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Application Number	
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First Named Inventor	HSIN-HSI TSAI
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Attorney Docket Number	US80883

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METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE

CROSS-REFERENCE TO RELATED APPLICATION(S)

[0001] The present application claims the benefit of and priority to U.S. provisional Patent Application Serial No. 62/840451 filed on 4/30/2019, entitled “Method and Apparatus of Wake Up Signal Monitoring in a Wireless Communication System,” (hereinafter referred to as “the ‘451 provisional”). The disclosure of the ‘451 provisional is hereby incorporated fully by reference into the present disclosure.

FIELD

[0002] The present disclosure generally relates to wireless communications, and more particularly, to a method of physical downlink control channel (PDCCH) monitoring and a related device.

BACKGROUND

[0003] 3GPP provides a new study item on a user equipment (UE) power saving in new radio (NR). UE battery life is an important aspect of the user’s experience, which will influence the adoption of 5G handsets and/or services. It is critical to study UE power consumption for Rel-16 to ensure that UE power efficiency for 5G NR use can be at least as good as long term evolution (LTE), and techniques and designs for improvements are identified and adopted.

[0004] Because a NR system may be capable of supporting high speed data transport, it is expected that user data tends to be bursty and provided in very short durations. One efficient UE power saving mechanism is to trigger the UE for network

access from a power efficient mode. UE would stay in the power efficient mode, such as micro sleep or OFF period in the long Discontinuous Reception (DRX) cycle, unless it is informed of network access through a UE power saving framework. Alternatively, the network can assist the UE to switch from the “network access” mode to the “power efficient” mode when there is no traffic to deliver, e.g., dynamic UE transition to sleep with network assistance signal.

[0005] In addition to minimizing the power consumption with the new wake-up/go-to-sleep mechanism, it is equally important to reduce the power consumption during the network access in radio resource control (RRC)_CONNECTED mode. More than half of the power consumption in LTE is with the UE in the access mode. The power saving scheme should focus on minimizing the dominate factor of power consumption during the network access, which includes the processing of aggregated bandwidth, active RF chain number and active reception/transmission time, and dynamic transition to power efficient mode. Since the majority cases of LTE field transmission time intervals (TTIs) are with no data or small amounts of data, the power saving scheme for the dynamic adaptation to the different data arrivals should be studied in RRC_CONNECTED mode. Dynamic adaptation to traffic in different dimensions, such as carrier, antenna, beamforming, and bandwidth, can also be studied for Rel-16. Furthermore, methods to enhance the transitions between “network access” mode and power saving mode should be considered. Both network-assisted and UE-assisted approaches should be considered for UE power saving mechanism.

[0006] The study of UE power saving in NR includes the study of the power saving schemes and the associated procedures. The study of power saving schemes is related to UE adaptation to the traffic and UE power consumption characteristics in frequency, time, antenna domains, discontinuous reception (DRX) configuration, and a UE processing timeline for UE power saving. The power saving signal/channel/procedure

is used for triggering adaptation of UE power consumption characteristics. The further study of the power saving signal/channel in triggering UE adaptation to DRX operation is related to the configuration of the power saving signal/channel according to the DRX configuration as the indication for the UE to wake up from the sleep state. The further study of the power saving signal/channel candidate in triggering the UE to achieve reduction in PDCCH monitoring is related to using the power saving signal/channel to trigger UE to skip PDCCH monitoring and/or to go to sleep for a period of time. For the adaptation to achieve reduction in PDCCH monitoring/decoding, The UE power consumption can be reduced when the number of UE PDCCH monitoring occasions and/or the number of PDCCH blind decodings is reduced.

[0007] DRX operation is introduced as conventional UE power saving. DRX operation governs PDCCH monitoring activity of the UE in RRC_CONNECTED mode. When DRX is configured, the UE does not have to continuously monitor PDCCH, so power consumption is reduced. FIG. 1 is a schematic diagram illustrating a DRX operation according to the related art. DRX operation is characterized by the following:

[0008] - on-duration: duration that the UE waits after waking up, to receive PDCCHs. If the UE successfully decodes a PDCCH, the UE stays awake and starts the inactivity timer;

[0009] - inactivity-timer: duration that the UE waits to successfully decode a PDCCH, from the last successful decoding of a PDCCH, and failing to successfully decode the PDCCH, can go back to sleep. The UE shall restart the inactivity timer following a single successful decoding of a PDCCH for a first transmission only (i.e., not for retransmissions);

[0010] - retransmission-timer: duration until a retransmission can be expected;

[0011] - DRX cycle: specifies the periodic repetition of the on-duration followed by a possible period of inactivity;

[0012] - active-time: total duration that the UE monitors PDCCH. This includes the “on-duration” of the DRX cycle, the time UE is performing continuous reception while the inactivity timer has not expired, and the time when the UE is performing continuous reception while waiting for a retransmission opportunity.

[0013] Specifically, a wake-up or a sleep state of the UE could be controlled by DRX mechanism (e.g., DRX Cycle, drx-onDurationTimer, drx-InactivityTimer, drx-StartOffset, etc.). When the UE stays in the wake-up state (e.g., when the UE is in DRX active time), the UE may ramp up power to monitor the PDCCH continuously. On the contrary, when the UE is in sleep state (e.g., when the UE is not in active time), the UE may not need to monitor the PDCCH.

[0014] However, the current DRX mechanism still suffers from some drawbacks. For instance, the running drx-InactivityTimer may keep the UE awake even without PDCCH scheduling, or whether or not there is PDCCH scheduling, the drx-onDurationTimer may still periodically trigger the UE to wake up. This situation may be called PDCCH-only monitoring (i.e., the UE keeps monitoring the PDCCH but no PDSCH/PUSCH is scheduled for the UE), which causes unnecessary power consumption in RRC connected mode. Therefore, in order to address the shortcoming of current DRX mechanism and save power for the UE, a power saving signal, namely wake-up signaling (WUS), is introduced.

[0015] FIG. 2 is a schematic diagram illustrating a WUS mechanism, in accordance with related art. The upper part represents a timeline for the WUS occasion and DRX operation (e.g., DRX cycle and DRX on duration time), and the lower part represents a level of a UE power consumption. The WUS occasion, which may be a time or frequency resource for WUS monitoring, may be pre-configured, by a generation node B (gNB), an offset before the on-duration time. For example, the UE may increase the power to monitor a WUS on a WUS occasion. If the UE receives the

WUS signal on the WUS occasion, the UE may spend a time to decode the WUS signal, and then wake up to monitor the PDCCH on the upcoming (or next) on-duration time of the DRX cycle. On the other hand, if the UE does not receive the WUS signal on the WUS occasion, the UE could switch to the sleep state, namely not wake up to monitor the PDCCH for a period (until the next WUS occasion or on-duration time).

[0016] The WUS occasion may be indicated by a control resource set (CORESET) or search space configuration. For example, the CORESET or search space configuration of the WUS could be configured along with the DRX configuration. In addition, as shown in FIG. 3, the CORESET or search space may be a specific CORESET or search space for the purpose of WUS monitoring (e.g., time and/or frequency resource for monitoring the WUS).

[0017] It is possible that the time domain of the CORESET (or search space) for the WUS may collide with the CORESET (or search space) for scheduling by the PDCCH, as shown in FIG. 3. For example, in FIG. 4, when the UE receives a scheduling PDCCH in the on duration of the DRX cycle, the UE may start or restart a DRX inactivity timer (e.g., drxInactivityTimer). When the DRX inactivity timer is running, the UE may keep monitoring the PDCCH (i.e., the UE stays in DRX active-time). However, if the active time of the UE overlaps with the on duration of the next DRX cycle (e.g., if an amount of time of the DRX inactivity timer is longer than the DRX cycle), the UE may keep monitoring the PDCCH for possible scheduling until the DRX inactivity timer expires. In this case, the UE may need to monitor the PDCCH for scheduling as well as the WUS occasion simultaneously, which increases power consumption of the UE.

SUMMARY

[0018] According to an aspect of the present disclosure, a method for a user equipment (UE) monitoring a physical downlink control channel (PDCCH) is disclosed. The method comprises receiving a first configuration from a base station to configure the UE with a first search space of the PDCCH, wherein the first search space is used for monitoring a scheduling signal used for indicating scheduling information, receiving a second configuration from the base station to configure the UE with a second search space of the PDCCH, wherein the second search space is used for monitoring a power saving signal used for indicating wake-up information associated with a Discontinuous Reception (DRX) functionality, monitoring the first search space in response to the UE being in a DRX active time of the DRX functionality, wherein the DRX active time is a time during which the UE monitors the PDCCH, and not monitoring the second search space in response to the UE being in the DRX active time of the DRX functionality.

[0019] According to an aspect of the present disclosure, a user equipment (UE) monitoring a physical downlink (DL) control channel (PDCCH) in a wireless communication system is disclosed. The UE comprises a processor, for executing computer-executable instructions, and a non-transitory machine-readable medium, coupled to the processor, for storing the computer-executable instructions, wherein the computer-executable instructions instruct the processor to receive a first configuration from a base station to configure the UE with a first search space of the PDCCH, wherein the first search space is used for monitoring a scheduling signal used for indicating a scheduling information, receive a second configuration from the base station to configure the UE with a second search space of the PDCCH, wherein the second search space is used for monitoring a power saving signal used for indicating wake-up

information associated with a Discontinuous Reception (DRX) functionality, monitor the first search space in response to the UE being in a DRX active time of the DRX functionality, wherein the DRX active time is a time during which the UE monitors the PDCCH, and not monitoring the second search space in response to the UE being in the DRX active time of the DRX functionality.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] Aspects of the exemplary disclosure are best understood from the following detailed description when read with the accompanying figures. Various features are not drawn to scale, dimensions of various features may be arbitrarily increased or reduced for clarity of discussion.

[0021] FIG. 1 is a schematic diagram illustrating a DRX cycle, in accordance with related art methods.

[0022] FIG. 2 is a schematic diagram illustrating a WUS mechanism, in accordance with related art methods.

[0023] FIG. 3 is a schematic diagram illustrating a CORESET or search space for scheduling a PDCCH and a WUS, in accordance with related art methods.

[0024] FIG. 4 is a schematic diagram illustrating the WUS within DRX active time, in accordance with related art methods.

[0025] FIG. 5 is a flowchart illustrating PDCCH monitoring, in accordance with example implementations of the present disclosure.

[0026] FIG. 6 is a schematic diagram illustrating WUS monitoring, in accordance with example implementations of the present disclosure.

[0027] FIG. 7 is a schematic diagram illustrating WUS monitoring, in accordance with example implementations of the present disclosure.

[0028] FIG. 8 is a block diagram illustrating a node for wireless communication, in accordance with example implementations of the present disclosure.

DETAILED DESCRIPTION

[0029] The following description contains specific information pertaining to exemplary implementations in the present disclosure. The drawings and their accompanying detailed description are directed to exemplary implementations. However, the present disclosure is not limited to these exemplary implementations. Other variations and implementations of the present disclosure will occur to those skilled in the art. Unless noted otherwise, like or corresponding elements in the figures may be indicated by like or corresponding reference numerals. Moreover, the drawings and illustrations are generally not to scale and are not intended to correspond to actual relative dimensions.

[0030] For the purpose of consistency and ease of understanding, like features are identified (although, in some examples, not shown) by numerals in the exemplary figures. However, the features in different implementations may be different in other respects, and therefore shall not be narrowly confined to what is shown in the figures.

[0031] The phrases “in one implementation,” and “in some implementations,” may each refer to one or more of the same or different implementations. The term “coupled” is defined as connected, whether directly or indirectly via intervening components, and is not necessarily limited to physical connections. The term “comprising” means “including, but not necessarily limited to” and specifically indicates open-ended inclusion or membership in the described combination, group, series and equivalents.

