted. Lee at 12:58-13:7. If the WTRU may receive an RAR, the RAR may include one or more of a grant for resources on which to send an UL transmission at 306 (e.g., msg3), a C-RNTI or TC-RNTI, and/or a timing advance (TA). In response to the RAR, the WTRU may transmit in the UL at 306 (e.g., msg3) on the granted resources and may adjust its UL timing according to the TA. For a contention-free RA procedure, the random access procedure 300 may end at 306. Lee at 14:33-40. FIG. 5 illustrates an example DL/UL decoupled system 500 in which communication of DL data and control may be with a node such as a Macro eNB 502. The node 502 may transmit and/or a WTRU 504 may receive the DL channels. The DL channels may include one or more of a physical DL shared channel (PDSCH), a physical DL control channel (PDCCH), an enhanced PDCCH (EPDCCH), and/or a physical hybrid automatic repeat request (ARQ) indicator channel (PHICH). The PDCCH (or EPDCCH) may provide UL and/or DL grants to the WTRU 504. Communication of UL data and control may be with another node 506 such as a small cell (e.g., small cell eNB) or LPN. The WTRU 504 may transmit and/or the node 506 may receive the UL channels. The UL channels may include one or more of a physical UL shared channel (PUSCH), a physical UL control channel (PUCCH), a physical random access channel (PRACH) (not shown in FIG. 5), and/or a

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sounding reference signal (SRS) (not shown in FIG. 5). PDCCH and EPDCCH may be used interchangeably. Lee at 16:61-17:12.



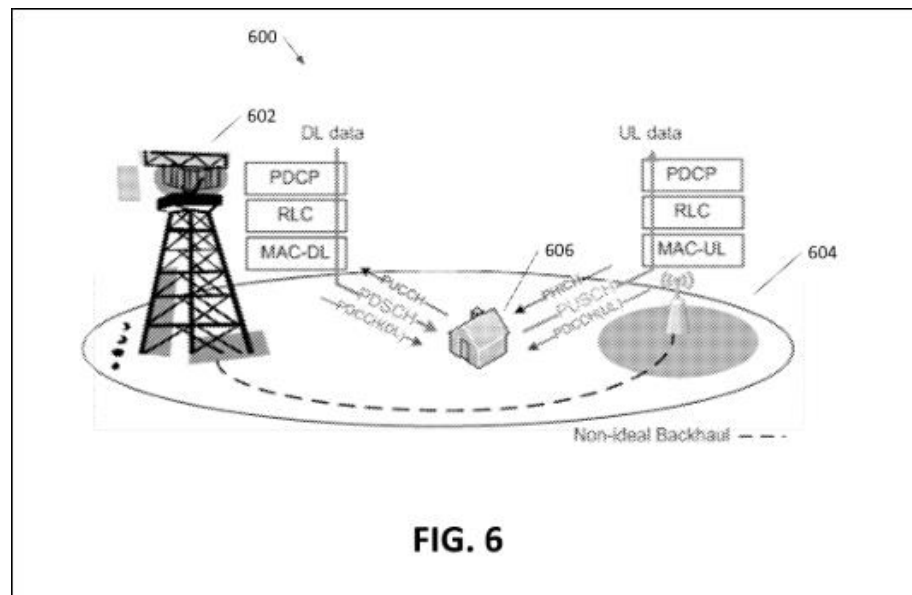
Lee at FIG. 5.

FIG. 6 illustrates an example DL/UL decoupled system 600 in which communication of DL data and associated control may be a one node such as a Macro eNB 602 and communication of UL data and associated control may be with another node 604 such as a small cell (e.g., small cell eNB) or LPN. In this example, PDSCH may be received by a WTRU 606 from one node such as the Macro eNB 602. The WTRU 606 may receive DL grants via a PDCCH or EPDCCH from this node. The WTRU 606 may provide feedback for the DL data such as HARQ ACK/NACK and CQI on a PUCCH to this node. PUSCH may be transmitted by the WTRU 606 to another node 604 such as the small cell (e.g., small cell eNB) or LPN. The WTRU 606 may receive UL grants on a PDCCH or EPDCCH from this other node 604. The WTRU 606 may receive feedback for the UL data such as HARQ ACK/NACK on a PHICH from this other node. PRACH and/or SRS may be transmitted by the WTRU 606 to at least one of the nodes. Lee at 17:13-30.

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Lee at FIG. 6.

WTRU communication in the DL with a node or cell may include receiving DL data and/or control channels from the node or cell, which may include one or more of PDSCH, PDCCH, ePDCCH, which may carry UL and/or DL grants, and/or PHICH. WTRU communication in the UL with a node or cell may include transmitting UL data and/or control channels to the node or cell, which may include one or more of PUSCH and PUCCH. Lee at 19:19-26.

An eNB, node, or cell (e.g., Macro or LPN) may transmit one or more of the signals described herein, which may be received by a WTRU. An eNB, node, or cell (e.g., Macro or LPN) may receive or intend to receive one or more of the signals described herein, which may be transmitted by a WTRU. Lee at 19:27-32.

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		UL communication may include certain UL channels and may include certain (e.g., related) DL channels. UL communication may include (e.g., include use of) one or more UL channels, such as at least one of PUSCH, PUCCH, SRS, and/or PRACH. These one or more UL channels may be transmitted by a WTRU and/or monitored and/or received by a cell or eNB. Such transmission, monitoring, and/or reception may constitute use of the channel. UL communication may include (e.g., include use of) one or more DL channels that may be associated with an UL channel or transmission such as a PDCCH or PHICH, which may be associated with an UL channel. A PDCCH, which may be associated with an UL channel, may include, but may not be limited to one or more of a PDCCH which may provide an UL grant or allocation, e.g., for a PUSCH transmission, a PDCCH which may provide a trigger for an aperiodic SRS transmission, and a PDCCH which may include a PDCCH order, e.g., for UL synchronization which may trigger or result in a PRACH transmission. A PHICH, which may be associated with a PUSCH may provide feedback (e.g., ACK/NACK) for or which may correspond to a PUSCH transmission. These one or more DL channels may be transmitted by a cell or eNB and/or monitored and/or received by a WTRU. Such transmission, monitoring, and/or reception may constitute use of the channel. Use of a cell or eNB for UL communication may not preclude use of the cell or eNB for DL communication. WTRU use of a cell or eNB for UL communication may not preclude its use of the cell or eNB for (e.g., for reception and/or use of) one or more of system information, broadcast signals and/or channels, synchronization signals and/or channels, and/or reference signals such as CRS. Lee at 19:39-20:3. A PUCCH may be associated with both cell-A (e.g., LPN) and cell-B (e.g., Macro) according to the information type (e.g., HARQ-ACK, CSI, SR) that may be carried by the PUCCH. A PUCCH that may include HARQ-ACK that may correspond to a PDSCH may be sent to cell-B (e.g., Macro), while a PUCCH that may include SR may be sent to cell-A (e.g., LPN). In another example, (E)PDCCH may be associated with both cell-A (e.g., LPN) and cell-B (e.g., Macro) according to the DCI format (e.g., DCI format 0 and DCI format 1A). A WTRU may monitor/receive a (E)PDCCH that may include a DCI format such as DCI format 1A from a cell-B (e.g., Macro), for example since it may be related to downlink assignment. A WTRU may monitor/receive (E)PDCCH that may include a DCI

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		format such as DCI format 0 from a cell-A (e.g., LPN), for example, since it may be related to uplink grant. Lee at 25:14-29. Downlink communication (e.g., by a WTRU) may include one or more of receiving PDSCH, monitoring (E)PDCCH associated with the PDSCH, and/or sending HARQ-ACK corresponding to the PDSCH. Receiving downlink signals and sending HARQ-ACK corresponding to the downlink signals may be from and/or to (or based on) the first cell (e.g., Macro). Lee at 26:7-14. A PUCCH may be transmitted to cell-A (e.g., Macro) or cell-B (e.g., LPN) according to the message type included in the PUCCH. The message type may be defined as a PUCCH format (e.g., 1/1a/1b/2/2a/2b/3). The target cell to which a WTRU may transmit a PUCCH may be determined according to the PUCCH format. Lee at 26:47-52. If a PUCCH may include HARQ-ACK that may correspond to a PDSCH from cell-A (e.g., Macro), the PUCCH may be transmitted (e.g., by the WTRU) to the cell-A (e.g., Macro). If a PUCCH may include a positive scheduling request (SR), the PUCCH may be transmitted (e.g., by the WTRU) to a cell-B (e.g., LPN). For example, the PUCCH formats that may include HARQ-ACK may be transmitted (e.g., by the WTRU) to the cell from which a WTRU may receive or may have received a corresponding PDSCH. For example, if a WTRU may receive a PDSCH from cell-A (e.g., Macro), the cell-A may be the target cell for the PUCCH formats including HARQ-ACK (e.g., PUCCH format 1a/1b/2a/2b/3). The PUCCH formats that may include SR (e.g., positive SR) may be transmitted (e.g., by the WTRU) to the cell (e.g., LPN) which may be configured or determined as an uplink cell (or as a cell for UL communication), e.g., in a decoupled mode of operation. Lee at 26:53-27:2. HARQ-ACK and positive SR may not be transmitted in the same PUCCH in the decoupled mode of operation or in other scenarios. For example, PUCCH format 1a may be used for 1-bit HARQ-ACK with positive SR (e.g., in FDD) if a WTRU may be in the coupled mode of operation. PUCCH format 1a may be used for (e.g., only for) 1-bit HARQ-ACK (e.g., in

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		FDD) if a WTRU may be in the decoupled mode of operation. For example, the positive SR may not be multiplexed (e.g., in PUCCH format 1a) in the decoupled mode of operation. A WTRU may use PUCCH format 1 for positive SR transmission. If a WTRU may or may need to transmit a HARQ-ACK and a positive SR in the same uplink subframe, the WTRU may drop the positive SR in the subframe and transmit the HARQ-ACK, e.g., to the cell-A (e.g., Macro) in the subframe. The WTRU may drop the HARQ-ACK and transmit the positive SR, e.g., to cell-B (e.g., LPN) in the subframe. Lee at 27:3-19. If a WTRU may have or may be scheduled for UCI and UL unicast traffic together (e.g., in the same subframe or TTI) the WTRU may drop the unicast traffic and may (e.g., may only) transmit the UCI. If a WTRU may have or be scheduled for UCI and UL unicast traffic together (e.g., in the same subframe or TTI) a WTRU may consider this as an error case. A WTRU may transmit one of the types of traffic to one of the cells or may not transmit PUSCH (e.g., any PUSCH). If a PUCCH may include a UCI including HARQ-ACK, a WTRU may transmit HARQ-ACK (e.g., may only transmit HARQ-ACK). A WTRU may use at least one of PUCCH or PUSCH for HARQ-ACK transmission, e.g., if a WTRU may have HARQ-ACK to transmit. Lee at 27:33-45. Transmission of a PUCCH and/or PUSCH may be by a WTRU. Lee at 31:35-36. The resources to use on the selected UL cell (e.g., the LPN) may be predefined, provided by the selected DL cell (e.g., the Macro), or provided by the selected UL cell (e.g., the LPN), and the WTRU may transmit the PRACH to the selected UL cell (e.g., the LPN) using at least one of those resources. The WTRU may indicate it has decoupled channel conditions to the selected UL cell, for example by using these resources. Lee at 34:63-35:3. A scheduled channel or transmission may be a channel or transmission for which resources may be (or may have been) allocated such as by grant, configuration, request, or other means. A retransmission may be (e.g., considered) a scheduled transmission (e.g., of a PUSCH). One or more of PUSCH, PUCCH, SPS, and PRACH may be (e.g., considered)

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		scheduled, a scheduled channel or a scheduled transmission. A scheduled transmission may be a planned transmission. PRACH which may be requested (e.g., by a node) or autonomously planned or initiated (e.g., by a WTRU) may be (e.g., considered) a scheduled transmission. Scheduled channel and scheduled transmission may be used interchangeably. Scheduled and allocated may be used interchangeably. Lee at 61:12-25. When an eNB may send a PDSCH to a WTRU, it may expect the WTRU to provide an ACK/NACK feedback, e.g., via PUCCH and/or PUSCH, in response to that PDSCH. The eNB may expect the ACK/NACK in a specific frequency and/or time location that may be relative to the frequency and/or time location of the PDSCH. The eNB may expect to receive a PUCCH in that specific resource location from that specific WTRU. When the eNB may detect or receive a PUCCH, it may know from which WTRU it may be coming. The resource location and/or timing of the PUCCH transmission may (e.g., implicitly) identify at least in part the identity of the WTRU which may (or may have) transmit the PUCCH. In an UL/DL decoupled scenario the LPN may not be aware of Macro eNB PDSCH transmission and may not at least one of expect, detect, and/or look for the corresponding PUCCH. Lee at 61:52-67. A WTRU may bundle the HARQ ACK/NACK bits corresponding to one or more PDSCH, received in a time window, into one or more ACK/NACK bits. The WTRU may receive a configuration of the HARQ bundling time window through higher layer signaling, e.g., from eNB. The HARQ bundling window may be represented with one or more parameters such as window size (possibly represented in number of subframes, e.g., n), window offset (possibly represented in number of subframes, e.g., m), etc. As an example of window size, it may be set to the same value as the number of subframes between two consecutive configured SR resources. As an example for window offset, it may be defined and/or configured as a number of subframes (e.g., m=4) before the subframe including the next SR resource (e.g., the SR resource to be used to carry the corresponding PDSCH HARQ ACK/NACK bits). For example, for a WTRU with n=10 and m=4, the WTRU may receive certain (e.g., all) potential PDSCHs in a window with the size of 10 subframes which may end 4 subframes before the next SR resource. The WTRU may determine the PDSCH

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		HARQ ACK/NACK bits for certain (e.g., all the) received PDSCH data within the window. The WTRU may bundle all those bits into a single ACK/NACK bit, and it may send the bundled ACK/NACK bit using the next SR resource (e.g., to the eNB). Lee at 62:43-67. PUSCH-based HARQ ACK/NACK may be provided. A WTRU may transmit a PUSCH carrying the corresponding PDSCH HARQ ACK/NACK bit(s), e.g., when the WTRU receives one or more PDSCH. The WTRU may not transmit a PUCCH including the corresponding PDSCH HARQ ACK/NACK bits, when the WTRU receives one or more PDSCHs. The WTRU may transmit the PDSCH HARQ ACK/NACK bit(s) of one or more PDSCHs in the same PUSCH. For example, the WTRU may transmit the HARQ ACK/NACK bit(s) of each PDSCH received in a certain period of time, e.g., a time window, in the same PUSCH. This window may be referred to as HARQ bundling window. A PUSCH may carry PDSCH HARQ ACK/NACK bit(s) and/or information regarding the corresponding PDSCH(s). For example, the PUSCH may carry indications of the DL HARQ processes of the corresponding PDSCH(s). The PUSCH may carry indications of the frequency and/or time locations the corresponding PDSCH(s) may be received. The WTRU may receive one or more configuration parameters defining the HARQ bundling window, e.g., window size. The size of the bundling window may be a value equal or greater than one. The WTRU may receive one or more UL grants for each window to carry the PDSCH HARQ ACK/NACK bits of the corresponding window. The WTRU may derive the frequency, time location and/or other transmission parameters of the PUSCH carrying the PDSCH HARQ ACK/NACK bits based on one or more DL grants of the PDSCH and/or PDSCH in the corresponding HARQ bundling window. For example, the transmission parameters of the PUSCH carrying the PDSCH HARQ ACK/NACK bits may be derived based on the characteristics of the first (or last) PDSCH grant in the corresponding bundling window. The WTRU may derive the frequency, time location and/or other parameters of the PUSCH carrying the PDSCH HARQ ACK/NACK bits, e.g., based on the boundaries of the bundling window. For example, the related PUSCH may be transmitted in n subframes after the end of the bundling window. Lee at 64:19-56.