[0032] Additionally, any two or more than two of the following paragraphs, (sub)-bullets, points, actions, behaviors, terms, alternatives, examples, or claims described in

the following disclosure may be combined logically, reasonably, and properly to form a specific method. Any sentence, paragraph, (sub)-bullet, point, action, behaviors, terms, or claims described in the following disclosure may be implemented independently and separately to form a specific method. Dependency, e.g., “based on”, “more specifically”, “preferably”, “In one embodiment”, “In one implementation”, “In one alternative” or etc., in the following disclosure is just one possible example which would not restrict the specific method.

[0033] Additionally, for the purposes of explanation and non-limitation, specific details, such as functional entities, techniques, protocols, and standards are set forth for providing an understanding of the described technology. In other examples, detailed description of well-known methods, technologies, system, and architectures are omitted so as not to obscure the description with unnecessary details.

[0034] Persons skilled in the art will recognize that any described network function(s) or algorithm(s) may be implemented by hardware, software or a combination of software and hardware. Described functions may correspond to modules that are software, hardware, firmware, or any combination thereof. The software implementation may comprise computer executable instructions stored on computer readable medium such as memory or other type of storage devices. For example, one or more microprocessors or general-purpose computers with communication processing capability may be programmed with corresponding executable instructions and carry out the described network function(s) or algorithm(s). The microprocessors or general-purpose computers may be formed of applications specific integrated circuitry (ASIC), programmable logic arrays, and/or using one or more digital signal processor (DSPs). Although some of the disclosed implementations are directed to software installed and executing on computer hardware, alternative implementations as firmware or as hardware or combination of hardware and software

are well within the scope of the present disclosure.

[0035] The computer readable medium includes but is not limited to random access memory (RAM), read only memory (ROM), erasable programmable read-only memory (EPROM), electrically erasable programmable read-only memory (EEPROM), flash memory, compact disc (CD) read-only memory (CD ROM), magnetic cassettes, magnetic tape, magnetic disk storage, or any other equivalent medium capable of storing computer-readable instructions.

[0036] A radio communication network architecture (e.g., a long term evolution (LTE) system, an LTE-Advanced (LTE-A) system, an LTE-A Pro system, or a New Radio system) typically includes at least one base station (BS), at least one UE, and one or more optional network elements that provide connection with a network. The UE communicates with the network (e.g., a core network (CN), an evolved packet core (EPC) network, an Evolved Universal Terrestrial Radio Access Network (RAN) (E-UTRAN), a Next-Generation (GN) Core (NGC), 5G CN (5GC), or an internet via a RAN established by the BS.

[0037] It should be noted that, in the present disclosure, a UE may include, but is not limited to, a mobile station, a mobile terminal or device, a user communication radio terminal. For example, a UE may be a portable radio equipment, that includes, but is not limited to, a mobile phone, a tablet, a wearable device, a sensor, or a personal digital assistant (PDA) with wireless communication capability. The UE is configured to receive and transmit signals over an air interface to one or more cells in a RAN.

[0038] A BS may include, but is not limited to, a node B (NB) as in the Universal Mobile Telecommunication System (UMTS), an evolved node B (eNB) as in the LTE-A, a radio network controller (RNC) as in the UMTS, a BS controller (BSC) as in the Global System for Mobile communications (GSM)/GSM EDGE RAN (GERAN), an NG-eNB as in an E-UTRA BS in connection with the 5GC, a next gNB as in the 5G-

RAN, and any other apparatus capable of controlling radio communication and managing radio resources within a cell. The BS may connect to serve the one or more UEs via a radio interface to the network.

[0039] A BS may be configured to provide communication services according to at least one of the following radio access technologies (RATs): Worldwide Interoperability for Microwave Access (WiMAX), GSM (often referred to as 2G), GERAN, General Packet Radio Service (GRPS), UMTS (often referred to as 3G) according to basic wideband-code division multiple access (W-CDMA), high-speed packet access (HSPA), LTE, LTE-A, evolved LTE (eLTE), New Radio (NR, often referred to as 5G), and/or LTE-A Pro. However, the scope of the present disclosure should not be limited to these protocols.

[0040] The BS is operable to provide radio coverage to a specific geographical area using a plurality of cells forming the RAN. The BS supports the operations of the cells. Each cell is operable to provide services to at least one UE within radio coverage of the cell. More specifically, each cell (often referred to as a serving cell) provides services to serve one or more UEs within the cell's radio coverage, (e.g., each cell schedules the DL and optionally uplink (UL) resources to at least one UE within the cell's radio coverage for DL and optionally UL packet transmissions). The BS can communicate with one or more UEs in the radio communication system via the plurality of cells. A cell may allocate sidelink (SL) resources for supporting proximity service (ProSe). Each cell may have overlapped coverage areas with other cells.

[0041] FIG. 5 illustrates a method 500 for a UE to perform PDCCH monitoring according to the present disclosure. In action 502, the UE receives a first configuration from a BS to configure the UE with a first search space of the PDCCH, where the first search space is used for monitoring a scheduling signal used for indicating scheduling information on the PDCCH. In action 504, the UE receives a second configuration from

the BS to configure the UE with a second search space of the PDCCH, where the second search space is used for monitoring a power saving signal used for indicating wake-up information associated with a Discontinuous Reception (DRX) functionality on the PDCCH. In action 506, the UE monitors the first search space in response to the UE being in a DRX active time of the DRX functionality, where the DRX active time is a time during which the UE monitors the PDCCH. In action 508, the UE does not monitor the second search space in response to the UE being in the DRX active time of the DRX functionality.

[0042] The method 500 achieves UE power saving by not monitoring the search space for scheduling the power saving signal (e.g., WUS) during the DRX active time. Referring back to FIG. 3, if the CORESETs corresponding to the two search spaces respectively for a PDCCH monitoring occasion and a WUS monitoring occasion collide in a time domain, the UE is prohibited to monitor the WUS on the WUS occasion within the DRX active time (e.g., during drxInactivityTimer running). For example, the UE ignores monitoring the WUS on a search space configured for the WUS. Hence, the power consumption for monitoring the WUS is reduced.

[0043] The DRX active time of the UE includes the time while:

[0044] the drx-onDurationTimer, drx-InactivityTimer, drx-RetransmissionTimerDL, drx-RetransmissionTimerUL, or ra-ContentionResolutionTimer is running; or

[0045] a Scheduling Request is sent on PUCCH and is pending; or

[0046] a PDCCH indicating a new transmission addressed to the Cell Radio Network Temporary Identifier (C-RNTI) of the Medium Access Control (MAC) entity has not been received after successful reception of a Random Access Response (RAR) for the Random Access Preamble not selected by the MAC entity among the contention-based Random Access Preamble.

[0047] More specifically, an ongoing Scheduling Request (SR) procedure may indicate that an SR is sent on the physical uplink control channel (PUCCH) and is pending.

[0048] The DRX inactive time may mean the DRX non-active time. More specifically, the UE state for only monitoring the WUS may not be called DRX active time and/or inactive time. The UE state for monitoring the WUS may be a specific state. On the other hand, the UE go-to-sleep state may indicate that the UE switches to the DRX inactive time (from DRX active time) or the UE does not monitor a normal PDCCH.

[0049] The WUS occasion may be time or frequency resource (e.g., CORESET/search space) for the UE to monitor a possible WUS transmitted from the BS. In one implementation, if the UE unsuccessfully decodes the WUS on the WUS occasion, the UE may assume that the WUS is not received. More specifically, the UE receiving the WUS may mean that the UE successfully monitors the WUS on the WUS occasion transmitted from the network node (e.g., eNB, gNB, multi-point transmission (TRP) and cell).

[0050] In one implementation, the UE may stop the drx-onDurationTimer when the UE receives the WUS on the WUS occasion (in DRX active time or in active time). The UE may stop the drx-onDurationTimer when the UE does not receive the WUS on the WUS occasion (in DRX active time or DRX inactive time). Alternatively, the UE may skip triggering drx-onDurationTimer when the UE receives the WUS on the WUS occasion (in DRX active time or inactive time).

[0051] More specifically, the UE may not start or restart the drx-onDurationTimer when the UE receives the WUS on the WUS occasion (in DRX active time or inactive time). Alternatively, the UE may stop the drx-onDurationTimer when the UE does not receive the WUS on the WUS occasion (in DRX active time or DRX inactive time).

[0052] More specifically, the UE may start or restart the drx-onDurationTimer (on a DRX cycle) when the UE does not monitor and/or receive the WUS on the WUS occasion (before the DRX cycle), or when the UE is in the DRX active time.

[0053] In one implementation, the UE may stop the drx-InactivityTimer when the UE receives the WUS on the WUS occasion (in DRX active time). Alternatively, the UE may stop the drx-InactivityTimer when the UE does not receive the WUS on the WUS occasion (in DRX active time or DRX inactive time).

[0054] More specifically, the UE may start or restart the drx-InactivityTimer when the UE receives the WUS on the WUS occasion (in DRX active time or DRX inactive time). Alternatively, the UE may start or restart the drx-InactivityTimer when the UE does not receive the WUS on the WUS occasion (in DRX active time or DRX inactive time).

[0055] More specifically, the UE may stop the drx-HARQ-RTT-TimerDL, drx-RetransmissionTimerDL, and/or ra-ContentionResolutionTimer when the UE receives the WUS on the WUS occasion (in DRX active time or DRX inactive time). Alternatively, the UE may stop the drx-HARQ-RTT-TimerDL, drx-RetransmissionTimerDL, and/or ra-ContentionResolutionTimer when the UE does not receive the WUS on the WUS occasion (in DRX active time or DRX inactive time).

[0056] For data scheduling, a network node could determine whether to schedule the UE with specific timing or not (e.g., based on buffer status of the UE, channel condition, etc.). Therefore, the network node could send a WUS (beforehand) to wake up the UE to monitor the normal PDCCH if needed. On the contrary, the network node could also decide not to send the WUS if the network node does not schedule UL or DL data transmission for the UE. By reducing unnecessary PDCCH monitoring opportunities, the UE could save significant power. More specifically, the UE power for WUS monitoring may be lower than UE power for normal PDCCH monitoring.

[0057] As shown in FIG. 6, the CORESET/search space configured for the WUS and the normal PDCCH may collide in the time domain. The normal PDCCH may be utilized for scheduling UL/DL data transmission, and the normal PDCCH may be configured by a PDCCH-configuration. The UE may only monitor one of the two CORESET/search spaces at a time. For example, when the UE is in DRX active time to monitor the normal PDCCH, the UE may not monitor the WUS on the WUS occasion. In other words, the monitoring occasion (i.e., CORESETs or search spaces) of the normal PDCCH may be different from the monitoring occasion of the WUS. More specifically, the monitoring occasion of the normal PDCCH and the monitoring of WUS may be associated with the same serving cell. For example, if the UE is not in DRX active time, the UE may monitor WUS on the WUS occasion. For another example, if the UE receives the WUS on a first WUS occasion, the UE may wake up to monitor the PDCCH and start/restart a drx-InactivityTimer when the UE receives a PDCCH for scheduling (e.g., PDCCH for UL/DL data transmission). If the drx-InactivityTimer is running on a second WUS occasion, the UE may not monitor the WUS on the second WUS occasion (since the UE is in DRX active time). In addition, the UE may go to sleep when the drx-InactivityTimer expires.

[0058] In other words, the purpose of the WUS may be to wake up the UE (e.g., when the UE receives the WUS), so that the UE may wake up to stay in DRX active time for monitoring the PDCCH (on next on duration time). However, if the UE is already in the DRX active time, it is unnecessary to monitor the WUS. Thus, the UE may not need to monitor the WUS when the UE is in DRX active time, so as to reduce the power consumption.