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		At Message 3, the WTRU may transmit the RRC Connection Request message using the configuration parameters in Message 2. In the decoupled scenario illustrated in FIG. 7, the WTRU may be configured to use HARQ-less operation as specified in Section 5.8. In the decoupled scenario illustrated in FIG. 8, the WTRU may be configured to use HARQ to send Message 3. Lee at 71:40-46. The 2013 Application supports these disclosures. <i>See, e.g.</i>, 2013 Application at [0092], [0104], [0105], [0106], [0107], [0044], [0083], [0087], [0091], [0092], [0073], [0079], [0092], [0095], [0102], [0103]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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, Lee 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, Lee discloses this limitation based on the following exemplary citations: The parts of the random access procedure which the WTRU may perform may include one or more of UL transmission of the PRACH preamble (e.g., msg1), monitoring for and/or reception of the DL RAR (e.g., msg2), UL transmission on resources which may have been allocated by the RAR (e.g., msg3) which may include a connection establishment request,

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		and monitoring for and/or reception of a DL contention resolution message (e.g., msg4). Lee at 50:57-64. If the WTRU may transmit a PRACH preamble to an LPN, the WTRU may perform one or more UL transmissions that may be associated with the random access procedure (e.g., msg1 and/or msg3) to or with the LPN. If the WTRU may transmit a PRACH preamble to an LPN, the WTRU may receive or expect to receive one or more DL transmissions which may be associated with the random access procedure (e.g., msg2 and/or msg4) from the Macro or the LPN. Lee at 52:23-32. A resource element (RE) may be associated with a subcarrier during an OFDM symbol interval. A resource block (RB) may include twelve consecutive subcarriers during a 0.5 ms timeslot. With seven symbols per timeslot, a RB may include $12 \times 7 = 84$ REs. Lee at 10:59-63. For dynamic scheduling, a subframe may include two consecutive timeslots, which may be referred to as a RB pair. Certain subcarriers on some OFDM symbols may be allocated to carry pilot or reference signals in the time-frequency grid. A number of subcarriers at the edges of the transmission bandwidth may not be transmitted in order to comply with spectral mask criteria. Lee at 10:64-11:3. One or more symbols, e.g., the first 1 to 3 OFDM symbol(s) in each subframe in the DL, may be occupied by one or more of PCFICH, PHICH, and PDCCH according to the overhead of the control channels, and the symbols occupied may be referred to as the DL control region. The PCFICH may be transmitted, for example, in the first OFDM symbol (e.g., symbol 0) in each subframe and/or may indicate the number of OFDM symbols used for the DL control region in the subframe. A WTRU may detect a Control Format Indicator (CFI) from a PCFICH, and the DL control region may be defined in the subframe according to the CFI value. The PCFICH may be skipped if a subframe may be defined as a non-PDSCH supportable subframe. DL symbols that are not part of a DL control region may be referred to as the data or PDSCH region. Enhanced PDCCH (EPDCCH) may be

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provided and/or used in the PDSCH region. The location of an EPDCCH in that region may be signaled, for example, via higher layer signaling such as Radio Resource Control (RRC) signaling, to a WTRU that may (or may be expected to) monitor, receive, or otherwise use that EPDCCH. The PDCCH and/or EPDCCH may provide control information, resource allocations (e.g., grants) for UL and/or DL transmission, and the like. 11:25-47.

TABLE 1

Example TDD LTE Uplink-downlink configurations.

Uplink- downlink configu- ration	Downlink- to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

Lee at Table 1.

When using a contention-based RA procedure, the WTRU may initiate the process by transmitting a RA preamble that it may randomly select from a common pool of preambles that may be communicated to the WTRU by the network, e.g., via broadcasted system information. The WTRU may transmit the preamble on a PRACH resource (e.g., a resource in time and frequency) that the WTRU may select from a set of allowed resources that may be communicated to the WTRU by the network, e.g., via broadcasted system information.

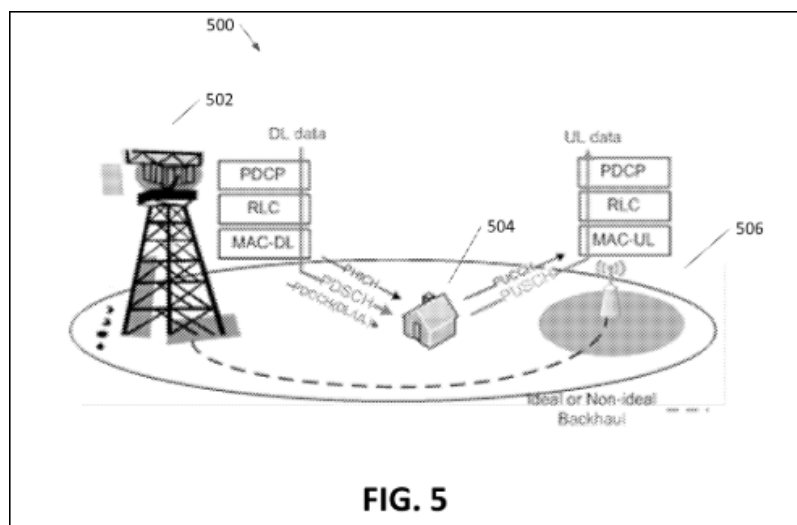
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		The cell's configured set of PRACH resources may be or may include this set of allowed PRACH resources. The unit of time for the PRACH resource may be a subframe. The subframe the WTRU may select for the PRACH resource may be the next subframe configured for PRACH in which the WTRU may transmit the PRACH (e.g., based on timing, measurement, and/or other WTRU considerations). The WTRU may select a frequency aspect of the PRACH resource (e.g., the resource blocks (RBs)) in the selected subframe, for example, based on parameters communicated to the WTRU by the network, e.g., via broadcasted system information. A frequency resource may be allowed for PRACH in a subframe for FDD or other cases. It may be defined by a starting (e.g., lowest) RB number that may be provided by the network, e.g., prach-FrequencyOffset, and may have a fixed bandwidth, such as six RBs. Lee at 13:38-63. If the WTRU may receive an RAR, the RAR may include one or more of a grant for resources on which to send an UL transmission at 306 (e.g., msg3), a C-RNTI or TC-RNTI, and/or a timing advance (TA). In response to the RAR, the WTRU may transmit in the UL at 306 (e.g., msg3) on the granted resources and may adjust its UL timing according to the TA. For a contention-free RA procedure, the random access procedure 300 may end at 306. Lee at 14:33-40. FIG. 5 illustrates an example DL/UL decoupled system 500 in which communication of DL data and control may be with a node such as a Macro eNB 502. The node 502 may transmit and/or a WTRU 504 may receive the DL channels. The DL channels may include one or more of a physical DL shared channel (PDSCH), a physical DL control channel (PDCCH), an enhanced PDCCH (EPDCCH), and/or a physical hybrid automatic repeat request (ARQ) indicator channel (PHICH). The PDCCH (or EPDCCH) may provide UL and/or DL grants to the WTRU 504. Communication of UL data and control may be with another node 506 such as a small cell (e.g., small cell eNB) or LPN. The WTRU 504 may transmit and/or the node 506 may receive the UL channels. The UL channels may include one or more of a physical UL shared channel (PUSCH), a physical UL control channel (PUCCH), a physical random access channel (PRACH) (not shown in FIG. 5), and/or a

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sounding reference signal (SRS) (not shown in FIG. 5). PDCCH and EPDCCH may be used interchangeably. Lee at 16:61-17:12.



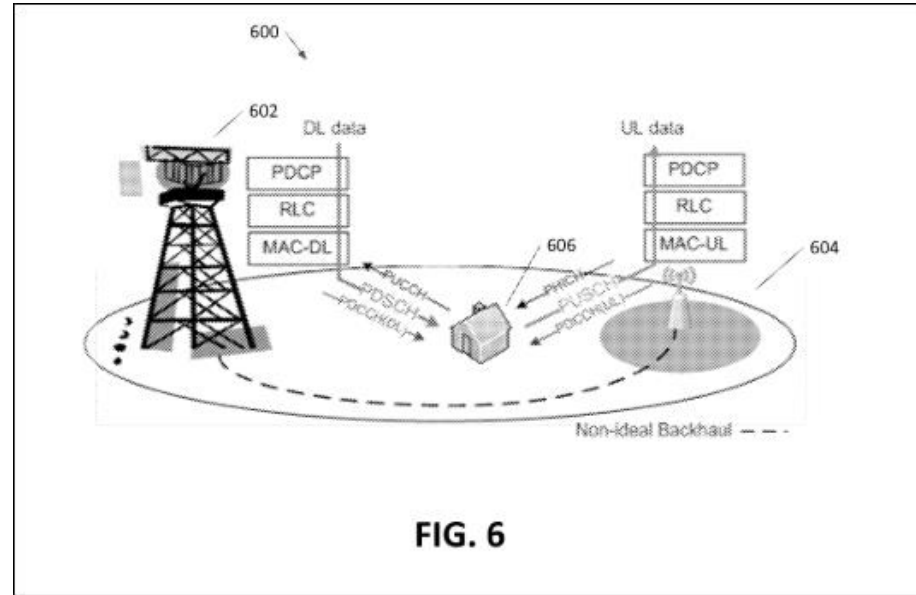
Lee at FIG. 5.

FIG. 6 illustrates an example DL/UL decoupled system 600 in which communication of DL data and associated control may be a one node such as a Macro eNB 602 and communication of UL data and associated control may be with another node 604 such as a small cell (e.g., small cell eNB) or LPN. In this example, PDSCH may be received by a WTRU 606 from one node such as the Macro eNB 602. The WTRU 606 may receive DL grants via a PDCCH or EPDCCH from this node. The WTRU 606 may provide feedback for the DL data such as HARQ ACK/NACK and CQI on a PUCCH to this node. PUSCH may be transmitted by the WTRU 606 to another node 604 such as the small cell (e.g., small cell eNB) or LPN. The WTRU 606 may receive UL grants on a PDCCH or EPDCCH from this other node 604. The WTRU 606 may receive feedback for the UL data such as HARQ ACK/NACK on a PHICH from this other node. PRACH and/or SRS may be transmitted by the WTRU 606 to at least one of the nodes. Lee at 17:13-30.

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Lee at FIG. 6.

One or more of frequency (e.g., UL or DL frequency or carrier frequency) selection, usage, or assignment may be limited to frequencies that a WTRU may use in order to have an appropriate or usable DL-UL separation, e.g., at least the nominal band value that may be based on the DL frequency band. Lee at 36:37-42.

To determine the UL and DL subframe configuration, for example, a rule (e.g., a predefined rule) may be applied to define uplink and downlink subframes. For example, at least certain subframe numbers (e.g., one or more of 0, 4, 5, and 9) may be defined as downlink subframes and the others may be considered as uplink subframes. The MBSFN subframe configuration may be used so that the subframes configured as MBSFN subframes may be considered as uplink subframes and the others may be considered as downlink subframes. The uplink and downlink subframes may be configured via higher

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		layer signaling. There may be default downlink (and/or UL) subframes that may be used (e.g., may always be used) as downlink (and/or UL) subframes. For subframes with a default direction, configuration may not be provided or used. For data channels, uplink and downlink subframes may be dynamically configured based on one or more HARQ process aspects (e.g., HARQ process timing). For example, if a WTRU may receive a downlink assignment in subframe n then the n+4 subframe or the subframe for the HARQ ACK/NACK feedback (e.g., subframe n+4) may become an uplink subframe (e.g., automatically). Lee at 41:1-30. The set (or subset) of uplink resources may be defined as a subset of the uplink subframes available. The subframe set {0, 2, 4, 6, 8} may be assigned to (or used in) the cell-A, and another subframe set {1, 3, 5, 7, 9} may be assigned to (or used in) the cell-B. The set (or subset) of uplink resources may be defined as a subset of PRB-pairs in a subframe. The even-numbered PRB-pair may be assigned to (or used in) the cell-A, and the odd-numbered PRB-pair may be assigned to (or used in) the cell-B. Lee at 42:26-34. A WTRU may receive a timing advance command that may be transmitted by the Macro cell and may understand that the command may be used or may be intended to be used as an adjustment (e.g., offset value) that may be applied to certain transmissions, for example, when the WTRU may maintain separate timing and/or frequency synchronization and/or offsets for UL and DL transmissions (or UL and DL communication or Macro and LPN communication). The WTRU may apply the adjustment to the certain transmissions. The certain transmissions may be, for example, transmissions that may be based on the WTRU's (e.g., current) UL (e.g., UL communication) or LPN synchronization. Lee at 57:35-46. A scheduled channel or transmission may be a channel or transmission for which resources may be (or may have been) allocated such as by grant, configuration, request, or other means. A retransmission may be (e.g., considered) a scheduled transmission (e.g., of a PUSCH). One or more of PUSCH, PUCCH, SPS, and PRACH may be (e.g., considered) scheduled, a scheduled channel or a scheduled transmission. A scheduled transmission may

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		be a planned transmission. PRACH which may be requested (e.g., by a node) or autonomously planned or initiated (e.g., by a WTRU) may be (e.g., considered) a scheduled transmission. Scheduled channel and scheduled transmission may be used interchangeably. Scheduled and allocated may be used interchangeably. Lee at 61:12-25. A WTRU may bundle the HARQ ACK/NACK bits corresponding to one or more PDSCH, received in a time window, into one or more ACK/NACK bits. The WTRU may receive a configuration of the HARQ bundling time window through higher layer signaling, e.g., from eNB. The HARQ bundling window may be represented with one or more parameters such as window size (possibly represented in number of subframes, e.g., n), window offset (possibly represented in number of subframes, e.g., m), etc. As an example of window size, it may be set to the same value as the number of subframes between two consecutive configured SR resources. As an example for window offset, it may be defined and/or configured as a number of subframes (e.g., m=4) before the subframe including the next SR resource (e.g., the SR resource to be used to carry the corresponding PDSCH HARQ ACK/NACK bits). For example, for a WTRU with n=10 and m=4, the WTRU may receive certain (e.g., all) potential PDSCHs in a window with the size of 10 subframes which may end 4 subframes before the next SR resource. The WTRU may determine the PDSCH HARQ ACK/NACK bits for certain (e.g., all the) received PDSCH data within the window. The WTRU may bundle all those bits into a single ACK/NACK bit, and it may send the bundled ACK/NACK bit using the next SR resource (e.g., to the eNB). Lee at 62:43-67. The WTRU may not send PDSCH HARQ ACK/NACK bits (e.g., via PUCCH) in an (e.g., every) UL subframe. The WTRU may receive a configuration parameter indicating which subframes the WTRU may use to send PDSCH HARQ ACK/NACK bits (e.g., via PUCCH). The WTRU may receive a configuration parameter r that may indicate that every r-th subframe may include PUCCH resources allocated to the WTRU and/or the WTRU may only transmit PDSCH HARQ ACK/NACK bits (e.g., via PUCCH) in those subframes. Different WTRUs may be configured by the same PUCCH resources and/or the same

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		PUCCH indexes. Different WTRUs may be configured to potentially send PDSCH HARQ ACK/NACK bits (e.g., via PUCCH) in different subframes. Lee at 64:4-18. PUSCH-based HARQ ACK/NACK may be provided. A WTRU may transmit a PUSCH carrying the corresponding PDSCH HARQ ACK/NACK bit(s), e.g., when the WTRU receives one or more PDSCH. The WTRU may not transmit a PUCCH including the corresponding PDSCH HARQ ACK/NACK bits, when the WTRU receives one or more PDSCHs. The WTRU may transmit the PDSCH HARQ ACK/NACK bit(s) of one or more PDSCHs in the same PUSCH. For example, the WTRU may transmit the HARQ ACK/NACK bit(s) of each PDSCH received in a certain period of time, e.g., a time window, in the same PUSCH. This window may be referred to as HARQ bundling window. A PUSCH may carry PDSCH HARQ ACK/NACK bit(s) and/or information regarding the corresponding PDSCH(s). For example, the PUSCH may carry indications of the DL HARQ processes of the corresponding PDSCH(s). The PUSCH may carry indications of the frequency and/or time locations the corresponding PDSCH(s) may be received. The WTRU may receive one or more configuration parameters defining the HARQ bundling window, e.g., window size. The size of the bundling window may be a value equal or greater than one. The WTRU may receive one or more UL grants for each window to carry the PDSCH HARQ ACK/NACK bits of the corresponding window. The WTRU may derive the frequency, time location and/or other transmission parameters of the PUSCH carrying the PDSCH HARQ ACK/NACK bits based on one or more DL grants of the PDSCH and/or PDSCH in the corresponding HARQ bundling window. For example, the transmission parameters of the PUSCH carrying the PDSCH HARQ ACK/NACK bits may be derived based on the characteristics of the first (or last) PDSCH grant in the corresponding bundling window. The WTRU may derive the frequency, time location and/or other parameters of the PUSCH carrying the PDSCH HARQ ACK/NACK bits, e.g., based on the boundaries of the bundling window. For example, the related PUSCH may be transmitted in n subframes after the end of the bundling window. Lee at 64:19-56.

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		The 2013 Application supports these disclosures. <i>See, e.g.</i>, 2013 Application at [0045], [0044], [0057], [0058], [0059], [0064], [0073], [0076], [0089], [0090], [0091], [0092], [0105], [0106]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.
1[f]	wherein the 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, Lee 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, Lee discloses this limitation based on the following exemplary citations: Uplink accessibility to a Macro eNB may be considered. The coverage limited LC-MTC device may start with a coupled scenario (e.g., with the Macro eNB) and then switch its UL (e.g., some or all of its UL) to another node (e.g., the LPN), which may have better UL coverage. The coverage limited LC-MTC device may have DL but not UL (or limited UL) coverage with one node (e.g., the Macro eNB) so that it may (e.g., may need to) start with another node (e.g., the LPN) for UL (or at least some UL) from the beginning. Lee at 17:42-50. A cell selection and/or reselection procedure may be different for a WTRU that may operate in coupled or decoupled mode. Lee at 21:6-8. For example, a WTRU, such as one configured with or operating in the decoupled mode, may be configured with and/or operate in a coverage limited mode of operation for one

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		direction of communication (e.g., DL) while the other direction of communication (e.g., UL) may use or be in non-coverage limited mode of operation. The coverage limited mode of operation may include the use of coverage enhancement transmission schemes, such as repetitions, TTI bundling, and/or PSD boosting of data and/or control channels. The non-coverage limited mode of operation may include legacy transmission schemes used for LTE device (e.g., coverage enhancements schemes may not be used). Lee at 29:65-30:9. The timing for HARQ procedures may be according to the coverage limited mode of operation for both downlink and uplink although uplink may not be configured as coverage limited mode of operation. The pathloss for uplink power control may be obtained from associated uplink LPN if the uplink may be configured with a non-coverage limited mode of operation while the downlink may be configured with a coverage limited mode of operation. Lee at 30:10-17. The CE level for each cell (e.g., for PUSCH transmission) may be configured or determined independently (e.g., for or by the WTRU). The CE level for the cell-B (e.g., Macro) may be determined (e.g., by the WTRU) during a RACH procedure. The CE level may be (or may be based on) the CE level the WTRU may use or may have used for the PRACH preamble transmission for which the WTRU may receive or may have received RAR successfully. The CE level for the cell-A (e.g., LPN) may be configured via higher layer signaling from the cell-B. The CE level for the cell-A (e.g., LPN) may be determined (e.g., by the WTRU) during a RACH procedure that may target cell-A. This RACH procedure may be separate from a RACH procedure for the cell-B. Lee at 31:62-32:9. A WTRU (e.g., a low-cost or coverage limited WTRU) may measure downlink signals from cells (e.g., hearable cells, available cells, cells in proximity, or identified cells such as by a list) and if a (e.g., the best) measurement (e.g., of signal power or RSRP) of those cells meets a certain criterion, e.g., is lower than a threshold, the WTRU may consider itself as a coverage limited WTRU. The WTRU may select the cell with a certain (e.g., the best) measurement, for example as its selected DL cell. The threshold that may differentiate a coverage limited WTRU from a non-coverage limited WTRU may be predefined, and/or

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		the threshold may be configured via higher layer signaling such as broadcast channels or signaling. Lee at 34:14-24. The assignment (or use) of the resource sets (or subsets) may be WTRU-specific and may apply in decoupled mode. The assignment (or use) of the resource sets (or subsets) may be applicable in scenarios in which the cells (e.g., cell-A and cell-B) may operate in or with the same frequency band. Lee at 42:35-39. The WTRU may not send PDSCH HARQ ACK/NACK bits (e.g., via PUCCH) in an (e.g., every) UL subframe. The WTRU may receive a configuration parameter indicating which subframes the WTRU may use to send PDSCH HARQ ACK/NACK bits (e.g., via PUCCH). The WTRU may receive a configuration parameter <i>r</i> that may indicate that every <i>r</i>-th subframe may include PUCCH resources allocated to the WTRU and/or the WTRU may only transmit PDSCH HARQ ACK/NACK bits (e.g., via PUCCH) in those subframes. Different WTRUs may be configured by the same PUCCH resources and/or the same PUCCH indexes. Different WTRUs may be configured to potentially send PDSCH HARQ ACK/NACK bits (e.g., via PUCCH) in different subframes. Lee at 64:4-18. The 2013 Application supports these disclosures. <i>See, e.g.</i>, 2013 Application at [0050], [0066], To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

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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, Lee 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, Lee discloses this limitation based on the following exemplary citations: One or more symbols, e.g., the first 1 to 3 OFDM symbol(s) in each subframe in the DL, may be occupied by one or more of PCFICH, PHICH, and PDCCH according to the overhead of the control channels, and the symbols occupied may be referred to as the DL control region. The PCFICH may be transmitted, for example, in the first OFDM symbol (e.g., symbol 0) in each subframe and/or may indicate the number of OFDM symbols used for the DL control region in the subframe. A WTRU may detect a Control Format Indicator (CFI) from a PCFICH, and the DL control region may be defined in the subframe according to the CFI value. The PCFICH may be skipped if a subframe may be defined as a non-PDSCH supportable subframe. DL symbols that are not part of a DL control region may be referred to as the data or PDSCH region. Enhanced PDCCH (EPDCCH) may be provided and/or used in the PDSCH region. The location of an EPDCCH in that region may be signaled, for example, via higher layer signaling such as Radio Resource Control (RRC) signaling, to a WTRU that may (or may be expected to) monitor, receive, or otherwise use that EPDCCH. The PDCCH and/or EPDCCH may provide control information, resource allocations (e.g., grants) for UL and/or DL transmission, and the like. Lee at 11:25-47. Each of the eNode- Bs 160 a, 160 b, 160 c may be associated with a particular cell (not shown) and may be configured to handle radio resource management decisions, handover decisions, scheduling of users in the uplink and/or downlink, and the like. As shown in FIG. 1D, the eNode- Bs 160 a, 160 b, 160 c may communicate with one another over an X2 interface. Lee at 8:4-10. As shown in FIG. 1E, the RAN 105 may include base stations 180 a, 180 b, 180 c, and an ASN gateway 182, though it will be appreciated that the RAN 105 may include any

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		number of base stations and ASN gateways while remaining consistent with an embodiment. The base stations 180 a, 180 b, 180 c may each be associated with a particular cell (not shown) in the RAN 105 and may each include one or more transceivers for communicating with the WTRUs 102 a, 102 b, 102 c over the air interface 117. In one embodiment, the base stations 180 a, 180 b, 180 c may implement MIMO technology. Thus, the base station 180 a, for example, may use multiple antennas to transmit wireless signals to, and receive wireless signals from, the WTRU 102 a. The base stations 180 a, 180 b, 180 c may also provide mobility management functions, such as handoff triggering, tunnel establishment, radio resource management, traffic classification, quality of service (QoS) policy enforcement, and the like. The ASN gateway 182 may serve as a traffic aggregation point and may be responsible for paging, caching of subscriber profiles, routing to the core network 109, and the like. Lee at 8:66-9:20. One or more symbols, e.g., the first 1 to 3 OFDM symbol(s) in each subframe in the DL, may be occupied by one or more of PCFICH, PHICH, and PDCCH according to the overhead of the control channels, and the symbols occupied may be referred to as the DL control region. The PCFICH may be transmitted, for example, in the first OFDM symbol (e.g., symbol 0) in each subframe and/or may indicate the number of OFDM symbols used for the DL control region in the subframe. A WTRU may detect a Control Format Indicator (CFI) from a PCFICH, and the DL control region may be defined in the subframe according to the CFI value. The PCFICH may be skipped if a subframe may be defined as a non-PDSCH supportable subframe. DL symbols that are not part of a DL control region may be referred to as the data or PDSCH region. Enhanced PDCCH (EPDCCH) may be provided and/or used in the PDSCH region. The location of an EPDCCH in that region may be signaled, for example, via higher layer signaling such as Radio Resource Control (RRC) signaling, to a WTRU that may (or may be expected to) monitor, receive, or otherwise use that EPDCCH. The PDCCH and/or EPDCCH may provide control information, resource allocations (e.g., grants) for UL and/or DL transmission, and the like. Lee at 11:25-47.