[0059] Various cases that the UE does not monitor the WUS (i.e., the UE ignores monitoring the WUS) are disclosed.

[0060] In one implementation, the UE may not monitor the WUS on the WUS

occasion (or ignore monitoring the WUS on the WUS occasion) when the UE is in DRX active time (e.g., duration of drx-InactivityTimer). On the contrary, the UE may monitor the WUS on the WUS occasion when the UE is not in DRX active time.

[0061] In one implementation, the UE may not monitor the WUS on the WUS occasion (or ignore monitoring WUS on the WUS occasion) when the UE monitors the normal PDCCH (e.g., PDCCH for DL/UL scheduling). On the contrary, the UE may monitor the WUS on the WUS occasion when the UE does not monitor the normal PDCCH at that time.

[0062] In one implementation, the UE may not monitor the WUS on the WUS occasion (or ignore monitoring WUS on the WUS occasion) and the normal PDCCH simultaneously.

[0063] In some implementations, when the UE detects a beam failure, the UE may need to monitor a specific CORESET/search space for beam failure recovery to find a candidate beam and/or to receive a beam indication (e.g., a transmission configuration indicator (TCI) state indication). In this situation, the UE may not be allowed to monitor the CORESET/search space for the WUS. The UE may stay in DRX active time to monitor the CORESET/search space for beam failure recovery until receiving the PDCCH for a beam indication (e.g., TCI state indication).

[0064] More specifically, the UE may not monitor the WUS on the WUS occasion ((or ignore monitoring WUS on the WUS occasion)) when the UE performs a beam failure recovery procedure or a random access procedure for beam failure recovery. It is noted that the UE performing the beam failure recovery procedure may mean a random access procedure for beam failure recovery is ongoing (e.g., not consider successfully complete).

[0065] In addition, the UE performing a random access procedure may mean a PDCCH indicating a new transmission addressed to the C-RNTI of the MAC entity has

not been received after successful reception of an RAR for the Random Access Preamble not selected by the MAC entity among the contention-based Random Access Preamble.

[0066] The WUS may be used to trigger the indication of an RS configuration for channel tracking, a channel state information (CSI) measurement, and beam management for the additional assistance of dynamic switching of a bandwidth part (BWP) or activation of secondary cell (SCell) in achieving the power saving gain. In addition, the WUS can be used for BWP switching, activation/deactivation of an SCell or adaptation of PDCCH monitoring and/or CORESET/search space of primary cell (PCell)/SCell. More specifically, the WUS may indicate other information (e.g., cross-slot scheduling, triggering RS transmission, CSI report, single vs. multi-cell operation, BWP, SCell, MIMO layer adaptation/number of Antenna adaptation, indication of CORESET, search space or candidate of subsequent PDCCH decoding, PDCCH monitoring periodicity, PDCCH skipping (skipping duration), DRX configuration, SPS activation/deactivation). Thus, there are trade-offs on whether the UE should monitor the WUS occasion when the UE stays in DRX active time.

[0067] With reference to FIG. 7, priority of monitoring the WUS and the normal PDCCH is disclosed. In order to save more power, the UE may only be allowed to monitor one of the CORESET/search space of WUS and the CORESET/search space of the normal PDCCH at a time. In other words, the UE may select one of the CORESET/search space to monitor based on a criterion. For example, if the UE monitors the CORESET/search space of the WUS, the UE does not monitor the CORESET/search space of the normal PDCCH. On the contrary, if the UE monitors the CORESET/search space of the normal PDCCH, the UE does not monitor the CORESET/search space of the WUS. Thus, the priority of monitoring the WUS and the normal PDCCH could be defined or specified in the UE (e.g., based on different

scenarios).

[0068] In one implementation, the priority of WUS and the normal PDCCH may be specified in the specification.

[0069] In one implementation, the priority of WUS and the normal PDCCH may be decided by UE implementation.

[0070] Preferably, the priority of the WUS and the normal PDCCH may be configured or applied for the UE in RRC connected mode.

[0071] Preferably, the priority of monitoring the WUS and the normal PDCCH may be different in different scenarios.

[0072] In one implementation, the priority of monitoring the normal PDCCH may be higher than monitoring the WUS in one of the following scenarios:

[0073] UE is performing a random access procedure;

[0074] UE is performing a beam failure recovery procedure;

[0075] UE is performing a random access procedure for a beam failure recovery procedure;

[0076] an SR procedure is ongoing; and

[0077] an SR procedure is triggered and pending.

[0078] In the other cases, the priority of monitoring the WUS may be higher than monitoring the normal PDCCH.

[0079] As shown in FIG. 7, the left part assumes that the priority of monitoring the WUS is higher than monitoring the normal PDCCH. If the time domain of the normal PDCCH occasion and the WUS occasion collide, the UE may only monitor WUS and could not monitor the normal PDCCH (even the UE is in DRX active time). For another example as right part, assuming that the priority of monitoring the normal PDCCH is higher than monitoring WUS. If the time domain of the normal PDCCH occasion and the WUS occasion collide, the UE could only monitor the normal PDCCH, and could

not monitor the WUS (on the WUS occasion).

[0080] Moreover, various WUS and/or DRX configurations are disclosed.

[0081] The WUS may be configured along with the DRX configuration as the indication for the UE to wake up from the sleep state, for triggering the UE to skip the PDCCH monitoring and to go to sleep for a period of time.

[0082] More specifically, the UE may monitor the WUS, and determine whether to go to sleep (e.g., not wake up (or not start the drx-onDurationTimer)) if the UE receives the WUS based on an indication from a network node.

[0083] More specifically, the UE may monitor the WUS, and determine whether to go to sleep (e.g., not wake up (or not start the drx-onDurationTimer)) if the UE does receive the WUS based on a network (NW) indication. In one embodiment, the UE may not go to sleep if the UE does not receive the WUS on the WUS occasion based on the NW indication. In one embodiment, the UE may stay in DRX active time (on next on duration time) if the UE does not receive the WUS on the WUS occasion based on the NW indication.

[0084] In one embodiment, the UE may stay in DRX active if the UE decodes the WUS unsuccessfully.

[0085] In one implementation, the UE may be configured with two different cycles for DRX (e.g., a long DRX cycle and a short DRX cycle). The start time and/or duration for the short DRX cycle may be configured according to the parameters “shortDRX” and/or “drx-ShortCycleTimer”. The start time and/or duration for the long DRX cycle may be further configured according to the parameter “drx-LongCycleStartOffse”. Since the UE may switch the DRX cycles, the WUS occasion may be different based on different DRX cycle. In other words, the UE may be configured with different configurations of the WUS for different DRX cycles. That is, the configuration of the WUS for short DRX cycle and the configuration of the WUS for long DRX cycle are

different. More specifically, the configuration of the WUS may be associated with the configuration of DRX cycle, where the association may be configured by network.

[0086] In addition, the UE may use the long or short DRX cycle based on the following rule. If the UE switches from short/long DRX cycle to long/short DRX cycle, the UE may determine the WUS occasion based on different DRX cycles and/or different configuration of the WUS.

[0087] For example, if the UE uses the short DRX cycle, the UE may use a first configuration of the WUS to determine the WUS occasion. If the UE uses the long DRX cycle, the UE may use a second configuration of the WUS to determine the WUS occasion, where the first configuration of the WUS is different from the second configuration of the WUS. More specifically, the UE uses a first configuration to determine the WUS occasion; if the drx-ShortCycleTimer expires, the UE may use a second configuration to determine the WUS occasion. On the other hand, the UE uses a first configuration to determine the WUS occasion, if the UE receives a Long DRX Command MAC CE, the UE may use a second configuration to determine the WUS occasion.

[0088] In addition, the UE may apply the same behavior as receiving the DRX command when the UE receives the WUS on the WUS occasion (in DRX active time). Alternatively, the UE may apply the same behavior as receiving the DRX command when the UE does not receive the WUS on the WUS occasion (in DRX active time).

[0089] In one implementation, the WUS may be referred to as a PDCCH-based power saving signal/channel.

[0090] In one implementation, the WUS may be configured with a specific configuration for the PDCCH based power saving signal/channel.

[0091] In one implementation, the WUS may be a UE-specific or a group common signal.

[0092] In one implementation, the WUS may be transmitted via a special cell (SpCell), SCell, primary secondary cell (PSCell), or PCell. The WUS may be indicated as RRC_CONNECTED, RRC_IDLE, or RRC_INACTIVE. More specifically, the WUS may be indicated via RRC signaling, MAC signaling (e.g., MAC CE), or PHY signaling (e.g., a DL control information (DCI)).

[0093] In one implementation, the WUS may be indicated to switch DL and/or UL BWP. More specifically, the WUS may include BWP information (e.g., a BWP index).

[0094] In one implementation, the WUS may include scheduling information (e.g., the information for receiving the PDSCH reception or transmitting the PUSCH), cell information (e.g., cell index) and/or beam information (e.g., beam index).

[0095] In one implementation, the WUS may include CORESET information (e.g., CORESET index).

[0096] In one implementation, the WUS may be indicated dynamically, periodically, aperiodically, and/or semi-persistently. More specifically, the WUS may be indicated via master cell group (MCG) or secondary cell group (SCG). Moreover, the WUS may be cross-cell indicated. More specifically, the WUS may be indicated on a specific cell and/or BWP.

[0097] In one implementation, the UE may derive the WUS occasion based a configuration (e.g., RRC configuration). Alternatively, the UE may derive the WUS occasion based on a pre-defined rule.

[0098] Note that, when the UE does not receive the WUS (on the WUS occasion), the UE may not report CSI on the PUCCH until the next WUS occasion, until the UE receives the WUS, or until the next DRX cycle. In addition, when the UE does not receive the WUS (on the WUS occasion or the DRX cycle), the UE may not transmit a sounding reference signal (SRS) until the next WUS occasion, until the UE receives the WUS, or until the next DRX cycle.

[0099] FIG. 8 illustrates a node 800 for wireless communication according to the present disclosure.

[00100] As illustrated in FIG. 8, the node 800 may include a transceiver 820, a processor 826, memory 828, one or more presentation components 834, and at least one antenna 836. The node 800 may also include an RF spectrum band module, a BS communications module, a network communications module, and a system communications management module, input/output (I/O) ports, I/O components, and a power supply (not shown). Each of these components may be in communication with each other, directly or indirectly, over one or more buses 840. The node 800 may be a UE or a BS that performs various disclosed functions as illustrated in FIG. 5.

[00101] The transceiver 820 includes a transmitter 822 (with transmitting circuitry) and a receiver 824 (with receiving circuitry) and may be configured to transmit and/or receive time and/or frequency resource partitioning information. The transceiver 820 may be configured to transmit in different types of subframes and slots including, but not limited to, usable, non-usable and flexibly usable subframes and slot formats. The transceiver 820 may be configured to receive data and control channels.

[00102] The node 800 may include a variety of computer-readable media. Computer-readable media may be any media that can be accessed by the node 800 and include both volatile and non-volatile media, removable and non-removable media. Computer-readable media may include computer storage media and communication media. Computer storage media includes both volatile and non-volatile, as well as removable and non-removable media implemented in any method or technology for storage of information such as computer-readable instructions, data structures, program modules or other data.

[00103] Computer storage media includes RAM, ROM, EEPROM, flash memory or other memory technology, CD-ROM, digital versatile disks (DVD) or other optical

disk storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices. Computer storage media does not include a propagated data signal. Communication media typically embodies computer-readable instructions, data structures, program modules or other data in a modulated data signal such as a carrier wave or other transport mechanism and includes any information delivery media. The term “modulated data signal” means a signal that has one or more of its characteristics set or changed in such a manner as to encode information in the signal. Communication media includes wired media such as a wired network or direct-wired connection, and wireless media such as acoustic, radio frequency (RF), infrared and other wireless media. Combinations of any of the disclosed media should be included within the scope of computer-readable media.

[00104] The memory 828 may include computer-storage media in the form of volatile and/or non-volatile memory. The memory 828 may be removable, non-removable, or a combination thereof. Memory includes solid-state memory, hard drives, and optical-disc drives. As illustrated in FIG. 8, the memory 828 may store computer-readable, computer-executable instructions 832 (e.g., software codes) that are configured to cause the processor 826 (e.g., processing circuitry) to perform various disclosed functions. Alternatively, the instructions 832 may be configured to cause the node 800 (e.g., when compiled and executed) to perform various disclosed functions.

[00105] The processor 826 may include an intelligent hardware device (e.g., a central processing unit (CPU), a microcontroller, an ASIC, etc). The processor 826 may include memory. The processor 826 may process the data 830 and the instructions 832 received from the memory 828, and information received via the transceiver 820, the base band communications module, and/or the network communications module. The processor 826 may also process information to be sent to the transceiver 820 for transmission via the antenna 836, to the network communications module for

transmission to a CN.

[00106] One or more presentation components 834 present data to a person or other device. Presentation components 834 include a display device, speaker, printing component, and vibrating component.

[00107] From the previous disclosure, it is evident that various techniques can be utilized for implementing the concepts of the present disclosure without departing from the scope of those concepts. Moreover, while the concepts have been described with specific reference to certain implementations, a person of ordinary skill in the art would recognize that changes can be made in form and detail without departing from the scope of those concepts. As such, the disclosure is to be considered in all respects as illustrative and not restrictive. It should also be understood that the present disclosure is not limited to the particular described implementations, but that many rearrangements, modifications, and substitutions are possible without departing from the scope of the present disclosure.

CLAIMS

WHAT IS CLAIMED IS:

1. A method for a user equipment (UE) monitoring a physical downlink control channel (PDCCH), the method comprising:
 - receiving a first configuration from a base station to configure the UE with a first search space of the PDCCH, wherein the first search space is used for monitoring a scheduling signal used for indicating scheduling information;
 - receiving a second configuration from the base station to configure the UE with a second search space of the PDCCH, wherein the second search space is used for monitoring a power saving signal used for indicating wake-up information associated with a Discontinuous Reception (DRX) functionality;
 - monitoring the first search space in response to the UE being in a DRX active time of the DRX functionality, wherein the DRX active time is a time during which the UE monitors the PDCCH; and
 - not monitoring the second search space in response to the UE being in the DRX active time of the DRX functionality.
2. The method of claim 1, wherein the first search space includes at least one of a first time and a first frequency resource for the UE to monitor the scheduling signal, and the second search space includes at least one of a second time and a second frequency resource for the UE to monitor the power saving signal.
3. The method of claim 1, further comprising:
 - determining whether to start a DRX on-duration timer of the DRX functionality according to the wake-up information.

4. The method of claim 1, wherein the power saving signal is further used for indicating a bandwidth part switch of a cell.

5. The method of claim 1, further comprising:
starting a DRX on-duration timer of the DRX functionality in response to not receiving the power saving signal in the second search space.

6. The method of claim 5, wherein the power saving signal is not received in the second search space in response to when the UE does not monitor the second search space or the UE unsuccessfully decodes the power saving signal.

7. The method of claim 1, wherein the not monitoring the second search space comprises: not monitoring the second search space while a DRX inactivity timer of the DRX functionality is running.

8. The method of claim 1, further comprising:
not monitoring the second search space in response to the UE performing a random access procedure, wherein the UE performs the random access procedure in response to one of:

a random access response window is running after transmitting a first random access preamble; and

the UE has not received the scheduling signal on the PDCCH indicating a new transmission addressed to a Cell Radio Network Temporary Identifier (C-RNTI) of the UE after successful reception of a random access response corresponding to a

second random access preamble not selected by the UE among contention-based random access preambles.

9. The method of claim 1, further comprising:

not monitoring the second search space in response to the UE performing a beam failure recovery procedure or the UE monitoring a third search space on the PDCCH, wherein the third search space is configured for the UE to monitor a beam failure response from the base station.

10. The method of claim 1, wherein the power saving signal is only received from a special cell (SpCell) of the base station.

11. A user equipment (UE) monitoring a physical downlink (DL) control channel (PDCCH) in a wireless communication system, the UE comprising:

a processor, for executing computer-executable instructions; and

a non-transitory machine-readable medium, coupled to the processor, for storing the computer-executable instructions, wherein the computer-executable instructions instruct the processor to:

receive a first configuration from a base station to configure the UE with a first search space of the PDCCH, wherein the first search space is used for monitoring a scheduling signal used for indicating scheduling information;

receive a second configuration from the base station to configure the UE with a second search space of the PDCCH, wherein the second search space is used for monitoring a power saving signal used for indicating wake-up information associated with a Discontinuous Reception (DRX) functionality;

monitor the first search space in response to the UE being in a DRX active time of the DRX functionality, wherein the DRX active time is a time during which the UE monitors the PDCCH; and

not monitoring the second search space in response to the UE being in the DRX active time of the DRX functionality.

12. The UE of claim 11, wherein the first search space includes at least one of a first time and a first frequency resource for the UE to monitor the scheduling signal, and the second search space includes at least one of a second time and a second frequency resource for the UE to monitor the power saving signal.

13. The UE of claim 11, wherein the computer-executable instructions further instruct the processor to:

determine whether to start a DRX on-duration timer of the DRX functionality according to the wake-up information.

14. The UE of claim 11, wherein the power saving signal is further used for indicating a bandwidth part switch of a cell.

15. The UE of claim 11, wherein the computer-executable instructions further instruct the processor to:

start a DRX on-duration timer of the DRX functionality in response to not receiving the power saving signal in the second search space.

16. The UE of claim 15, wherein the computer-executable instructions further instruct the processor to:

not receive the power saving signal in the second search space in response to when the UE does not monitor the second search space or the UE unsuccessfully decodes the power saving signal.

17. The UE of claim 11, wherein the computer-executable instructions further instruct the processor to:

not monitor the second search space while a DRX inactivity timer of the DRX functionality is running.

18. The UE of claim 11, wherein the computer-executable instructions further instruct the processor to:

not monitoring the second search space in response to the UE performing a random access procedure, wherein the UE performs the random access procedure in response to one of:

a random access response window is running after transmitting a first random access preamble; and

the UE has not received the scheduling signal on the PDCCH indicating a new transmission addressed to a Cell Radio Network Temporary Identifier (C-RNTI) of the UE after successful reception of a random access response corresponding to a second random access preamble not selected by the UE among contention-based random access preambles.

19. The UE of claim 11, wherein the computer-executable instructions further instruct the processor to:

not monitor the second search space in response to the UE performing a beam failure recovery procedure or the UE monitoring a third search space of the PDCCH,

wherein the third search space is configured for the UE to monitor a beam failure response from the base station.

20. The UE of claim 11, wherein the power saving signal is only received from a special cell (SpCell) of the base station.

ABSTRACT

A method for a UE to monitor a PDCCH comprises receiving a first configuration from a base station to configure the UE with a first search space of the PDCCH, where the first search space is used for monitoring a scheduling signal used for indicating scheduling information, receiving a second configuration from the base station to configure the UE with a second search space of the PDCCH, wherein the second search space is used for monitoring a power saving signal used for indicating wake-up information associated with a DRX functionality, monitoring the first search space in response to the UE being in a DRX active time of the DRX functionality, wherein the DRX active time is a time during which the UE monitors the PDCCH, and not monitoring the second search space in response to the UE being in the DRX active time of the DRX functionality.

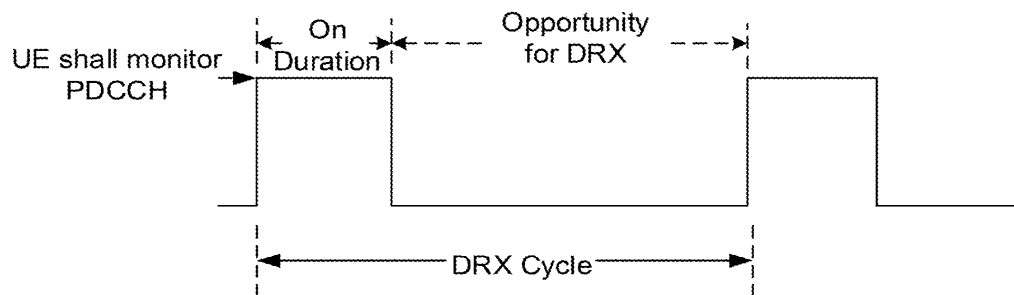


FIG. 1
(RELATED ART)

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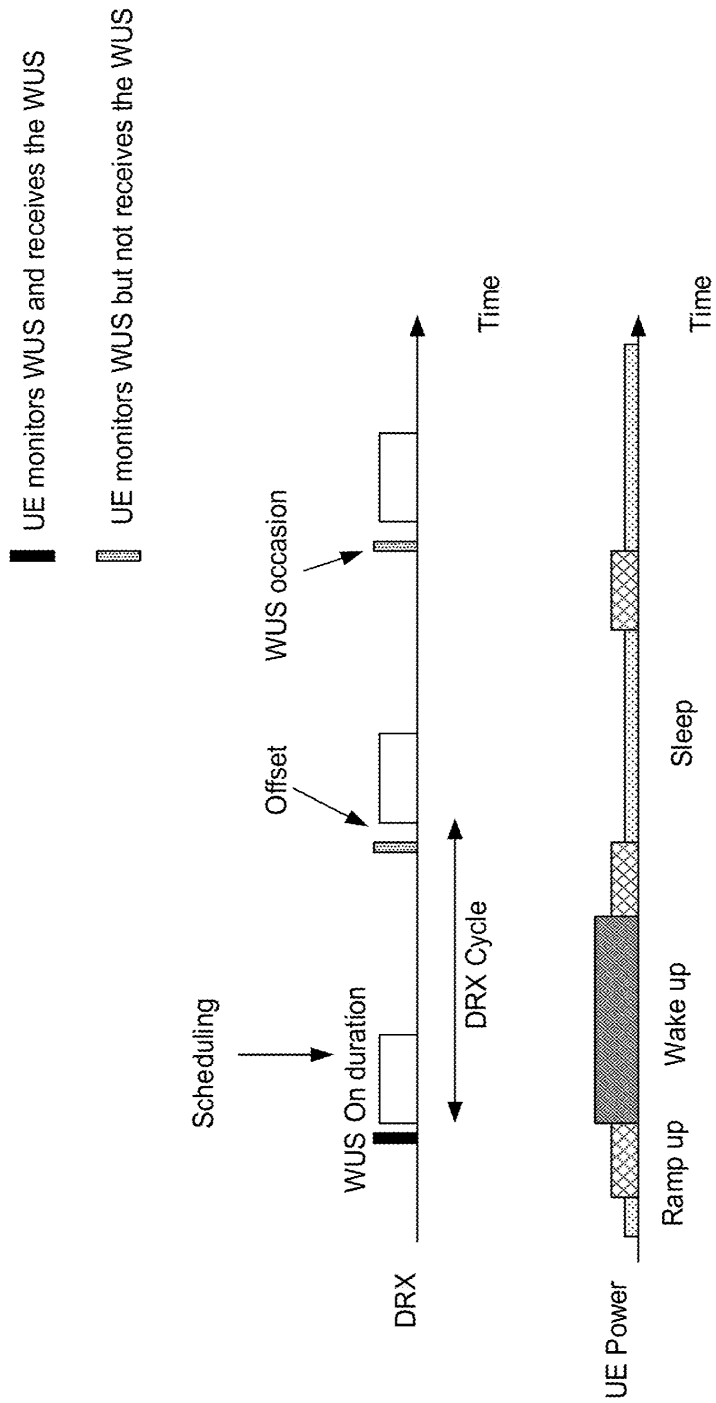