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		Signals and/or channels may be associated with a cell that may correspond to a certain carrier frequency and/or geographic area. A carrier frequency may be a center frequency of a cell (e.g., the center frequency of a cell's supported bandwidth). An eNB may have one or more cells associated with it. An eNB may be or refer to a cell. Lee at 11:53-58. Downlink reference signals may include a Cell-specific Reference Signal (CRS), a Channel-State-Information Reference Signal (CSI-RS), and/or a DeModulation Reference Signal (DM-RS), and/or a Positioning Reference Signal (PRS). DL reference signals may be received and/or used by a WTRU. CRS may be used by a WTRU for channel estimation for coherent demodulation of a (e.g., any) downlink physical channel. Certain DL channels may include at least one of PMCH, EPDCCH, and PDSCH when configured with TM7, TM8, TM9, or TM10. A WTRU may use the CRS for channel state information measurements for the reporting of CQI, PMI, and/or RI, for example, if the WTRU is configured with a transmission mode using CRS for PDSCH demodulation. A WTRU may use the CRS for cell-selection and/or mobility-related measurements. The CRS may be received in certain subframes (e.g., any subframe), and multiple antenna ports (e.g., up to four antenna ports) may be supported. A WTRU may use DM-RS for demodulation of certain channels, which may include at least one of EPDCCH and PDSCH configured with TM7, TM8, TM9, or TM10. DM-RS may be used for the demodulation of a channel (e.g., EPDCCH or PDSCH) and may be transmitted in the resource blocks assigned to the channel (e.g., EPDCCH or PDSCH). A WTRU may use CSI-RS, which may be transmitted with a duty cycle, for channel state information measurements, for example, if the WTRU may be configured with a transmission mode, which may use DM-RS for PDSCH demodulation. The CSI-RS may also be used for cell-selection and mobility-related measurements, for example, if a WTRU may be configured with a transmission mode (e.g., TM10). A WTRU may use the PRS for position related measurements. Lee at 12:26-57. A WTRU may transmit uplink reference signals, including, for example, a sounding reference signal (SRS) and/or and DM-RS. The SRS may be transmitted in the last SC-FDMA symbol in a set of uplink subframes which may be configured for WTRU-specific SRS subframes, which may be a subset of cell-specific SRS subframes. The SRS may be

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		transmitted by a WTRU periodically in the WTRU-specific SRS subframes within a configured and/or predefined frequency bandwidth. A WTRU may transmit the SRS in an aperiodic manner, for example, if the WTRU may receive an aperiodic SRS (A-SRS) transmission trigger in a DCI. A WTRU may transmit DM-RS for the PUSCH demodulation at the eNB receiver and the location of DM-RS may be in the middle of the SC-FDMA symbols (e.g., fourth SC-FDMA symbol in normal CP) in each slot for the resource blocks for which PUSCH transmission may be granted. Lee at 12:58-13:7. When using a contention-based RA procedure, the WTRU may initiate the process by transmitting a RA preamble that it may randomly select from a common pool of preambles that may be communicated to the WTRU by the network, e.g., via broadcasted system information. The WTRU may transmit the preamble on a PRACH resource (e.g., a resource in time and frequency) that the WTRU may select from a set of allowed resources that may be communicated to the WTRU by the network, e.g., via broadcasted system information. The cell's configured set of PRACH resources may be or may include this set of allowed PRACH resources. The unit of time for the PRACH resource may be a subframe. The subframe the WTRU may select for the PRACH resource may be the next subframe configured for PRACH in which the WTRU may transmit the PRACH (e.g., based on timing, measurement, and/or other WTRU considerations). The WTRU may select a frequency aspect of the PRACH resource (e.g., the resource blocks (RBs)) in the selected subframe, for example, based on parameters communicated to the WTRU by the network, e.g., via broadcasted system information. A frequency resource may be allowed for PRACH in a subframe for FDD or other cases. It may be defined by a starting (e.g., lowest) RB number that may be provided by the network, e.g., prach-FrequencyOffset, and may have a fixed bandwidth, such as six RBs. Lee at 13:38-63. The coupled mode may be defined as a primary mode and the decoupled mode may be defined as a secondary mode. The primary mode may be considered as the default mode so that the WTRU (e.g., low-cost WTRU) may (or may always) start with coupled mode for the cell access and may switch or be switched to decoupled mode, for example, according to the channel condition. The configuration may be provided by the eNB and/or received

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		by the WTRU via higher layer signaling, such as RRC signaling. The decoupled mode may be configured by higher layers for a WTRU configured for or operating in coupled mode. If a WTRU is configured with a decoupled mode, the WTRU may start or perform an uplink cell search procedure described herein. The WTRU may perform an UL cell search procedure while a downlink cell search procedure may not be performed. The decoupled mode may be configured by higher layers and the configuration signaling may include the uplink cell information. The uplink cell information may include at least one of cell-ID, center frequency, bandwidth, and PRACH resource configuration. Lee at 21:64-22:16. A WTRU may detect the physical cell-ID for the first cell, e.g., via a synchronization channel, and the physical cell-ID for the second cell may be signaled, e.g., via higher layer signaling. A WTRU may detect the physical cell-ID for the first cell, e.g., via a synchronization channel, in a frequency band, and the WTRU may detect the physical cell-ID for the second cell, e.g., via a synchronization channel, in another frequency band. Lee at 25:66-26:6. The CE level for the PUCCH formats that may include HARQ-ACK may be determined by the WTRU during the PRACH procedure. The CE level for the PUCCH format that may include positive SR may be configured by higher layer signaling. For example, the CE level for the PUCCH format that may include HARQ-ACK may be determined from (e.g., may be determined to be the same as) the CE level which may be (or may have been) used for the PRACH preamble transmission from which the WTRU may have received RAR successfully. The CE level for the PUCCH format including positive SR may be configured by higher layer signaling, e.g., when the WTRU may be configured to operate decoupled mode. Lee at 31:10-22. Determination of and/or use of a CE level for a channel (e.g., PUCCH and/or PUSCH) may be by a WTRU. Configuration of a CE level (e.g., for use by a WTRU) which may be for a channel (e.g., PUCCH and/or PUSCH) may be by a cell. The WTRU may receive such configuration from the cell, e.g., via signaling such as higher layer signaling. Lee at 31:37-42.

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		The CE level for each cell may be configured by one of the cells (e.g., the cell-B). The CE level for each cell may be signaled by higher layers, e.g., after RRC connection setup, where the RRC connection setup may be with one of the cells (e.g., cell-B). Lee at 32:10-14. The certain (or reserved) PRACH resources, which may be used to indicate decoupled channel conditions, may be provided via broadcast channels or signaling. These resources may be independent (or separate) from the PRACH resources that may be used for coupled mode or by a (e.g., legacy) LTE WTRU, e.g., one that may not operate in, consider operating in, or intend to operate in decoupled mode. The certain (or reserved) PRACH resources that may be used to indicate decoupled channel conditions, may be predefined. A WTRU may be informed, e.g., via higher layer signaling, such as broadcast (or dedicated) signaling whether a node or the network supports decoupled mode. Lee at 34:37-48. Higher layer signaling (e.g., RRC signaling) may be used to indicate the decoupled channel condition, e.g., after RRC connection setup. Configuration information for decoupled mode may be provided via higher layer signaling, e.g., by an eNB to the WTRU, and the WTRU (e.g., low-cost WTRU) may switch from coupled mode to decoupled mode. The WTRU may perform a random access procedure, e.g., for connection establishment, to a node (e.g., Macro eNB) and that node may provide the configuration information for decoupled mode. The WTRU may, for example, in response to the receipt of the configuration information, switch to or begin operating in decoupled mode. The configuration information may include information related to one or more cells (e.g., additional cells) such as the LPN cell (or cells) to use in decoupled mode, e.g., the cell frequency, cell bandwidth, cell ID, among others. Lee at 35:7-23. A node (e.g., a Macro) may provide (e.g., broadcast) a list of cells or LPNs that may be used for uplink cell selection and may include frequency (or frequency band) information, for example with or in the list. 38:3-6.

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		The WTRU may receive broadcasting channels or information from both the Macro and the LPN. If the TDD subframe configuration may be different between the Macro and the LPN, priority (e.g., predefined priority) rules may be applied to determine the direction that the WTRU may use for the subframes. The downlink subframes in the Macro may have higher priority than the uplink subframes in the LPN. The uplink subframes in the LPN may have higher priority than downlink subframes in the Macro. Lee at 39:62-40:3. To determine the UL and DL subframe configuration, for example, a rule (e.g., a predefined rule) may be applied to define uplink and downlink subframes. For example, at least certain subframe numbers (e.g., one or more of 0, 4, 5, and 9) may be defined as downlink subframes and the others may be considered as uplink subframes. The MBSFN subframe configuration may be used so that the subframes configured as MBSFN subframes may be considered as uplink subframes and the others may be considered as downlink subframes. The uplink and downlink subframes may be configured via higher layer signaling. There may be default downlink (and/or UL) subframes that may be used (e.g., may always be used) as downlink (and/or UL) subframes. For subframes with a default direction, configuration may not be provided or used. For data channels, uplink and downlink subframes may be dynamically configured based on one or more HARQ process aspects (e.g., HARQ process timing). For example, if a WTRU may receive a downlink assignment in subframe n then the n+4 subframe or the subframe for the HARQ ACK/NACK feedback (e.g., subframe n+4) may become an uplink subframe (e.g., automatically). Lee at 41:1-30. Mutually exclusive uplink resources may be configured for two or more cells. For example, a set or subset of uplink resources may be assigned to (or used in) a cell-A (e.g., LPN), and another set or subset of uplink resources that may be non-overlapped with the uplink resources assigned to (or used in) a cell-A may be assigned to (or used in) a cell-B (e.g., Macro). Lee at 42:19-25. The set (or subset) of uplink resources may be defined as a subset of the uplink subframes available. The subframe set {0, 2, 4, 6, 8} may be assigned to (or used in) the cell-A, and

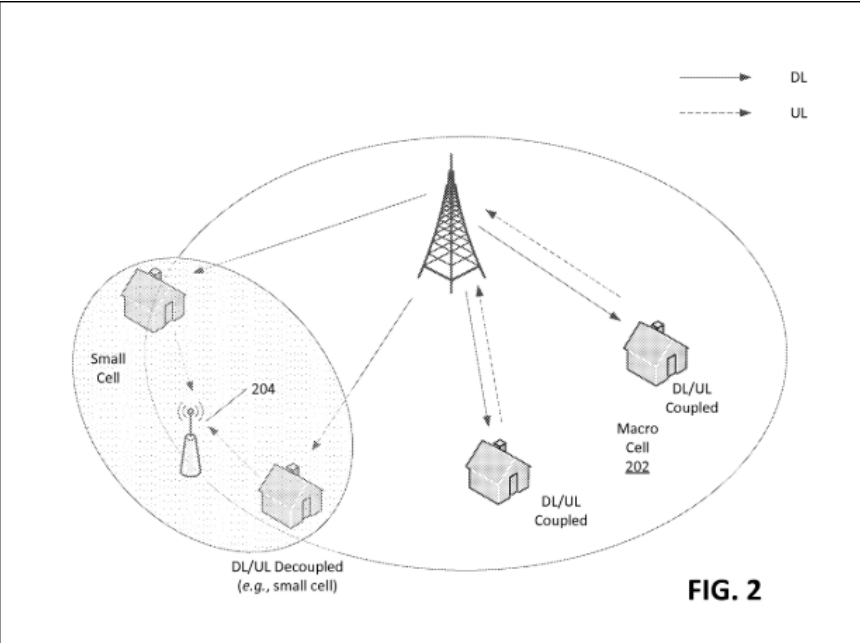
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		another subframe set {1, 3, 5, 7, 9} may be assigned to (or used in) the cell-B. The set (or subset) of uplink resources may be defined as a subset of PRB-pairs in a subframe. The even-numbered PRB-pair may be assigned to (or used in) the cell-A, and the odd-numbered PRB-pair may be assigned to (or used in) the cell-B. Lee at 42:26-34. The assignment (or use) of the resource sets (or subsets) may be WTRU-specific and may apply in decoupled mode. The assignment (or use) of the resource sets (or subsets) may be applicable in scenarios in which the cells (e.g., cell-A and cell-B) may operate in or with the same frequency band. Lee at 42:35-39. Such configuration of LPN cells that may be used for UL transmission or UL communication may be WTRU-specific and may be provided via higher layer signaling to WTRUs that may have Macro cell access. A WTRU may be triggered to obtain measurements on a subset of the LPNs in the configured (or pre-configured) list. Such triggering may be done dynamically via physical layer signaling, or it may be done by higher layer signaling. Lee at 43:43-50. A WTRU may bundle the HARQ ACK/NACK bits corresponding to one or more PDSCH, received in a time window, into one or more ACK/NACK bits. The WTRU may receive a configuration of the HARQ bundling time window through higher layer signaling, e.g., from eNB. The HARQ bundling window may be represented with one or more parameters such as window size (possibly represented in number of subframes, e.g., n), window offset (possibly represented in number of subframes, e.g., m), etc. As an example of window size, it may be set to the same value as the number of subframes between two consecutive configured SR resources. As an example for window offset, it may be defined and/or configured as a number of subframes (e.g., m=4) before the subframe including the next SR resource (e.g., the SR resource to be used to carry the corresponding PDSCH HARQ ACK/NACK bits). For example, for a WTRU with n=10 and m=4, the WTRU may receive certain (e.g., all) potential PDSCHs in a window with the size of 10 subframes which may end 4 subframes before the next SR resource. The WTRU may determine the PDSCH HARQ ACK/NACK bits for certain (e.g., all the) received PDSCH data within the

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		window. The WTRU may bundle all those bits into a single ACK/NACK bit, and it may send the bundled ACK/NACK bit using the next SR resource (e.g., to the eNB). Lee at 62:43-67. The 2013 Application supports these disclosures. <i>See, e.g.</i>, 2013 Application at [0048], [0059], [0060], [0061], [0046], [0107], [0103], [0042], [0044], [0047], [0048], [0058], [0059], [0064], [0082], [0086], [0101], [0107]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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, Lee discloses the start offset information on the resource allocated to the uplink control channel is determined based on a coverage level. For example, Lee discloses this limitation based on the following exemplary citations: The associated (E)PDCCH for the uplink grant may include an indication, e.g., an explicit indication (e.g., one or more bits), of the CE level (e.g., that the WTRU may use) for the corresponding PUSCH transmission. One or more of the CE levels supported and the CE level to use may be indicated in the DCI format that may be used for uplink grant. Lee at 32:18-24. A CE level dependent C-RNTI may be used. For example, C-RNTI-1 may be used to indicate CE level-1, C-RNTI-2 may be used to indicate CE-level-2, and so on. There may be a one-to-one mapping between C-RNTI and CE level. The (E)PDCCH search space may

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		be partitioned, and each partition may correspond to a certain CE level. If a WTRU may receive an uplink grant in a certain (E)PDCCH search space partition, the partition may implicitly indicate the CE level for the PUSCH transmission. Two or more (E)PDCCH search spaces may be configured for uplink communication, and each (E)PDCCH search space may correspond to (or may be configured with) a certain CE level. If a WTRU may receive a DCI for uplink communication, the CE level for the PUSCH transmission may be determined based on the search space from which the WTRU received the DCI. The CE level of the associated (E)PDCCH for the uplink grant may be used as the CE level for the PUSCH transmission. Lee at 32:28-44. An uplink and/or a downlink channel may be repeated over multiple subframes to improve coverage of the channel, and/or the number of repetitions (and/or PSD boosting) may be different according to the coverage enhancement (CE) level. For example, up to a certain number (e.g., four) of CE levels may be supported for an uplink or a downlink channel, and the first CE level (e.g., CE level 1) may be no repetition. The second CE level (e.g., CE level 2) may use a certain number (e.g., five) of repetitions. The third and fourth CE levels (e.g., CE level 3 and CE level 4) may use certain repetitions (e.g., 10 and 20 repetitions, respectively). Lee at 30:32-42. The CE level (e.g., for a PUCCH format) may be configured or determined (e.g., independently) according to the message type that may be included in the PUCCH, e.g., in the decoupled mode of operation. The same CE level may be applied for certain (e.g., all) PUCCH formats in the coupled mode of operation or in other cases. Lee at 30:50-55. The CE level for a PUCCH format that may include HARQ-ACK may be configured or determined based on the coverage limitation level of cell-B (e.g., Macro). The CE level for a PUCCH format that may include positive SR may be configured or determined based on the coverage limitation level of the cell-A (e.g., LPN). Lee at 30:60-65. One or more of PUCCH formats 1a/1b/2/2a/2b/3 may be configured with or determined to have the same CE level. A subset of PUCCH formats may be supported for HARQ-ACK