FIG. 2
(RELATED ART)

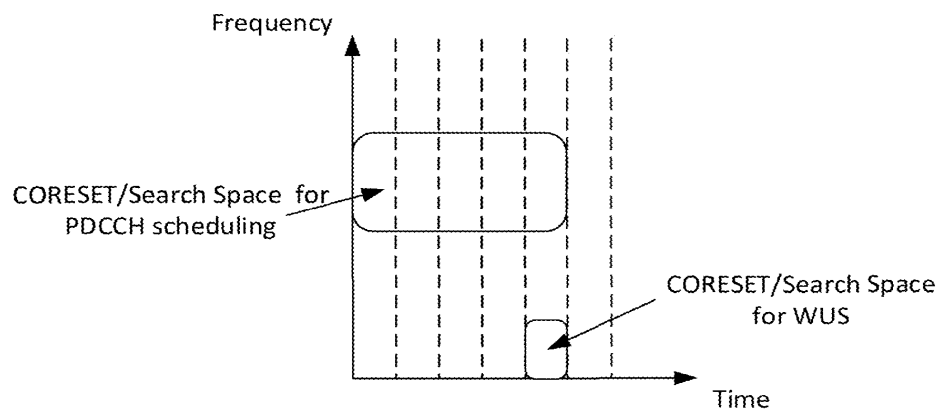


FIG. 3
(RELATED ART)

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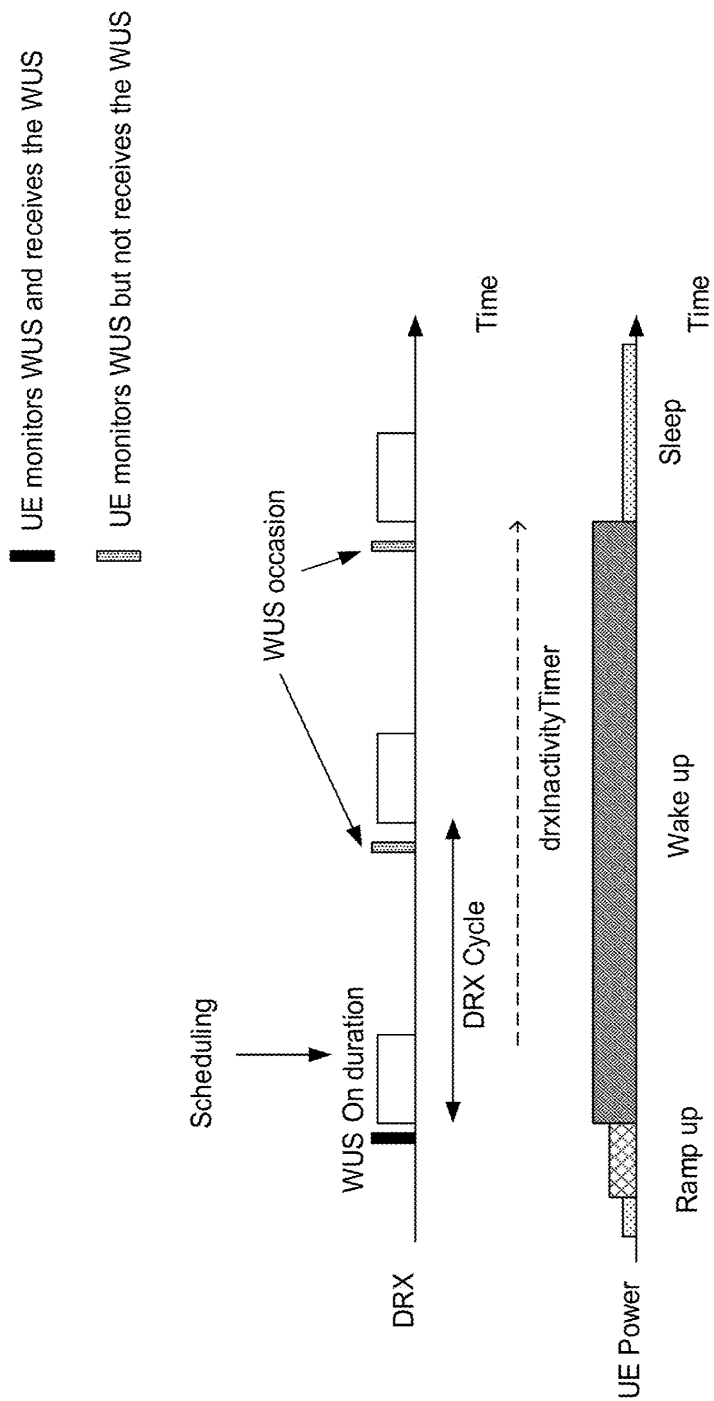


FIG. 4
(RELATED ART)

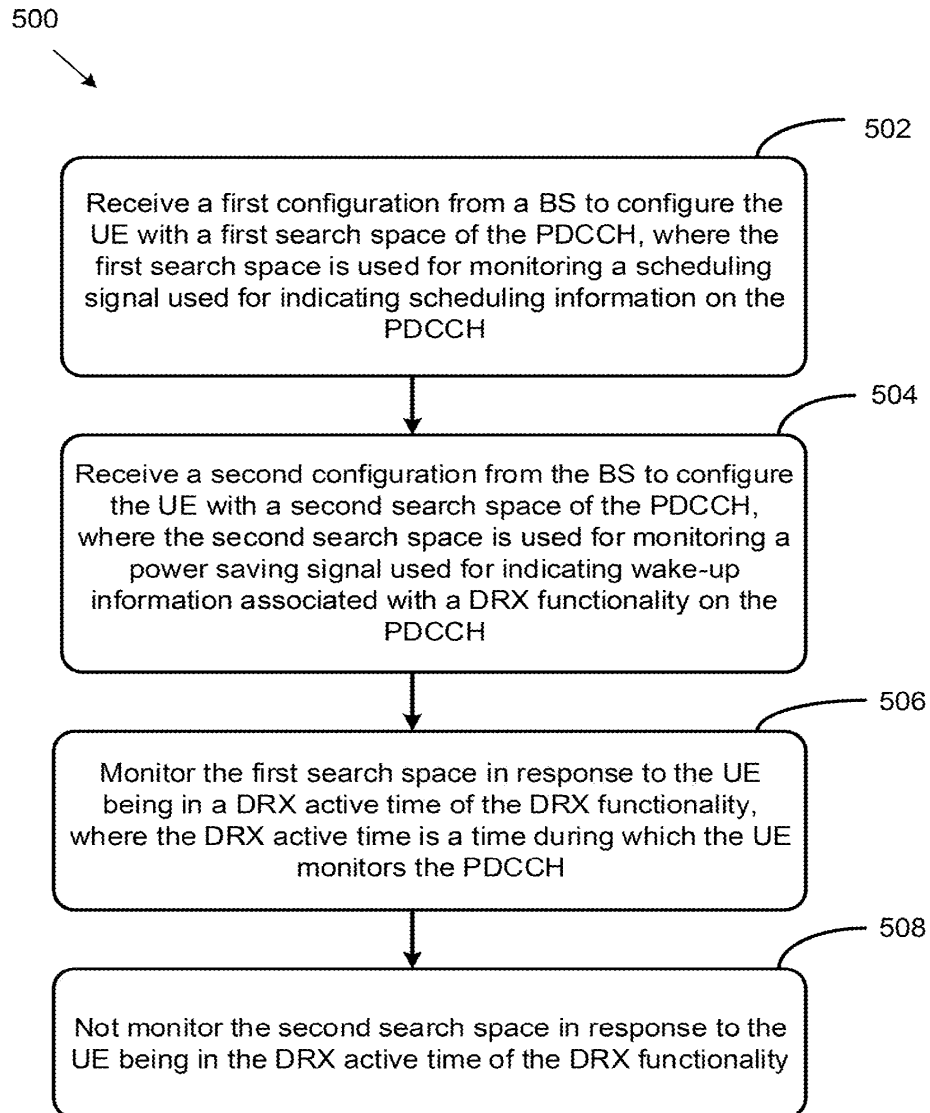


FIG. 5

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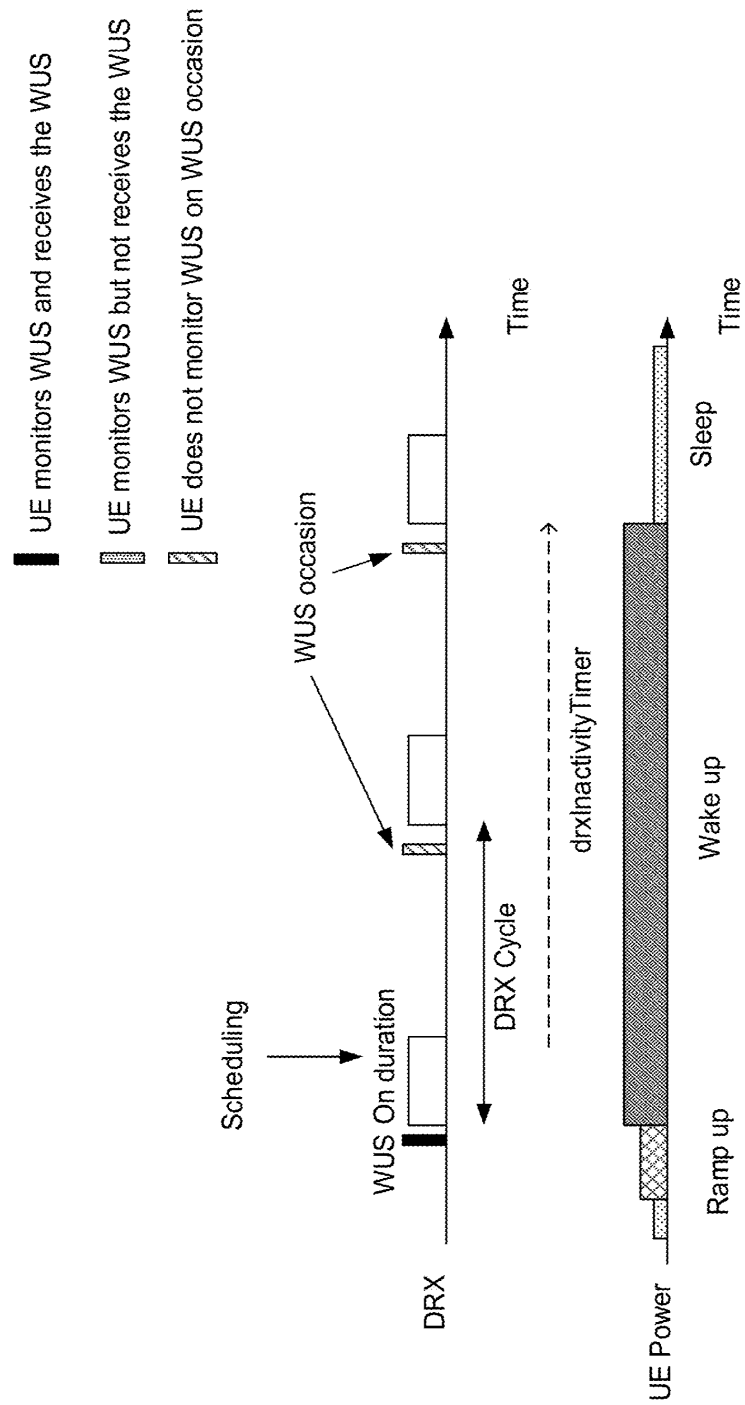