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		transmission in the decoupled mode of operation. For instance, PUCCH format 1a may be (e.g., the only PUCCH format) supported in the decoupled mode. PUCCH format 1a/2 may be (e.g., the only PUCCH formats) supported in the decoupled mode. Lee at 30:66-31:6. PUCCH format 1 may be configured with or determined to have a CE level that may be smaller than the CE level for other PUCCH formats. Lee at 31:7-9. The CE level for the PUCCH formats that may include HARQ-ACK may be determined by the WTRU during the PRACH procedure. The CE level for the PUCCH format that may include positive SR may be configured by higher layer signaling. For example, the CE level for the PUCCH format that may include HARQ-ACK may be determined from (e.g., may be determined to be the same as) the CE level which may be (or may have been) used for the PRACH preamble transmission from which the WTRU may have received RAR successfully. The CE level for the PUCCH format including positive SR may be configured by higher layer signaling, e.g., when the WTRU may be configured to operate decoupled mode. Lee at 31:10-22. The CE for a PUCCH (and/or PUSCH) may be determined or configured based on the target cell for the PUCCH (and/or PUSCH) transmission. For example, if a PUCCH (and/or PUSCH) may be transmitted to a target cell, cell-A (e.g., Macro), the CE level may be based on the cell-A. If a PUCCH may be transmitted to a target cell, cell-B (e.g., LPN), the CE level may be based on the cell-B. Lee at 31:23-29. The CE level for PUCCH (and/or PUSCH) may be determined or configured based on the physical or virtual cell-ID for the PUCCH (and/or PUSCH) transmission. The CE level may be determined or configured as a function of WTRU ID which may be used for uplink transmission. Lee at 31:23-29. The processor 118 may also be coupled to the GPS chipset 136, which may be configured to provide location information (e.g., longitude and latitude) regarding the current location of the WTRU 102. In addition to, or in lieu of, the information from the GPS chipset 136,

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		the WTRU 102 may receive location information over the air interface 115/116/117 from a base station (e.g., base stations 114 a, 114 b) and/or determine its location based on the timing of the signals being received from two or more nearby base stations. It will be appreciated that the WTRU 102 may acquire location information by way of any suitable location-determination implementation while remaining consistent with an embodiment. 6:40-52. As illustrated in FIG. 2, in a DL/UL coupled case, an LC-MTC device may communicate with a Macro cell 202 for uplink and/or downlink. In a DL/UL decoupled case, an LC-MTC device may communicate with the Macro cell 202 for downlink while transmitting an uplink signal to a low power node (LPN) 204. The uplink signal may be transmitted to the low power node 204, e.g., because of a transmission power difference between the Macro cell 202 and the low power node 204. For example, the Macro cell 202 may transmit signals at 46 dBm, whereas the low power node 204 may transmit signals at 27 dBm. This may result in different downlink coverage. The coverage for uplink may be related to the geographical distance between the WTRU and the base station so that low power node may have better uplink coverage. Lee at 10:28-42.

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	 FIG. 2	
	Lee at FIG. 2. Uplink accessibility to a Macro eNB may be considered. The coverage limited LC-MTC device may start with a coupled scenario (e.g., with the Macro eNB) and then switch its UL (e.g., some or all of its UL) to another node (e.g., the LPN), which may have better UL coverage. The coverage limited LC-MTC device may have DL but not UL (or limited UL) coverage with one node (e.g., the Macro eNB) so that it may (e.g., may need to) start with another node (e.g., the LPN) for UL (or at least some UL) from the beginning. Lee at 17:42-50. A WTRU may operate in, be configured with, or be configured to operate in a coverage limited mode of operation for certain or all channels in DL and/or UL. Coverage limited and coverage enhanced may be used interchangeably. Lee at 20:28-32.	

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		In a coverage limited mode, a WTRU and/or an eNB communicating with the WTRU may perform certain actions to improve the coverage or performance on one or more channels such as repetition or power boosting. Lee at 20:33-36. A WTRU may operate in coverage limited mode when the WTRU may be (or may be considered) coverage limited. Lee at 20:51-52. A WTRU may be (or may be considered) coverage limited in a certain direction (e.g., DL and/or UL) if one or more of the following may reach or cross (e.g., become higher or lower than) a threshold: a measurement (e.g., RSRP) that may be made by the WTRU, a value derived or determined, e.g., by the WTRU, from a measurement (e.g., pathloss), and a difference between one or more values or measurements that may be determined by the WTRU. Different levels of coverage limitation may be performed. Different thresholds may be used for the different levels. Lee at 20:53-62. For example, a WTRU, such as one configured with or operating in the decoupled mode, may be configured with and/or operate in a coverage limited mode of operation for one direction of communication (e.g., DL) while the other direction of communication (e.g., UL) may use or be in non-coverage limited mode of operation. The coverage limited mode of operation may include the use of coverage enhancement transmission schemes, such as repetitions, TTI bundling, and/or PSD boosting of data and/or control channels. The non-coverage limited mode of operation may include legacy transmission schemes used for LTE device (e.g., coverage enhancements schemes may not be used). Lee at 29:65-30:9. The timing for HARQ procedures may be according to the coverage limited mode of operation for both downlink and uplink although uplink may not be configured as coverage limited mode of operation. The pathloss for uplink power control may be obtained from associated uplink LPN if the uplink may be configured with a non-coverage limited mode of operation while the downlink may be configured with a coverage limited mode of operation. Lee at 30:10-17.

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		Determination of and/or use of a CE level for a channel (e.g., PUCCH and/or PUSCH) may be by a WTRU. Configuration of a CE level (e.g., for use by a WTRU) which may be for a channel (e.g., PUCCH and/or PUSCH) may be by a cell. The WTRU may receive such configuration from the cell, e.g., via signaling such as higher layer signaling. Lee at 31:37-42. The CE level for each cell (e.g., for PUSCH transmission) may be configured or determined independently (e.g., for or by the WTRU). The CE level for the cell-B (e.g., Macro) may be determined (e.g., by the WTRU) during a RACH procedure. The CE level may be (or may be based on) the CE level the WTRU may use or may have used for the PRACH preamble transmission for which the WTRU may receive or may have received RAR successfully. The CE level for the cell-A (e.g., LPN) may be configured via higher layer signaling from the cell-B. The CE level for the cell-A (e.g., LPN) may be determined (e.g., by the WTRU) during a RACH procedure that may target cell-A. This RACH procedure may be separate from a RACH procedure for the cell-B. Lee at 31:62-32:9. The CE level for a PUSCH transmission may be indicated by or in the associated (E)PDCCH for the PUSCH (e.g., which may include the UL grant for the PUSCH). Lee at 32:15-17. The associated (E)PDCCH for the uplink grant may include an indication, e.g., an explicit indication (e.g., one or more bits), of the CE level (e.g., that the WTRU may use) for the corresponding PUSCH transmission. One or more of the CE levels supported and the CE level to use may be indicated in the DCI format that may be used for uplink grant. Lee at 32:18-24. A CE level dependent C-RNTI may be used. For example, C-RNTI-1 may be used to indicate CE level-1, C-RNTI-2 may be used to indicate CE-level-2, and so on. There may be a one-to-one mapping between C-RNTI and CE level. The (E)PDCCH search space may be partitioned, and each partition may correspond to a certain CE level. If a WTRU may receive an uplink grant in a certain (E)PDCCH search space partition, the partition may

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		implicitly indicate the CE level for the PUSCH transmission. Two or more (E)PDCCH search spaces may be configured for uplink communication, and each (E)PDCCH search space may correspond to (or may be configured with) a certain CE level. If a WTRU may receive a DCI for uplink communication, the CE level for the PUSCH transmission may be determined based on the search space from which the WTRU received the DCI. The CE level of the associated (E)PDCCH for the uplink grant may be used as the CE level for the PUSCH transmission. Lee at 32:28-44. The CE level for a (E)PDCCH transmission may be determined based on the DCI format, which may be carried in the (E)PDCCH. The CE level for one or more DCI formats that may be associated with the downlink communication (e.g., DCI format 1A/2/2A/2B/2C) may be determined based on the CE level for the cell-B (e.g., Macro). The CE level for one or more DCI formats that may be associated with the uplink communication (e.g., DCI format 0/4) may be determined based on the CE level for the cell-A (e.g., LPN). The CE level for one or more DCI formats that may be associated with the downlink communication may be determined by the cell-B (e.g., Macro). The CE level for one or more DCI formats that may be associated with the uplink communication may be determined by the cell-A (e.g., LPN). The CE level for one or more DCI formats that may be associated with the downlink communication may be determined during a RACH procedure. For example, the CE level which may be used by a WTRU for the PRACH preamble transmission for which the WTRU may receive a RAR successfully may be or may determine the CE level for the DCI formats which may be associated with the downlink (or UL) communication. The CE level for one or more DCI formats which may be associated with the uplink (or DL) communication may be configured via higher layer signaling. Lee at 33:3-27. The WTRU may, for example, based on UL or DL pathloss, select an UL cell that it may consider to have better uplink coverage, for example, the cell with the lowest UL or DL pathloss. Lee at 34:25-28.

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		A WTRU may have coverage, which may include limited coverage, in the DL to the Macro cell and may have limited coverage in the UL that may be more limited than the coverage in the DL. The WTRU may be handed off (e.g., by the Macro) to a LPN (e.g., nearby LPN) for UL transmissions (or UL communication), e.g., to improve the performance. The Macro cell may assist the WTRU in discovering nearby LPNs. The WTRU may have no UL coverage (or may have coverage that may be limited beyond a threshold) to the Macro and may independently find and connect to a LPN for UL and to a Macro cell for DL. A WTRU may maintain separate synchronization to Macro and LPN cells for DL and UL transmissions, e.g., if there is no synchronization between the Macro cell and the LPN. Lee at 42:47-60. A WTRU may be indicated with UL grant information that may be included in a MAC CE received from the network. A WTRU may use the included UL grant to transmit the corresponding HARQ feedback of received MAC CE information on the allocated PUSCH. The WTRU may be allocated with PUSCH for the purpose of HARQ feedback rather than using PUCCH in the decoupled UL/DL scenario. For example, a WTRU may receive MAC CE with UL grant information for each scheduled PDSCH reception of data, which may be used by the WTRU to transmit the corresponding HARQ feedback for reception of PDSCH data on PUSCH. The WTRU may receive reduced UL grant information in the MAC CE. The MAC CE UL grant may include RB assignment and/or modulation and coding scheme. The WTRU may receive the UL resources for HARQ A/N transmission, or may include resources for UL data and/or for other UL control information. Lee at 67:38-54. The 2013 Application supports these disclosures. <i>See, e.g.</i>, 2013 Application at [0046], [0028], [0029], [0034], [0037], [0046], [0047], [0057], [0072], [0073], [0102]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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

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		combine Lee 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, Lee 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, Lee discloses this limitation based on the following exemplary citations: If a PUCCH may include HARQ-ACK that may correspond to a PDSCH from cell-A (e.g., Macro), the PUCCH may be transmitted (e.g., by the WTRU) to the cell-A (e.g., Macro). If a PUCCH may include a positive scheduling request (SR), the PUCCH may be transmitted (e.g., by the WTRU) to a cell-B (e.g., LPN). For example, the PUCCH formats that may include HARQ-ACK may be transmitted (e.g., by the WTRU) to the cell from which a WTRU may receive or may have received a corresponding PDSCH. For example, if a WTRU may receive a PDSCH from cell-A (e.g., Macro), the cell-A may be the target cell for the PUCCH formats including HARQ-ACK (e.g., PUCCH format 1a/1b/2a/2b/3). The PUCCH formats that may include SR (e.g., positive SR) may be transmitted (e.g., by the WTRU) to the cell (e.g., LPN) which may be configured or determined as an uplink cell (or as a cell for UL communication), e.g., in a decoupled mode of operation. Lee at 26:53-27:2. For a contention-based procedure, contention resolution may occur at 308 (e.g., msg4). A contention resolution message may include information (e.g., C-RNTI) that may indicate the WTRU for which the RAR may have been intended. If the WTRU may receive a contention resolution message indicating that it as the intended WTRU, the WTRU may consider the random access procedure 300 successful. If not, the WTRU may consider the random access procedure 300 a failure and may try again. Lee at 14:41-49.

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		FIG. 3 illustrates an example random access procedure 300. At 302 (e.g., msg1), the WTRU may transmit a preamble, which may be at a certain power level. An eNB that may receive the preamble may respond with a Random Access Response (RAR), e.g., msg2, at 304. If the WTRU may not receive the RAR within a certain time window, the WTRU may transmit another preamble (which may be different from the previous preamble) and may transmit it at a higher power (e.g., ramp up the power such as according to a ramping protocol). The WTRU may repeat transmitting preambles until at least one of the following may happen: the WTRU receives an RAR, the WTRU reaches (or exceeds) its maximum power, and/or the WTRU reaches (or exceeds) the maximum number of ramps which may be permitted. If the WTRU may reach or exceed one of the maximums, the WTRU may consider the random access procedure 300 to fail. The ramping step and maximum number of ramp may be provided by the eNB, such as via system information that may be broadcast. Lee at 14:14-31.

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		<pre> sequenceDiagram participant WTRU participant eNB Note over WTRU: 302 WTRU->>eNB: Random Access Preamble Note over eNB: 304 eNB->>WTRU: Random Access Response Note over WTRU: 306 WTRU->>eNB: Scheduled Transmission Note over eNB: 308 eNB->>WTRU: Contention Resolution </pre> The diagram illustrates a random access procedure between a WTRU (Wireless Terminal) and an eNB (evolved NodeB). The WTRU initiates the process by sending a 'Random Access Preamble' (labeled 302). The eNB responds with a 'Random Access Response' (labeled 304). The WTRU then sends a 'Scheduled Transmission' (labeled 306), and the eNB provides 'Contention Resolution' (labeled 308). The entire sequence is labeled FIG. 3. Lee at FIG. 3. When a cell is switched to or used for a certain direction (e.g., UL or DL), the cell may be switched to or used for certain (e.g., some or all) data channels and/or control channels in that direction. When a cell is switched to or used for a certain direction (e.g., UL or DL), the cell may be switched to or used at least for data channels in that direction and may include the associated feedback control channels, which may be in the opposite direction. For example, using a cell for DL (or DL communication) may mean using it for at least PDSCH and PUCCH, which may carry HARQ feedback for the PDSCH. Using a cell for UL (or UL communication) may mean using it for at least PUSCH or PUSCH and PHICH, which may carry HARQ feedback for the PUSCH. Lee at 18:10-23.