FIG. 6

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- UE monitors WUS and receives the WUS
- ▨ UE monitors WUS but not receives the WUS
- ▤ UE does not monitor WUS on WUS occasion

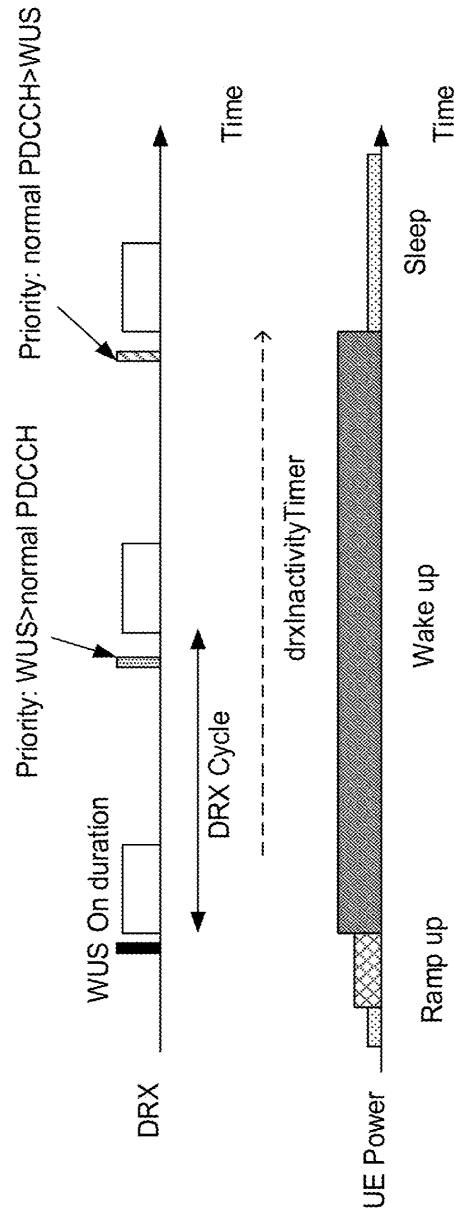


FIG. 7

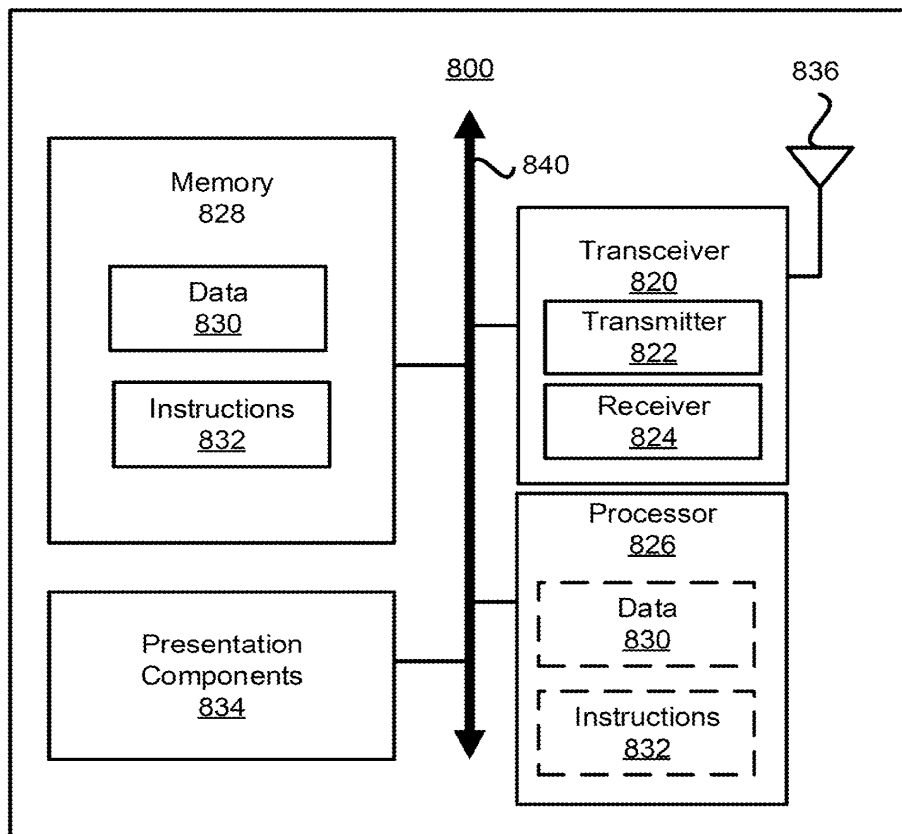


FIG. 8

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE
-------------------------------	--

As the below named inventor, I hereby declare that:

This declaration is directed to: ☒ The attached application, or
☐ United States application or PCT international application number _____
 filed on _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

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LEGAL NAME OF INVENTOR

Inventor: HSIN-HSI TSAI Date (Optional): _____
 Signature: HSIN-HSI TSAI

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE
---------------------------	--

As the below named inventor, I hereby declare that:

This declaration is directed to: ☒ The attached application, or
☐ United States application or PCT international application number _____
 filed on _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

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LEGAL NAME OF INVENTOR

Inventor: CHIA-HUNG WEI Date (Optional): _____
 Signature: CHIA-HUNG WEI

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE
---------------------------	--

As the below named inventor, I hereby declare that:

This declaration is directed to: ☒ The attached application, or
☐ United States application or PCT international application number _____
 filed on _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: CHIE-MING CHOU Date (Optional): _____
 Signature: Chie Ming Chou

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	US80883
		Application Number	
Title of Invention	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor	1				Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	HSIN-HSI		TSAI		
Residence Information (Select One) US Residency • Non US Residency Active US Military Service					
City	Taipei		Country of Residence ⁱ	TW	
Mailing Address of Inventor:					
Address 1		11F., No. 32, Jihu Rd., Neihu Dist.			
Address 2		Taipei City			
City	Taipei		State/Province		
Postal Code	114	Country ⁱ	TW		
Inventor	2				Remove
Legal Name					
Prefix	Given Name	Middle Name	Family Name	Suffix	
	CHIA-HUNG		WEI		
Residence Information (Select One) US Residency • Non US Residency Active US Military Service					
City	Hsinchu		Country of Residence ⁱ	TW	
Mailing Address of Inventor:					
Address 1		5F-1, NO. 5, HSIN-AN RD.,			
Address 2		HSINCHU SCIENCE-BASED INDUSTRIAL PARK, TAIWAN			
City	Hsinchu		State/Province		
Postal Code	300	Country ⁱ	TW		
Inventor	3				Remove
Legal Name					

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	US80883
		Application Number	
Title of Invention	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE		

Prefix	Given Name	Middle Name	Family Name	Suffix
	CHIE-MING		CHOU	
Residence Information (Select One) US Residence ☒ Non US Residence Active US Military Service				
City	Hsinchu	Country of Residence ⁱ	TW	

Mailing Address of Inventor:

Address 1	5F-1, NO. 5, HSIN-AN RD.		
Address 2	HSINCHU SCIENCE-BASED INDUSTRIAL PARK, TAIWAN		
City	Hsinchu	State/Province	
Postal Code	300	Country ⁱ	TW
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button. Add			

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence Information of this application.			
Customer Number	54000		
Email Address	eo-a-proce@scienbizip.com	Add Email	Remove Email
Email Address	eo-a-cbd@scienbizip.com	Add Email	Remove Email
Email Address	eo-a-procc@scienbizippc.com		Remove Email

Application Information:

Title of the Invention	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE		
Attorney Docket Number	US80883	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	8	Suggested Figure for Publication (if any)	

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	US80883
		Application Number	
Title of Invention	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE		

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	54000		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Claims benefit of provisional	62/840451	2019-04-30
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			Add

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	US80883
		Application Number	
Title of Invention	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE		

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)ⁱ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ^j (if applicable)	Remove

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

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013. ☐ NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.
--

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	US80883
		Application Number	
Title of Invention	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE		

Authorization or Opt-Out of Authorization to Permit Access:

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

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

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

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

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

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

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

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

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

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

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

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	US80883
		Application Number	
Title of Invention	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE		

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.			
Applicant 1		Remove	
If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.			
		Clear	
☒ Assignee	Legal Representative under 35 U.S.C. 117		Joint Inventor
Person to whom the inventor is obligated to assign.		Person who shows sufficient proprietary interest	
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:			
Name of the Deceased or Legally Incapacitated Inventor:			
If the Applicant is an Organization check here. ☒			
Organization Name	FG Innovation Company Limited		
Mailing Address Information For Applicant:			
Address 1	Flat 2623, 26/F Tuen Mun Central Square		
Address 2	22 Hoi Wing Road, Tuen Mun, New Territories		
City	Tuen Mun	State/Province	
Country	HK	Postal Code	
Phone Number		Fax Number	
Email Address			
Additional Applicant Data may be generated within this form by selecting the Add button.			Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	US80883
		Application Number	
Title of Invention	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE		

Assignee	1			
Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.				
Remove				
If the Assignee or Non-Applicant Assignee is an Organization check here. ☐				
Prefix	Given Name	Middle Name	Family Name	Suffix
Mailing Address Information For Assignee including Non-Applicant Assignee:				
Address 1				
Address 2				
City		State/Province		
Country i		Postal Code		
Phone Number		Fax Number		
Email Address				
Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add				

Signature:

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

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

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

Signature	/Alvin Koan/		Date (YYYY-MM-DD)	2020-04-27
First Name	Alvin	Last Name	Koan	Registration Number 68468
Additional Signature may be generated within this form by selecting the Add button. Add				

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	US80883
		Application Number	
Title of Invention	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE		

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE		
First Named Inventor/Applicant Name:		HSIN-HSI TSAI		
Filer:		Alvin Sean Koan		
Attorney Docket Number:		US80883		
Filed as Large Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	300	300
UTILITY SEARCH FEE	1111	1	660	660
UTILITY EXAMINATION FEE	1311	1	760	760
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1720

Electronic Acknowledgement Receipt	
EFS ID:	39280799
Application Number:	16859945
International Application Number:	
Confirmation Number:	9503
Title of Invention:	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE
First Named Inventor/Applicant Name:	HSIN-HSI TSAI
Customer Number:	54000
Filer:	Alvin Sean Koan
Filer Authorized By:	
Attorney Docket Number:	US80883
Receipt Date:	27-APR-2020
Filing Date:	
Time Stamp:	20:51:42
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$ 1720
RAM confirmation Number	E20204QK52358003
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	US80883200427POA.pdf	1138480	no	2
			c37e1ad7fb8558af68be542bdcd2f025a845f385		
Warnings:					
Information:					
2	Specification	US80883200427_Spec.pdf	145181	no	24
			3aa1afc72a75fd88c7e18db7903837c4d6f82faf		
Warnings:					
Information:					
3	Claims	US80883200427_Clms.pdf	61911	no	6
			9c720e2e6deb609577522aa6ea2fd717705b7c		
Warnings:					
Information:					
4	Abstract	US80883200427_Abst.pdf	53453	no	1
			52072cb1eded8bb4aaf20ea996208150c8680bc6		
Warnings:					
Information:					
5	Drawings-only black and white line drawings	US80883200427_draw.pdf	710674	no	8
			8dd0c0814c48237048d1d6a02acbf6458d354c42		
Warnings:					
Information:					
6	Oath or Declaration filed	US80883200424DEC.pdf	840777	no	3
			3e3167a5d2b49f2be0645f473141263ad171e509		
Warnings:					
Information:					

7	Application Data Sheet	US80883__ADS.pdf	1792870	no	9				
			e038c3d70c0a5826a1b7702811156fa040276a0						
Warnings:									
Information:									
8	Fee Worksheet (SB06)	fee-info.pdf	34569	no	2				
			1c4f7d77ff42611d32c967517c534f972095a86						
Warnings:									
Information:									
Total Files Size (in bytes):			4777915						
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.									