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		When switching communication in a certain direction (e.g., DL and/or UL) to another cell or node, at least one data channel in that direction (e.g., PDSCH and/or PUSCH) and/or certain associated control channels or signaling for the at least one data channel in that direction may be switched. This may include scheduling grants, which may be carried on a control channel (e.g., PDCCH or EPDCCH) in the same or opposite direction and/or feedback, which may be carried on a channel such as a control channel in the opposite direction (e.g., PUCCH and/or PHICH). Lee at 18:55-64. WTRU communication in the DL with a node or cell may include receiving DL data and/or control channels from the node or cell, which may include one or more of PDSCH, PDCCH, ePDCCH, which may carry UL and/or DL grants, and/or PHICH. WTRU communication in the UL with a node or cell may include transmitting UL data and/or control channels to the node or cell, which may include one or more of PUSCH and PUCCH. Lee at 19:19-26. An eNB, node, or cell (e.g., Macro or LPN) may transmit one or more of the signals described herein, which may be received by a WTRU. An eNB, node, or cell (e.g., Macro or LPN) may receive or intend to receive one or more of the signals described herein, which may be transmitted by a WTRU. Lee at 19:27-32. UL communication may include certain UL channels and may include certain (e.g., related) DL channels. UL communication may include (e.g., include use of) one or more UL channels, such as at least one of PUSCH, PUCCH, SRS, and/or PRACH. These one or more UL channels may be transmitted by a WTRU and/or monitored and/or received by a cell or eNB. Such transmission, monitoring, and/or reception may constitute use of the channel. UL communication may include (e.g., include use of) one or more DL channels that may be associated with an UL channel or transmission such as a PDCCH or PHICH, which may be associated with an UL channel. A PDCCH, which may be associated with an UL channel, may include, but may not be limited to one or more of a PDCCH which may provide an UL grant or allocation, e.g., for a PUSCH transmission, a PDCCH which may provide a trigger for an aperiodic SRS transmission, and a PDCCH which may include a

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		PDCCH order, e.g., for UL synchronization which may trigger or result in a PRACH transmission. A PHICH, which may be associated with a PUSCH may provide feedback (e.g., ACK/NACK) for or which may correspond to a PUSCH transmission. These one or more DL channels may be transmitted by a cell or eNB and/or monitored and/or received by a WTRU. Such transmission, monitoring, and/or reception may constitute use of the channel. Use of a cell or eNB for UL communication may not preclude use of the cell or eNB for DL communication. WTRU use of a cell or eNB for UL communication may not preclude its use of the cell or eNB for (e.g., for reception and/or use of) one or more of system information, broadcast signals and/or channels, synchronization signals and/or channels, and/or reference signals such as CRS. Lee at 19:39-20:3. A WTRU may operate in coverage limited mode when the WTRU may be (or may be considered) coverage limited. Lee at 20:51-52. A WTRU may be (or may be considered) coverage limited in a certain direction (e.g., DL and/or UL) if one or more of the following may reach or cross (e.g., become higher or lower than) a threshold: a measurement (e.g., RSRP) that may be made by the WTRU, a value derived or determined, e.g., by the WTRU, from a measurement (e.g., pathloss), and a difference between one or more values or measurements that may be determined by the WTRU. Different levels of coverage limitation may be performed. Different thresholds may be used for the different levels. Lee at 20:53-62. Downlink communication (e.g., by a WTRU) may include one or more of receiving PDSCH, monitoring (E)PDCCH associated with the PDSCH, and/or sending HARQ-ACK corresponding to the PDSCH. Receiving downlink signals and sending HARQ-ACK corresponding to the downlink signals may be from and/or to (or based on) the first cell (e.g., Macro). Lee at 26:7-14. A WTRU may receive and/or monitor (E)PDCCH associated with PDSCH (e.g., DL assignment) from the first cell. A WTRU may assume that the PDSCH, (E)PDCCH associated with the PDSCH, and/or HARQ-ACK corresponding to the PDSCH are from/to

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		a quasi-collocated transmission point. The same time/frequency offset may be used for demodulation (e.g., of one or more of these channels). For HARQ-ACK transmission, the timing advance may be applied (e.g., by the WTRU) according to a downlink timing reference, which may be of (or determined from the DL timing of) the first cell. Lee at 26:7-14. A PUCCH may be transmitted to cell-A (e.g., Macro) or cell-B (e.g., LPN) according to the message type included in the PUCCH. The message type may be defined as a PUCCH format (e.g., 1/1a/1b/2/2a/2b/3). The target cell to which a WTRU may transmit a PUCCH may be determined according to the PUCCH format. Lee at 26:47-52. HARQ-ACK and positive SR may not be transmitted in the same PUCCH in the decoupled mode of operation or in other scenarios. For example, PUCCH format 1a may be used for 1-bit HARQ-ACK with positive SR (e.g., in FDD) if a WTRU may be in the coupled mode of operation. PUCCH format 1a may be used for (e.g., only for) 1-bit HARQ-ACK (e.g., in FDD) if a WTRU may be in the decoupled mode of operation. For example, the positive SR may not be multiplexed (e.g., in PUCCH format 1a) in the decoupled mode of operation. A WTRU may use PUCCH format 1 for positive SR transmission. If a WTRU may or may need to transmit a HARQ-ACK and a positive SR in the same uplink subframe, the WTRU may drop the positive SR in the subframe and transmit the HARQ-ACK, e.g., to the cell-A (e.g., Macro) in the subframe. The WTRU may drop the HARQ-ACK and transmit the positive SR, e.g., to cell-B (e.g., LPN) in the subframe. Lee at 27:3-19. If a WTRU may have or may be scheduled for UCI and UL unicast traffic together (e.g., in the same subframe or TTI) the WTRU may drop the unicast traffic and may (e.g., may only) transmit the UCI. If a WTRU may have or be scheduled for UCI and UL unicast traffic together (e.g., in the same subframe or TTI) a WTRU may consider this as an error case. A WTRU may transmit one of the types of traffic to one of the cells or may not transmit PUSCH (e.g., any PUSCH). If a PUCCH may include a UCI including HARQ-ACK, a WTRU may transmit HARQ-ACK (e.g., may only transmit HARQ-ACK). A

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		WTRU may use at least one of PUCCH or PUSCH for HARQ-ACK transmission, e.g., if a WTRU may have HARQ-ACK to transmit. Lee at 27:33-45. The CE level for a PUCCH format that may include HARQ-ACK may be configured or determined based on the coverage limitation level of cell-B (e.g., Macro). The CE level for a PUCCH format that may include positive SR may be configured or determined based on the coverage limitation level of the cell-A (e.g., LPN). Lee at 30:60-65. To determine the UL and DL subframe configuration, for example, a rule (e.g., a predefined rule) may be applied to define uplink and downlink subframes. For example, at least certain subframe numbers (e.g., one or more of 0, 4, 5, and 9) may be defined as downlink subframes and the others may be considered as uplink subframes. The MBSFN subframe configuration may be used so that the subframes configured as MBSFN subframes may be considered as uplink subframes and the others may be considered as downlink subframes. The uplink and downlink subframes may be configured via higher layer signaling. There may be default downlink (and/or UL) subframes that may be used (e.g., may always be used) as downlink (and/or UL) subframes. For subframes with a default direction, configuration may not be provided or used. For data channels, uplink and downlink subframes may be dynamically configured based on one or more HARQ process aspects (e.g., HARQ process timing). For example, if a WTRU may receive a downlink assignment in subframe n then the n+4 subframe or the subframe for the HARQ ACK/NACK feedback (e.g., subframe n+4) may become an uplink subframe (e.g., automatically). Lee at 41:1-30. ACK/NACK may be a feedback for a HARQ process or procedure. ACK/NACK may represent one or more of ACK (positive acknowledgement), NACK (negative acknowledgement), and DTX (discontinuous transmission which may mean no acknowledgement). Lee at 62:1-5. A WTRU may bundle the HARQ ACK/NACK bits corresponding to one or more PDSCH, received in a time window, into one or more ACK/NACK bits. The WTRU may receive a

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		configuration of the HARQ bundling time window through higher layer signaling, e.g., from eNB. The HARQ bundling window may be represented with one or more parameters such as window size (possibly represented in number of subframes, e.g., n), window offset (possibly represented in number of subframes, e.g., m), etc. As an example of window size, it may be set to the same value as the number of subframes between two consecutive configured SR resources. As an example for window offset, it may be defined and/or configured as a number of subframes (e.g., m=4) before the subframe including the next SR resource (e.g., the SR resource to be used to carry the corresponding PDSCH HARQ ACK/NACK bits). For example, for a WTRU with n=10 and m=4, the WTRU may receive certain (e.g., all) potential PDSCHs in a window with the size of 10 subframes which may end 4 subframes before the next SR resource. The WTRU may determine the PDSCH HARQ ACK/NACK bits for certain (e.g., all the) received PDSCH data within the window. The WTRU may bundle all those bits into a single ACK/NACK bit, and it may send the bundled ACK/NACK bit using the next SR resource (e.g., to the eNB). Lee at 62:43-67. PUSCH-based HARQ ACK/NACK may be provided. A WTRU may transmit a PUSCH carrying the corresponding PDSCH HARQ ACK/NACK bit(s), e.g., when the WTRU receives one or more PDSCH. The WTRU may not transmit a PUCCH including the corresponding PDSCH HARQ ACK/NACK bits, when the WTRU receives one or more PDSCHs. The WTRU may transmit the PDSCH HARQ ACK/NACK bit(s) of one or more PDSCHs in the same PUSCH. For example, the WTRU may transmit the HARQ ACK/NACK bit(s) of each PDSCH received in a certain period of time, e.g., a time window, in the same PUSCH. This window may be referred to as HARQ bundling window. A PUSCH may carry PDSCH HARQ ACK/NACK bit(s) and/or information regarding the corresponding PDSCH(s). For example, the PUSCH may carry indications of the DL HARQ processes of the corresponding PDSCH(s). The PUSCH may carry indications of the frequency and/or time locations the corresponding PDSCH(s) may be received. The WTRU may receive one or more configuration parameters defining the HARQ bundling window, e.g., window size. The size of the bundling window may be a value equal or greater than one. The WTRU may receive one or more UL grants for each

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		window to carry the PDSCH HARQ ACK/NACK bits of the corresponding window. The WTRU may derive the frequency, time location and/or other transmission parameters of the PUSCH carrying the PDSCH HARQ ACK/NACK bits based on one or more DL grants of the PDSCH and/or PDSCH in the corresponding HARQ bundling window. For example, the transmission parameters of the PUSCH carrying the PDSCH HARQ ACK/NACK bits may be derived based on the characteristics of the first (or last) PDSCH grant in the corresponding bundling window. The WTRU may derive the frequency, time location and/or other parameters of the PUSCH carrying the PDSCH HARQ ACK/NACK bits, e.g., based on the boundaries of the bundling window. For example, the related PUSCH may be transmitted in n subframes after the end of the bundling window. Lee at 64:19-56. A WTRU may be indicated with UL grant information that may be included in a MAC CE received from the network. A WTRU may use the included UL grant to transmit the corresponding HARQ feedback of received MAC CE information on the allocated PUSCH. The WTRU may be allocated with PUSCH for the purpose of HARQ feedback rather than using PUCCH in the decoupled UL/DL scenario. For example, a WTRU may receive MAC CE with UL grant information for each scheduled PDSCH reception of data, which may be used by the WTRU to transmit the corresponding HARQ feedback for reception of PDSCH data on PUSCH. The WTRU may receive reduced UL grant information in the MAC CE. The MAC CE UL grant may include RB assignment and/or modulation and coding scheme. The WTRU may receive the UL resources for HARQ A/N transmission, or may include resources for UL data and/or for other UL control information. Lee at 67:38-54. The 2013 Application supports these disclosures. <i>See, e.g.</i>, 2013 Application at [0085], [0092], [0038], [0046], [0059], [0083], [0084], [0085], [0086], [087], [0088], [0089], [0090], [0091], [0092], [0093], [0094], [0095], [0097], [0098], [0099], [0100], [0101], [0104], [0105], [0107]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee renders it obvious, either alone, in combination with the knowledge of a person of ordinary

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

2. Claim 2

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2	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, Lee 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, Lee discloses this limitation based on the following exemplary citations: See limitation 1[h]. As illustrated in FIG. 2, in a DL/UL coupled case, an LC-MTC device may communicate with a Macro cell 202 for uplink and/or downlink. In a DL/UL decoupled case, an LC-MTC device may communicate with the Macro cell 202 for downlink while transmitting an uplink signal to a low power node (LPN) 204. The uplink signal may be transmitted to the low power node 204, e.g., because of a transmission power difference between the Macro cell 202 and the low power node 204. For example, the Macro cell 202 may transmit signals at 46 dBm, whereas the low power node 204 may transmit signals at 27 dBm. This may result in different downlink coverage. The coverage for uplink may be related to the geographical distance between the WTRU and the base station so that low power node may have better uplink coverage. Lee at 10:28-42.