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 16/859,945				
APPLICATION AS FILED - PART I										
(Column 1)		(Column 2)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY				
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)			
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300			
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	660			
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	760			
TOTAL CLAIMS (37 CFR 1.16(i))	20	minus 20 = *			OR	x 100 =	0.00			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2	minus 3 = *				x 460 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00			
			TOTAL			TOTAL	1720			
* If the difference in column 1 is less than zero, enter "0" in column 2.										
APPLICATION AS AMENDED - PART II										
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY		
AMENDMENT A		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
AMENDMENT B		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))							OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.										



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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO.	TOT CLAIMS	IND CLAIMS
16/859,945	04/27/2020		1720	US80883	20	2

CONFIRMATION NO. 9503

FILING RECEIPT



0000000116700736

54000
ScienBiziP, PC
550 South Hope Street
Suite 2825
Los Angeles, CA 90071

Date Mailed: 05/05/2020

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

HSIN-HSI TSAI, Taipei, TAIWAN;
CHIA-HUNG WEI, Hsinchu, TAIWAN;
CHIE-MING CHOU, Hsinchu, TAIWAN;

Applicant(s)

FG Innovation Company Limited, Tuen Mun, HONG KONG;

Power of Attorney: The patent practitioners associated with Customer Number 54000

Domestic Priority data as claimed by applicant

This appln claims benefit of 62/840,451 04/30/2019

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

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

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

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

If Required, Foreign Filing License Granted: 05/01/2020

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/859,945**

Projected Publication Date: 11/05/2020

Non-Publication Request: No

Early Publication Request: No
Title

METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED
DEVICE

Preliminary Class

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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

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

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	16859945
	Filing Date	2020-04-27
	First Named Inventor	HSIN-HSI TSAI
	Art Unit	
	Examiner Name	
	Attorney Docket Number	US80883

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Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear		
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	1	20180145800	A1	2018-05-24	SAMSUNG ELECTRONICS CO LTD	the whole document		
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	1	109155931	CN	A	2019-01-04	HUAWEI TECHNOLOGIES CO LTD	At least the Abstract	×
	2	108012314	CN	A	2018-05-08	MEDIATEK INC	At least the Abstract	☒
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		16859945
	Filing Date		2020-04-27
	First Named Inventor	HSIN-HSI TSAI	
	Art Unit		
	Examiner Name		
Attorney Docket Number		US80883	

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
	1	Qualcomm Incorporated, "UE power saving for PDCCH monitoring", 3GPP TSG RAN WG1 #87, R1-1612065, 18 Nov.2016(18.11.2016), the whole document	
	2	Qualcomm Incorporated, "Advanced Grant Indication for UE Power Saving", 3GPP TSG RAN WG1 NR AdHoc#3, R1-1716418, 21 Sep.2017(21.09.2017), the whole document	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		16859945
	Filing Date		2020-04-27
	First Named Inventor	HSIN-HSI TSAI	
	Art Unit		
	Examiner Name		
	Attorney Docket Number	US80883	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Alvin Koan/	Date (YYYY-MM-DD)	2020-10-18
Name/Print	Alvin Koan	Registration Number	68468

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
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Electronic Acknowledgement Receipt	
EFS ID:	40880585
Application Number:	16859945
International Application Number:	
Confirmation Number:	9503
Title of Invention:	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE
First Named Inventor/Applicant Name:	HSIN-HSI TSAI
Customer Number:	54000
Filer:	Alvin Sean Koan
Filer Authorized By:	
Attorney Docket Number:	US80883
Receipt Date:	19-OCT-2020
Filing Date:	27-APR-2020
Time Stamp:	15:22:44
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	US8088320101801IDS-NPL.pdf	2345815 eb74e6c52ff66cfac9f5f13eeaa4b3b48fd97c43	no	5

Warnings:

Information:					
2	Foreign Reference	US8088320101801IDS-OT.pdf	2517905	no	16
			2eb52a476438a1339178985738e52326eb035d9c		
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3	Non Patent Literature	US8088320101802IDS-NPL.pdf	729451	no	3
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Information:					
4	Information Disclosure Statement (IDS) Form (SB08)	US80883__IDS.pdf	532850	no	4
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Warnings:					
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5	Foreign Reference	US8088320101802IDS-OT.pdf	17476729	no	31
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/859,945	04/27/2020	HSIN-HSI TSAI	US80883

CONFIRMATION NO. 9503

PUBLICATION NOTICE



OC000000121162566

54000
ScienBiziP, PC
550 South Hope Street
Suite 2825
Los Angeles, CA 90071

Title:METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE

Publication No.US-2020-0351784-A1

Publication Date:11/05/2020

NOTICE OF PUBLICATION OF APPLICATION

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

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

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (03-15)

Approved for use through 07/31/2016. OMB 0651-0031

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	16859945
	Filing Date	2020-04-27
	First Named Inventor	HSIN-HSI TSAI
	Art Unit	
	Examiner Name	
	Attorney Docket Number	US80883

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Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	
	1	20180145800	A1	2018-05-24	SRIVASTAV et al.		
	2	20180124701	A1	2018-05-03	JHANG et al.		
	3	20180270756	A1	2018-09-20	BHATTAD et al.		
	4	20200154356	A1	2020-05-14	BHATTAD et al.		
	5	20180332533	A1	2018-11-15	BHATTAD et al.		
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		16859945
	Filing Date		2020-04-27
	First Named Inventor	HSIN-HSI TSAI	
	Art Unit		
	Examiner Name		
Attorney Docket Number		US80883	

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	1	108012314	CN	A	2018-05-08	MEDIATEK INC	Corresponding to US201800124701 (A1)	×
	2	201842801	TW	A	2018-12-01	QUALCOMM INC	Corresponding to US.20180270756 (A1) US.20200154356 (A1)	☒
	3	201902264	TW	A	2019-01-01	QUALCOMM INC	Corresponding to US.20180332533 (A1)	☒

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		16859945
	Filing Date		2020-04-27
	First Named Inventor	HSIN-HSI TSAI	
	Art Unit		
	Examiner Name		
	Attorney Docket Number		US80883

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Amir Bahrami/	Date (YYYY-MM-DD)	2021-06-11
Name/Print	Amir Bahrami	Registration Number	70460

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt	
EFS ID:	42964234
Application Number:	16859945
International Application Number:	
Confirmation Number:	9503
Title of Invention:	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE
First Named Inventor/Applicant Name:	HSIN-HSI TSAI
Customer Number:	54000
Filer:	Amir Bahrami
Filer Authorized By:	
Attorney Docket Number:	US80883
Receipt Date:	11-JUN-2021
Filing Date:	27-APR-2020
Time Stamp:	13:08:37
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Foreign Reference	US80883210601IDS-OT.pdf	1046979	no	15
			206857a9a9f594030de773738e00808b1c18159f		

Warnings:

Information:					
2	Foreign Reference	US80883210603IDS-OT.pdf	12826729	no	108
			6859d243305d0577ddb0a84c1bc35e88bbf1866c		
Warnings:					
Information:					
3	Foreign Reference	US80883210602IDS-OT.pdf	12709003	no	101
			72429a0674feb655b5b37fb318930a03187ea49		
Warnings:					
Information:					
4	Information Disclosure Statement (IDS) Form (SB08)	US80883__IDS.pdf	1035469	no	4
			bd2349664cdac2b20d8969550469125aa4cc1099		
Warnings:					
Information:					
Total Files Size (in bytes):			27618180		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

Under the Paperwork Reduction Act of 1995, no person is required to respond to a collection of information unless it displays a valid OMB control number

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

☒

Practitioners associated with Customer Number:

116201

OR

☐

Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number

Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

☒

The address associated with Customer Number: 116201

OR

☐

Firm or individual name

Address

City

State

Zip

Country

Telephone

Email

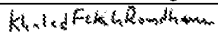
Assignee name and address:

Hannibal IP LLC, 5204 Bluewater Dr., Frisco, Texas 75036 U.S.A.

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of the practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee.

Signature 	Date Sept 3, 2021
Name Khalad Fekih-Romdhane	Telephone
Title Manager	

This collection of information is required by 37 CFR 1.31, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public, which is to update (and by the USPTO to process) the file of a patent or reexamination proceeding. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 18 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: TSAL, HSIN-HSI
Serial No.: 16/859,945
Filing Date: April 27, 2020
Group Art Unit: 2467
Examiner: CHOWDHURY, MOHAMMED SHAMSUL
Confirmation No.: 9503
Title: METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL
MONITORING AND RELATED DEVICE

Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

SUBMISSION OF NEW APPLICATION DATA SHEET

Applicant submits a new Application Data Sheet in order to update the name of the Applicant from FG Innovation Company Limited to Hannibal IP LLC. The Applicant also requests an updated filing receipt listing Hannibal IP LLC as the Applicant.

No fee is believed due. However, the Commissioner is hereby authorized to charge any fees and credit any over payments to Deposit Account No. 602766.

Respectfully submitted,

/Do Hyung Kim/

Dated: September 27, 2021

Do Hyung Kim
Attorney of Applicant
Reg. No. 66487

SUL LEE Law Firm PLLC
3030 LBJ Fwy, Ste 1130
Dallas, Texas 75234
Tel.: 214-206-4064
Fax.: 214-206-4068
E-mail: dkim@sulleelaw.com

Electronic Acknowledgement Receipt	
EFS ID:	43875951
Application Number:	16859945
International Application Number:	
Confirmation Number:	9503
Title of Invention:	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE
First Named Inventor/Applicant Name:	HSIN-HSI TSAI
Customer Number:	54000
Filer:	Do Hyung Kim/Julie Mcleod
Filer Authorized By:	Do Hyung Kim
Attorney Docket Number:	US80883
Receipt Date:	27-SEP-2021
Filing Date:	27-APR-2020
Time Stamp:	15:58:38
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Assignee showing of ownership per 37 CFR 3.73	2021_09_27_373C.pdf	120030	no	3
			20e47e2a22679cfa0f3dce737689628192ff04d5		

Warnings:

Information:					
2	Application Data Sheet	2021_09_27_Amended_ADS.pdf	370957	no	9
			2d0a5664b5df10ed6db9ab05375bf8d88a1b086		
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
3	Power of Attorney	Executed_POA-signed.pdf	424726	no	2
			1bb8c625420d9f9359a1aee50de638db722fca81		
Warnings:					
Information:					
4	Transmittal Letter	Transmittal_Ltr.pdf	65910	no	1
			a03b34514448d7e2cbd28064aaa78c3375f75a9a		
Warnings:					
Information:					
Total Files Size (in bytes):			981623		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

STATEMENT UNDER 37 CFR 3.73(c)Applicant/Patent Owner: Hannibal IP LLCApplication No./Patent No.: 16/859,945 Filed/Issue Date: April 27, 2020Titled: METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICEHannibal IP LLC, a Corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose one of options 1, 2, 3 or 4 below):

1. ☒ The assignee of the entire right, title, and interest.
2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):
- ☐ The extent (by percentage) of its ownership interest is ____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.
- ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose one of options A or B below):

- A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.
- B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: TSAI, Hsin-Hsi; WEI, Chia-Hung; CHOU, Chie-Ming To: FG Innovation Company Limited

The document was recorded in the United States Patent and Trademark Office at

Reel 052506, Frame 0646, or for which a copy thereof is attached.2. From: FG Innovation Company Limited To: Hannibal IP LLC

The document was recorded in the United States Patent and Trademark Office at

Reel 057487, Frame 0504, or for which a copy thereof is attached.