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		The diagram illustrates a network architecture with a central tower (base station) and three types of cells. A legend indicates that solid arrows represent Downlink (DL) and dashed arrows represent Uplink (UL). The cells are: 1) A 'Small Cell' (house icon) labeled 'DL/UL Coupled'. 2) A 'Macro Cell 202' (house icon) labeled 'DL/UL Coupled'. 3) A 'DL/UL Decoupled (e.g., small cell)' (house icon) labeled 'DL/UL Decoupled (e.g., small cell)'. A reference numeral '204' points to a specific cell within the DL/UL Decoupled group. The tower is connected to all three cell types via both DL and UL paths. Lee at FIG. 2. When using a contention-based RA procedure, the WTRU may initiate the process by transmitting a RA preamble that it may randomly select from a common pool of preambles that may be communicated to the WTRU by the network, e.g., via broadcasted system information. The WTRU may transmit the preamble on a PRACH resource (e.g., a resource in time and frequency) that the WTRU may select from a set of allowed resources that may be communicated to the WTRU by the network, e.g., via broadcasted system information. The cell's configured set of PRACH resources may be or may include this set of allowed PRACH resources. The unit of time for the PRACH resource may be a subframe. The subframe the WTRU may select for the PRACH resource may be the next subframe configured for PRACH in which the WTRU may transmit the PRACH (e.g., based on timing, measurement, and/or other WTRU considerations). The WTRU may select a frequency aspect of the PRACH resource (e.g., the resource blocks (RBs)) in the

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		selected subframe, for example, based on parameters communicated to the WTRU by the network, e.g., via broadcasted system information. A frequency resource may be allowed for PRACH in a subframe for FDD or other cases. It may be defined by a starting (e.g., lowest) RB number that may be provided by the network, e.g., prach-FrequencyOffset, and may have a fixed bandwidth, such as six RBs. Lee at 13:38-63. Uplink accessibility to a Macro eNB may be considered. The coverage limited LC-MTC device may start with a coupled scenario (e.g., with the Macro eNB) and then switch its UL (e.g., some or all of its UL) to another node (e.g., the LPN), which may have better UL coverage. The coverage limited LC-MTC device may have DL but not UL (or limited UL) coverage with one node (e.g., the Macro eNB) so that it may (e.g., may need to) start with another node (e.g., the LPN) for UL (or at least some UL) from the beginning. Lee at 17:42-50. For example, a WTRU, such as one configured with or operating in the decoupled mode, may be configured with and/or operate in a coverage limited mode of operation for one direction of communication (e.g., DL) while the other direction of communication (e.g., UL) may use or be in non-coverage limited mode of operation. The coverage limited mode of operation may include the use of coverage enhancement transmission schemes, such as repetitions, TTI bundling, and/or PSD boosting of data and/or control channels. The non-coverage limited mode of operation may include legacy transmission schemes used for LTE device (e.g., coverage enhancements schemes may not be used). Lee at 29:65-30:9. The timing for HARQ procedures may be according to the coverage limited mode of operation for both downlink and uplink although uplink may not be configured as coverage limited mode of operation. The pathloss for uplink power control may be obtained from associated uplink LPN if the uplink may be configured with a non-coverage limited mode of operation while the downlink may be configured with a coverage limited mode of operation. Lee at 30:10-17.

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		An uplink and/or a downlink channel may be repeated over multiple subframes to improve coverage of the channel, and/or the number of repetitions (and/or PSD boosting) may be different according to the coverage enhancement (CE) level. For example, up to a certain number (e.g., four) of CE levels may be supported for an uplink or a downlink channel, and the first CE level (e.g., CE level 1) may be no repetition. The second CE level (e.g., CE level 2) may use a certain number (e.g., five) of repetitions. The third and fourth CE levels (e.g., CE level 3 and CE level 4) may use certain repetitions (e.g., 10 and 20 repetitions, respectively). Lee at 30:32-42. The CE level for a PUCCH format that may include HARQ-ACK may be configured or determined based on the coverage limitation level of cell-B (e.g., Macro). The CE level for a PUCCH format that may include positive SR may be configured or determined based on the coverage limitation level of the cell-A (e.g., LPN). Lee at 30:60-65. The CE level for the PUCCH formats that may include HARQ-ACK may be determined by the WTRU during the PRACH procedure. The CE level for the PUCCH format that may include positive SR may be configured by higher layer signaling. For example, the CE level for the PUCCH format that may include HARQ-ACK may be determined from (e.g., may be determined to be the same as) the CE level which may be (or may have been) used for the PRACH preamble transmission from which the WTRU may have received RAR successfully. The CE level for the PUCCH format including positive SR may be configured by higher layer signaling, e.g., when the WTRU may be configured to operate decoupled mode. Lee at 31:10-22. The associated (E)PDCCH for the uplink grant may include an indication, e.g., an explicit indication (e.g., one or more bits), of the CE level (e.g., that the WTRU may use) for the corresponding PUSCH transmission. One or more of the CE levels supported and the CE level to use may be indicated in the DCI format that may be used for uplink grant. Lee at 32:18-24.

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		The 2013 Application supports these disclosures. <i>See, e.g.</i>, 2013 Application at [0046], [0028], [0029], [0034], [0037], [0046], [0047], [0057], [0072], [0073], [0102]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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

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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, Lee 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, Lee discloses this limitation based on the following exemplary citations: <i>See</i> limitation 1[pre]. The communications system 100 may also include a base station 114 a and a base station 114 b. Each of the base stations 114 a, 114 b may be any type of device configured to wirelessly interface with at least one of the WTRUs 102 a, 102 b, 102 c, 102 d to facilitate access to one or more communication networks, such as the core network 106/107/109, the Internet 110, and/or the networks 112. By way of example, the base stations 114 a, 114 b may be a base transceiver station (BTS), a Node-B, an eNode B, a Home Node B, a Home eNode B, a site controller, an access point (AP), a wireless router, and the like. While the

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		base stations 114 a, 114 b are each depicted as a single element, it will be appreciated that the base stations 114 a, 114 b may include any number of interconnected base stations and/or network elements. Lee at 3:20-34. A low cost machine type communication (LC-MTC) device working on an LTE network (e.g., a smart meter located in a basement of a house) may assume higher received Signal to Interference Noise Ratio (SINR) losses (e.g., up to 15 dB) as compared to some other LTE devices. The throughput and/or delay criteria for the LC-MTC may also be relaxed. A device's downlink (DL) and uplink (UL) communications may be with the same cell, e.g., in a DL/UL coupled case. Lee at 10:23-27. The 2013 Application supports these disclosures. <i>See, e.g.</i>, 2013 Application at [0010], [0011], [0068], [0090]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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	At least under Pegasus's apparent infringement theory, Lee 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, Lee discloses this limitation based on the following exemplary citations: <i>See limitation 1[a].</i>

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	allocated to the uplink control channel;	As shown in FIG. 1E, the RAN 105 may include base stations 180 a, 180 b, 180 c, and an ASN gateway 182, though it will be appreciated that the RAN 105 may include any number of base stations and ASN gateways while remaining consistent with an embodiment. The base stations 180 a, 180 b, 180 c may each be associated with a particular cell (not shown) in the RAN 105 and may each include one or more transceivers for communicating with the WTRUs 102 a, 102 b, 102 c over the air interface 117. In one embodiment, the base stations 180 a, 180 b, 180 c may implement MIMO technology. Thus, the base station 180 a, for example, may use multiple antennas to transmit wireless signals to, and receive wireless signals from, the WTRU 102 a. The base stations 180 a, 180 b, 180 c may also provide mobility management functions, such as handoff triggering, tunnel establishment, radio resource management, traffic classification, quality of service (QoS) policy enforcement, and the like. The ASN gateway 182 may serve as a traffic aggregation point and may be responsible for paging, caching of subscriber profiles, routing to the core network 109, and the like. Lee at 8:66-9:19. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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[b]	transmitting downlink control information for scheduling the downlink data; and	At least under Pegasus's apparent infringement theory, Lee discloses transmitting downlink control information for scheduling the downlink data. For example, Lee discloses this limitation based on the following exemplary citations: <i>See</i> limitation 1[b].

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		A PUCCH may be associated with both cell-A (e.g., LPN) and cell-B (e.g., Macro) according to the information type (e.g., HARQ-ACK, CSI, SR) that may be carried by the PUCCH. A PUCCH that may include HARQ-ACK that may correspond to a PDSCH may be sent to cell-B (e.g., Macro), while a PUCCH that may include SR may be sent to cell-A (e.g., LPN). In another example, (E)PDCCH may be associated with both cell-A (e.g., LPN) and cell-B (e.g., Macro) according to the DCI format (e.g., DCI format 0 and DCI format 1A). A WTRU may monitor/receive a (E)PDCCH that may include a DCI format such as DCI format 1A from a cell-B (e.g., Macro), for example since it may be related to downlink assignment. A WTRU may monitor/receive (E)PDCCH that may include a DCI format such as DCI format 0 from a cell-A (e.g., LPN), for example, since it may be related to uplink grant. Lee at 25:14-29. Fully decoupled, fully decoupled operation, fully decoupled mode of operation, and other variations, may mean or may imply but not be limited to a scenario or operation in which uplink (e.g., all UL) channels may be associated with one cell and downlink (e.g., all DL) channels may be associated with another cell. For example, uplink (e.g., all uplink) channels, which may include PUCCH and PUSCH may be transmitted to a cell-A (e.g., LPN), while downlink (e.g., all downlink) channels such as PDSCH and (E)PDCCH may be received from a cell-B (e.g., Macro). Lee at 24:64-25:5. A PDCCH (or EPDCCH) may be monitored/received (e.g., by a WTRU) from either cell-A (e.g., Macro) or cell-B (e.g., LPN) according to the DCI format which may be carried by the PDCCH (or EPDCCH). In an example, if a WTRU may attempt to decode a DCI format which may be related to uplink grant (e.g. DCI formats 0 and/or 4), the WTRU may monitor PDCCH (or EPDCCH) based on the configuration of the cell-B (e.g., LPN). The WTRU may monitor PDCCH (or EPDCCH) based on the configuration of the cell-A (e.g., Macro) if the WTRU may attempt to decode a DCI format which may be related to downlink grant. Lee at 27:60-28:4. One or more symbols, e.g., the first 1 to 3 OFDM symbol(s) in each subframe in the DL, may be occupied by one or more of PCFICH, PHICH, and PDCCH according to the

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		overhead of the control channels, and the symbols occupied may be referred to as the DL control region. The PCFICH may be transmitted, for example, in the first OFDM symbol (e.g., symbol 0) in each subframe and/or may indicate the number of OFDM symbols used for the DL control region in the subframe. A WTRU may detect a Control Format Indicator (CFI) from a PCFICH, and the DL control region may be defined in the subframe according to the CFI value. The PCFICH may be skipped if a subframe may be defined as a non-PDSCH supportable subframe. DL symbols that are not part of a DL control region may be referred to as the data or PDSCH region. Enhanced PDCCH (EPDCCH) may be provided and/or used in the PDSCH region. The location of an EPDCCH in that region may be signaled, for example, via higher layer signaling such as Radio Resource Control (RRC) signaling, to a WTRU that may (or may be expected to) monitor, receive, or otherwise use that EPDCCH. The PDCCH and/or EPDCCH may provide control information, resource allocations (e.g., grants) for UL and/or DL transmission, and the like. Lee at 11:25-47. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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, Lee discloses transmitting the downlink data. For example, Lee discloses this limitation based on the following exemplary citations: <i>See</i> limitation 1[c].

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		One or more symbols, e.g., the first 1 to 3 OFDM symbol(s) in each subframe in the DL, may be occupied by one or more of PCFICH, PHICH, and PDCCH according to the overhead of the control channels, and the symbols occupied may be referred to as the DL control region. The PCFICH may be transmitted, for example, in the first OFDM symbol (e.g., symbol 0) in each subframe and/or may indicate the number of OFDM symbols used for the DL control region in the subframe. A WTRU may detect a Control Format Indicator (CFI) from a PCFICH, and the DL control region may be defined in the subframe according to the CFI value. The PCFICH may be skipped if a subframe may be defined as a non-PDSCH supportable subframe. DL symbols that are not part of a DL control region may be referred to as the data or PDSCH region. Enhanced PDCCH (EPDCCH) may be provided and/or used in the PDSCH region. The location of an EPDCCH in that region may be signaled, for example, via higher layer signaling such as Radio Resource Control (RRC) signaling, to a WTRU that may (or may be expected to) monitor, receive, or otherwise use that EPDCCH. The PDCCH and/or EPDCCH may provide control information, resource allocations (e.g., grants) for UL and/or DL transmission, and the like. Lee at 11:25-47. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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	At least under Pegasus's apparent infringement theory, Lee 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

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	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;	allocated to the uplink control channel. For example, Lee discloses this limitation based on the following exemplary citations: See limitation 1[e]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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[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, Lee 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, Lee discloses this limitation based on the following exemplary citations: See limitation 1[f]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

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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 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, Lee 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, Lee discloses this limitation based on the following exemplary citations: See limitation 1[g]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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[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, Lee discloses the start offset information on the resource allocated to the uplink control channel is determined based on a coverage level. For example, Lee discloses this limitation based on the following exemplary citations: See limitation 1[h]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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

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		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, Lee 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, Lee discloses this limitation based on the following exemplary citations: See limitation 1[i]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

4. Claim 4

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4	The method of claim 3, wherein: at least one of the plurality of pieces of start offset information is applied	At least under Pegasus's apparent infringement theory, Lee 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, Lee discloses this limitation based on the following exemplary citations: See every limitation of claim 3, claim 2, limitation 1[h].

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	according to a corresponding coverage level of the MTC terminal.	To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

5. Claim 5

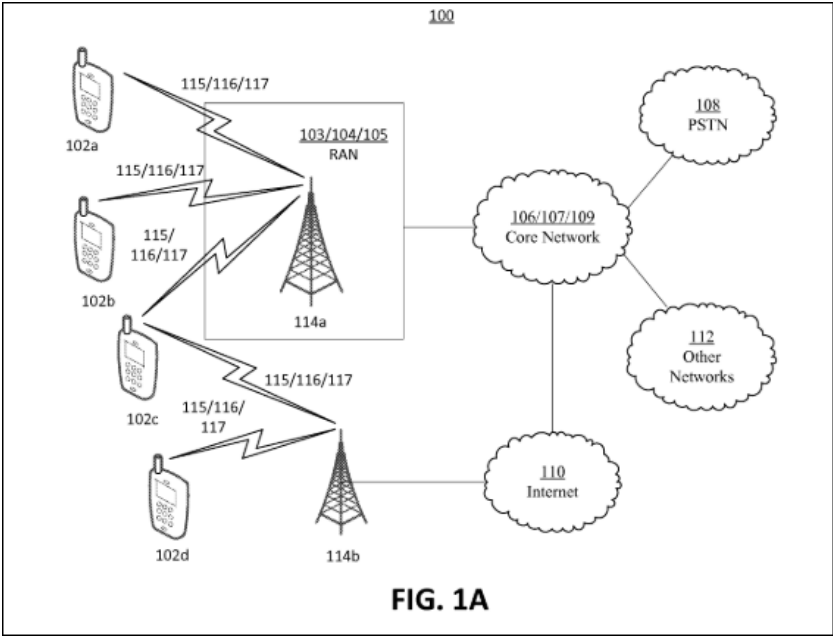
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5[pre]	A Machine Type Communication (MTC) terminal for transmitting response information of downlink data to a base station, the terminal comprising:	To the extent the preamble is limiting, at least under Pegasus's apparent infringement theory, Lee discloses a Machine Type Communication (MTC) terminal for transmitting response information of downlink data to a base station. For example, Lee discloses this limitation based on the following exemplary citations: See limitation 1[pre]. As shown in FIG. 1A, the communications system 100 may include wireless transmit/receive units (WTRUs) 102 a, 102 b, 102 c, and/or 102 d (which generally or collectively may be referred to as WTRU 102), a radio access network (RAN) 103/104/105, a core network 106/107/109, a public switched telephone network (PSTN) 108, the Internet 110, and other networks 112, though it will be appreciated that the disclosed embodiments contemplate any number of WTRUs, base stations, networks, and/or network elements. Each of the WTRUs 102 a, 102 b, 102 c, 102 d may be any type of device configured to operate and/or communicate in a wireless

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		environment. By way of example, the WTRUs 102 a, 102 b, 102 c, 102 d may be configured to transmit and/or receive wireless signals and may include user equipment (UE), a mobile station, a fixed or mobile subscriber unit, a pager, a cellular telephone, a personal digital assistant (PDA), a smartphone, a laptop, a netbook, a personal computer, a wireless sensor, consumer electronics, and the like. Lee at 3:1-19. FIG. 1B is a system diagram of an example WTRU 102. As shown in FIG. 1B, the WTRU 102 may include a processor 118, a transceiver 120, a transmit/receive element 122, a speaker/microphone 124, a keypad 126, a display/touchpad 128, non-removable memory 130, removable memory 132, a power source 134, a global positioning system (GPS) chipset 136, and other peripherals 138. It will be appreciated that the WTRU 102 may include any sub-combination of the foregoing elements while remaining consistent with an embodiment. Also, embodiments contemplate that the base stations 114 a and 114 b, and/or the nodes that base stations 114 a and 114 b may represent, such as but not limited to transceiver station (BTS), a Node-B, a site controller, an access point (AP), a home node-B, an evolved home node-B (eNodeB), a home evolved node-B (HeNB or HeNodeB), a home evolved node-B gateway, and proxy nodes, among others, may include some or all of the elements depicted in FIG. 1B and described herein. Lee at 5:15-32.

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		FIG. 1B Lee at FIG. 1B. The 2013 Application supports these disclosures. <i>See, e.g.</i>, 2013 Application at [0009], [0047], [0026] , [0001], [0029]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee renders it obvious, either alone, in combination with the knowledge of

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		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 Lee 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 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;	At least under Pegasus's apparent infringement theory, Lee 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, Lee discloses this limitation based on the following exemplary citations: See limitations 1[a], 1[b], and 1[c]. The processor 118 may be a general purpose processor, a special purpose processor, a conventional processor, a digital signal processor (DSP), a plurality of microprocessors, one or more microprocessors in association with a DSP core, a controller, a microcontroller, Application Specific Integrated Circuits (ASICs), Field Programmable Gate Array (FPGAs) circuits, any other type of integrated circuit (IC), a state machine, and the like. The processor 118 may perform signal coding, data processing, power control, input/output processing, and/or any other functionality that enables the WTRU 102 to operate in a wireless environment. The processor 118 may be coupled to the transceiver 120, which may be coupled to the transmit/receive element 122. While FIG. 1B depicts the processor 118 and the transceiver 120 as separate components, it will be appreciated that the processor 118 and the transceiver 120 may be integrated together in an electronic package or chip. Lee at 5:33-49.

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		The transmit/receive element 122 may be configured to transmit signals to, or receive signals from, a base station (e.g., the base station 114 a) over the air interface 115/116/117. For example, in one embodiment, the transmit/receive element 122 may be an antenna configured to transmit and/or receive RF signals. In another embodiment, the transmit/receive element 122 may be an emitter/detector configured to transmit and/or receive IR, UV, or visible light signals, for example. In yet another embodiment, the transmit/receive element 122 may be configured to transmit and receive both RF and light signals. It will be appreciated that the transmit/receive element 122 may be configured to transmit and/or receive any combination of wireless signals. Lee at 5:50-62. As shown in FIG. 1A, the communications system 100 may include wireless transmit/receive units (WTRUs) 102 a, 102 b, 102 c, and/or 102 d (which generally or collectively may be referred to as WTRU 102), a radio access network (RAN) 103/104/105, a core network 106/107/109, a public switched telephone network (PSTN) 108, the Internet 110, and other networks 112, though it will be appreciated that the disclosed embodiments contemplate any number of WTRUs, base stations, networks, and/or network elements. Each of the WTRUs 102 a, 102 b, 102 c, 102 d may be any type of device configured to operate and/or communicate in a wireless environment. By way of example, the WTRUs 102 a, 102 b, 102 c, 102 d may be configured to transmit and/or receive wireless signals and may include user equipment (UE), a mobile station, a fixed or mobile subscriber unit, a pager, a cellular telephone, a personal digital assistant (PDA), a smartphone, a laptop, a netbook, a personal computer, a wireless sensor, consumer electronics, and the like. Lee at 3:1-19.

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		 FIG. 1A Lee at FIG. 1A. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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	At least under Pegasus’s apparent infringement theory, Lee discloses a controller configured to determine a resource allocated to the uplink control channel for

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	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 on the resource allocated to the uplink control channel; and	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 on the resource allocated to the uplink control channel. For example, Lee discloses this limitation based on the following exemplary citations: See limitation 1[e]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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, Lee 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, Lee discloses this limitation based on the following exemplary citations: See limitation 1[d]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee renders it obvious, either alone, in combination with the knowledge of a person of ordinary skill in the art, and/or in combination with other prior art references identified in the cover pleading or herein. A person of ordinary skill in the

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		art would have been motivated to combine Lee 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[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, Lee 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, Lee discloses this limitation based on the following exemplary citations: See limitation 1[f]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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, Lee 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, Lee discloses this limitation based on the following exemplary citations: See limitation 1[g].

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	MTC terminal from the base station;	To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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[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, Lee discloses the start offset information on the resource allocated to the uplink control channel is determined based on a coverage level. For example, Lee discloses this limitation based on the following exemplary citations: See limitation 1[h]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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	At least under Pegasus's apparent infringement theory, Lee discloses when the response information of the downlink data of the MTC terminal is repeatedly

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	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.	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, Lee discloses this limitation based on the following exemplary citations: See limitation 1[i]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

6. Claim 6

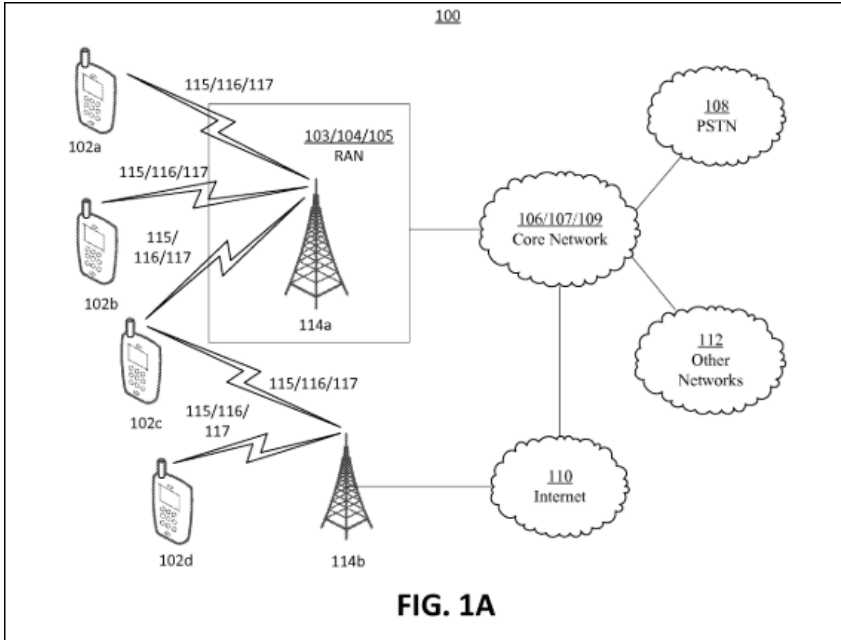
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6	The MTC terminal of claim 5, wherein: at least one of the plurality of pieces of start offset information is applied according to a corresponding coverage level of the MTC terminal.	At least under Pegasus's apparent infringement theory, Lee discloses 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, Lee discloses this limitation based on the following exemplary citations: See every limitation of claim 5, claim 2, limitation 1[h]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate

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		this claim, Lee 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 Lee with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

7. Claim 7

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7[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, Lee discloses A base station for configuring a resource of response information of downlink data for a Machine Type Communication (MTC) terminal. For example, Lee discloses this limitation based on the following exemplary citations: See limitations 1[pre] and 3[pre]. The communications system 100 may also include a base station 114 a and a base station 114 b. Each of the base stations 114 a, 114 b may be any type of device configured to wirelessly interface with at least one of the WTRUs 102 a, 102 b, 102 c, 102 d to facilitate access to one or more communication networks, such as the core network 106/107/109, the Internet 110, and/or the networks 112. By way of example, the base stations 114 a, 114 b may be a base transceiver station (BTS), a Node-B, an eNode B, a Home Node B, a Home eNode B, a site controller, an access point (AP), a wireless router, and the like. While the base stations 114 a, 114 b are each depicted as a single element, it will be appreciated that the base stations 114 a, 114 b may include any number of interconnected base stations and/or network elements. Lee at 3:20-34.

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		The base station 114 b in FIG. 1A may be a wireless router, Home Node B, Home eNode B, or access point, for example, and may utilize any suitable RAT for facilitating wireless connectivity in a localized area, such as a place of business, a home, a vehicle, a campus, and the like. In one embodiment, the base station 114 b and the WTRUs 102 c, 102 d may implement a radio technology such as IEEE 802.11 to establish a wireless local area network (WLAN). In another embodiment, the base station 114 b and the WTRUs 102 c, 102 d may implement a radio technology such as IEEE 802.15 to establish a wireless personal area network (WPAN). In yet another embodiment, the base station 114 b and the WTRUs 102 c, 102 d may utilize a cellular-based RAT (e.g., WCDMA, CDMA2000, GSM, LTE, LTE-A, etc.) to establish a picocell or femtocell. As shown in FIG. 1A, the base station 114 b may have a direct connection to the Internet 110. Thus, the base station 114 b may not be required to access the Internet 110 via the core network 106/107/109. Lee at 4:20-37.

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		 FIG. 1A Lee at FIG. 1A. Each of the eNode- Bs 160 a, 160 b, 160 c may be associated with a particular cell (not shown) and may be configured to handle radio resource management decisions, handover decisions, scheduling of users in the uplink and/or downlink, and the like. As shown in FIG. 1D, the eNode- Bs 160 a, 160 b, 160 c may communicate with one another over an X2 interface. Lee at 8:4-10.

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		FIG. 1D Lee at FIG. 1D. The 2013 Application supports these disclosures. <i>See, e.g.</i>, 2013 Application at [0010], [0011]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same field of endeavor to address the same known problems, according to known methods which would yield predictable results.

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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, Lee discloses a transmitting unit configured to transmit structural information, downlink control information for scheduling the downlink data, and the downlink data. For example, Lee discloses this limitation based on the following exemplary citations: See limitations 1[a], 3[a], 1[b], 3[b], 1[c], 3[c]. The RAN 104 may include eNode- Bs 160 a, 160 b, 160 c, though it will be appreciated that the RAN 104 may include any number of eNode-Bs while remaining consistent with an embodiment. The eNode- Bs 160 a, 160 b, 160 c may each include one or more transceivers for communicating with the WTRUs 102 a, 102 b, 102 c over the air interface 116. In one embodiment, the eNode- Bs 160 a, 160 b, 160 c may implement MIMO technology. Thus, the eNode-B 160 a, for example, may use multiple antennas to transmit wireless signals to, and receive wireless signals from, the WTRU 102 a. Lee at 7:60-8:3. Each of the eNode- Bs 160 a, 160 b, 160 c may be associated with a particular cell (not shown) and may be configured to handle radio resource management decisions, handover decisions, scheduling of users in the uplink and/or downlink, and the like. As shown in FIG. 1D, the eNode- Bs 160 a, 160 b, 160 c may communicate with one another over an X2 interface. Lee at 8:4-10. Each of the eNode- Bs 160 a, 160 b, 160 c may be associated with a particular cell (not shown) and may be configured to handle radio resource management decisions, handover decisions, scheduling of users in the uplink and/or downlink, and the like. As shown in FIG. 1D, the eNode- Bs 160 a, 160 b, 160 c may communicate with one another over an X2 interface. Lee at 8:4-10. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee renders it obvious, either alone, in combination with the knowledge of

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		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 Lee 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[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, Lee discloses 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, Lee discloses this limitation based on the following exemplary citations: See limitations 1[a] and 3[a]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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[c]	wherein the resource of the uplink control channel for transmitting the response information of the downlink data is determined based on at	At least under Pegasus's apparent infringement theory, Lee 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

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	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;	the resource allocated to the uplink control channel. For example, Lee discloses this limitation based on the following exemplary citations: See limitation 1[e]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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, Lee 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, Lee discloses this limitation based on the following exemplary citations: See limitation 1[f]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee with any of the other prior art references identified in the cover pleading or herein with a reasonable expectation of success because each of these references contains familiar elements within the same

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		field of endeavor to address the same known problems, according to known methods which would yield predictable results.
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, Lee 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, Lee discloses this limitation based on the following exemplary citations: See limitation 1[g]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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, Lee discloses the start offset information of the resource allocated to the uplink control channel is determined based on a coverage level. For example, Lee discloses this limitation based on the following exemplary citations: See limitation 1[h]. To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate

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Claim Language		Exemplary Citations to Lee
		this claim, Lee 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 Lee 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[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, Lee 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, Lee discloses this limitation based on the following exemplary citations: <i>See limitation 1[i].</i> To the extent it is found that Lee does not expressly disclose this limitation, the limitation is inherent. Moreover, to the extent it is found that Lee does not anticipate this claim, Lee 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 Lee 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.