[Page 1 of 2]

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
 Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Do Hyung Kim/

Signature

Do Hyung Kim

Printed or Typed Name

September 27, 2021

Date

66487

Title or Registration Number

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	US80883- <u>HANN013-US-PAT</u>
		Application Number	<u>16/859,945</u>
Title of Invention	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor	1				Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	HSIN-HSI		TSAI			
Residence Information (Select One) US Residency • Non US Residency Active US Military Service						
City	Taipei		Country of Residence ⁱ	TW		
Mailing Address of Inventor:						
Address 1		11F., No. 32, Jihu Rd., Neihu Dist.				
Address 2		Taipei City				
City	Taipei		State/Province			
Postal Code	114		Country ⁱ	TW		
Inventor	2				Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	CHIA-HUNG		WEI			
Residence Information (Select One) US Residency • Non US Residency Active US Military Service						
City	Hsinchu		Country of Residence ⁱ	TW		
Mailing Address of Inventor:						
Address 1		5F-1, NO. 5, HSIN-AN RD.,				
Address 2		HSINCHU SCIENCE-BASED INDUSTRIAL PARK, TAIWAN				
City	Hsinchu		State/Province			
Postal Code	300		Country ⁱ	TW		
Inventor	3				Remove	
Legal Name						

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	US80883- <u>HANN013-US-PAT</u>
		Application Number	<u>16/859,945</u>
Title of Invention	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE		

Prefix	Given Name	Middle Name	Family Name	Suffix
	CHIE-MING		CHOU	
Residence Information (Select One) US Residence ☒ Non US Residence Active US Military Service				
City	Hsinchu	Country of Residence ⁱ	TW	

Mailing Address of Inventor:

Address 1	5F-1, NO. 5, HSIN-AN RD.		
Address 2	HSINCHU SCIENCE-BASED INDUSTRIAL PARK, TAIWAN		
City	Hsinchu	State/Province	
Postal Code	300	Country ⁱ	TW
All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button. Add			

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below. For further information see 37 CFR 1.33(a).			
☐ An Address is being provided for the correspondence information of this application.			
Customer Number	54000- <u>116201</u>		
Email Address	ea-proce@scienbizip.com ip@sulleelaw.com	Add Email	Remove Email
Email Address	ea-cbd@scienbizip.com	Add Email	Remove Email
Email Address	ea-proce@scienbizippe.com		Remove Email

Application Information:

Title of the Invention	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE		
Attorney Docket Number	US80883- <u>HANN013-US-PAT</u>	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	8	Suggested Figure for Publication (if any)	

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	US80883 <u>HANN013-US-PAT</u>
		Application Number	<u>16/859,945</u>
Title of Invention	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE		

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	☒ Customer Number	☐ US Patent Practitioner	☐ Limited Recognition (37 CFR 11.9)
Customer Number	<u>54000- 116201</u>		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	<u>Pending</u>	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	<u>Claims benefit of provisional</u>	<u>62/840451</u>	<u>2019-04-30</u>
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.			Add

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	-US80883- <u>HANN013-US-PAT</u>
		Application Number	<u>16/859,945</u>
Title of Invention	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE		

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)ⁱ the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

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

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

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013. ☐ NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.
--

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	-US80883- <u>HANN013-US-PAT</u>
	Application Number	<u>16/859,945</u>
Title of Invention	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE	

Authorization or Opt-Out of Authorization to Permit Access:

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

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

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

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

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

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

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

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

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

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

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

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	US80883 <u>HANN013-US-PAT</u>
	Application Number	<u>16/859,945</u>
Title of Invention	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.		
Applicant 1	Remove	
If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section. Clear		
☒ Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.		Person who shows sufficient proprietary interest
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:		
Name of the Deceased or Legally Incapacitated Inventor: 		
If the Applicant is an Organization check here. ☒		
Organization Name	 <u>Hannibal IP LLC</u>	
Mailing Address Information For Applicant:		
Address 1	 <u>Flat 2623, 26/F Tuen Mun Central Square</u> <u>5204 Bluewater Dr.</u>	
Address 2	 <u>22 Hoi Wing Road, Tuen Mun, New Territories</u>	
City	 <u>Tuen Mun</u> <u>Frisko</u>	State/Province <u>TX</u>
Country	 <u>HK</u> <u>U.S.A.</u>	Postal Code <u>75036</u>
Phone Number		Fax Number
Email Address	 <u>ip@sulleelaw.com</u>	
Additional Applicant Data may be generated within this form by selecting the Add button. Add 		

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	US80883 HANN013-US-PAT
		Application Number	16/859,945
Title of Invention	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE		

Assignee 1				
Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.				
Remove				
If the Assignee or Non-Applicant Assignee is an Organization check here. ☐				
Prefix	Given Name	Middle Name	Family Name	Suffix
Mailing Address Information For Assignee including Non-Applicant Assignee:				
Address 1				
Address 2				
City		State/Province		
Country i		Postal Code		
Phone Number		Fax Number		
Email Address				
Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add				

Signature:

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

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

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

Signature	~~/Alvin Koan/~~ /Do Hyung Kim/		Date (YYYY-MM-DD)	2021-09-27 ~~2020-04-27~~
First Name	Alvin	Do Hyung	Last Name	Koan Kim
			Registration Number	68468 66487
Additional Signature may be generated within this form by selecting the Add button. Add				

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	~~US80883~~ <u>HANN013-US-PAT</u>
		Application Number	<u>16/859,945</u>
Title of Invention	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE		

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO.	TOT CLAIMS	IND CLAIMS
16/859,945	04/27/2020	2467	1720	HANN013-US-PAT	20	2

CONFIRMATION NO. 9503
CORRECTED FILING RECEIPT



0000000128748122

116201
Sul Lee
3030 Lyndon B Johnson Fwy
Suite 1130
Dallas, TX 75234

Date Mailed: 09/30/2021

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

HSIN-HSI TSAI, Taipei, TAIWAN;
CHIA-HUNG WEI, Hsinchu, TAIWAN;
CHIE-MING CHOU, Hsinchu, TAIWAN;

Applicant(s)

Hannibal IP LLC, Frisco, TX;

Power of Attorney: The patent practitioners associated with Customer Number 116201

Domestic Priority data as claimed by applicant

This appln claims benefit of 62/840,451 04/30/2019

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see <http://www.uspto.gov> for more information.) - None.

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

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

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

If Required, Foreign Filing License Granted: 05/01/2020

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/859,945**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No
Title

METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED
DEVICE

Preliminary Class

370

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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

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

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

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

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

LICENSE FOR FOREIGN FILING UNDER
Title 35, United States Code, Section 184
Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

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

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

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

NOT GRANTED

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

SelectUSA

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



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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/859,945	04/27/2020	HSIN-HSI TSAI	US80883

CONFIRMATION NO. 9503

POWER OF ATTORNEY NOTICE



OC000000128748117

54000
ScienBiziP, PC
550 South Hope Street
Suite 2825
Los Angeles, CA 90071

Date Mailed: 09/30/2021

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 09/27/2021.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/sleutchit/



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/859,945	04/27/2020	HSIN-HSI TSAI	HANN013-US-PAT

CONFIRMATION NO. 9503

POA ACCEPTANCE LETTER



116201
Sul Lee
3030 Lyndon B Johnson Fwy
Suite 1130
Dallas, TX 75234

Date Mailed: 09/30/2021

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 09/27/2021.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/sleutchit/



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Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/859,945	04/27/2020	HSIN-HSI TSAI	HANN013-US-PAT	9503
116201	7590	10/15/2021	EXAMINER	
Sul Lee			CHOWDHURY, MOHAMMED SHAMSUL	
3030 Lyndon B Johnson Fwy				
Suite 1130				
Dallas, TX 75234				
			ART UNIT	PAPER NUMBER
			2467	
			NOTIFICATION DATE	DELIVERY MODE
			10/15/2021	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

IP@sulleelaw.com
jmcleod@sulleepllc.com
sul@sulleelaw.com

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on **10/19/2020** & **06/11/2021** are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent for a claimed invention may not be obtained, notwithstanding that the claimed invention is not identically disclosed as set forth in section 102, if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. Patentability shall not be negated by the manner in which the invention was made.

In event the determination of the status of the application as subject to AIA 35 U.S.C. 102 and 103 (or as subject to pre-AIA 35 U.S.C. 102 and 103) is incorrect, any correction of the statutory basis for the rejection will not be considered a new ground of rejection if the prior art

relied upon, and the rationale supporting the rejection, would be the same under either status.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103 are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. **Claims 1-3, 7, 11-13 and 17** are rejected under 35 U.S.C. 103 as being unpatentable over Wu et al. (2020/0229092), Wu hereinafter, in view of Lin et al. (2019/0297577), Lin hereinafter.

Re. Claims 1 and 11, Wu teaches a method for a user equipment (UE) monitoring a physical downlink control channel (PDCCH) (§0023 - *FIG. 1 is a schematic flowchart of a method for monitoring a PDCCH*) and a user equipment (UE) (Fig. 20, UE 2000/Fig. 21) monitoring a physical downlink (DL) control channel (PDCCH) in a wireless communication system (Fig. 1-13 & §0023 - *a method for monitoring a PDCCH*; Also, see §0009), the UE comprising: a processor (Fig. 21, 2110), for executing computer-executable instructions (§0337 - §0338); and a non-transitory machine-readable medium (Fig. 21, 2120), coupled to the processor, for storing the computer-executable instructions, wherein the computer-executable instructions instruct the processor to (§0337 - §0338) : receive a first configuration from a base station to configure the UE with a first search space of the PDCCH, wherein the first search space is used for monitoring a scheduling signal used for indicating scheduling information (Fig. 1-16 & §0063 - *when the*

UE receives the configuration information of the physical layer power saving signal (referring to Wake up signal, WUS, see ¶0058) transmitted by the base station, wherein the physical layer power saving signal is used to perform a specific power saving operation, and then the UE monitors the physical layer power saving signal on the preconfigured time frequency resource, and performs a corresponding power saving operation based on whether the physical layer power saving signal is monitored, .. starts monitoring the PDCCH while waking up from the sleep mode. Fig. 6 & ¶0097 - When the UE applies the short DRX cycle, the On-Duration of two consecutive short DRX cycles corresponds to one WUS, that is, the WUS and the On-Duration of the short DRX cycle is an one-to-multiple correspondence. Fig. 6 & ¶0101 - when the short DRX cycle is configured, one WUS can be configured to correspond to the On-Duration of N short DRX cycles, wherein N is a configurable value, and the system specifies that the maximum value of N is the drx-ShortCycleTimer. That is, when UE applies short DRX cycle corresponding to WUS (i.e., physical layer power saving signal, see ¶0058), the configuration related to short DRX cycle as received by the UE is termed as first configuration as per instant application at least in ¶0087. Also, Fig. 13 shows a plurality of PDCCH search spaces corresponding to a plurality of physical layer power saving signals (i.e., WUS with a plurality of DRX functionalities, such as short DRX cycle or long DRX cycle as shown in Fig.6 along with disclosures at least in ¶0097, ¶0101), see ¶0173. Fig. 13 & ¶0175 - each physical layer power saving (i.e., WUS with first configuration (short DRX cycle) or WUS with second configuration (long DRX cycle)) is used to perform the UE to start or stop monitoring the PDCCH on the corresponding PDCCH search space (interpreted as PDCCH search space corresponding to first configuration (WUS associated with short DRX cycle). Also, WUS (wake-up signal) is interpreted both as a scheduling signal and power saving signal as per instant application at least in ¶0014,

where it recites "a power saving signal, namely wake-up signaling (WUS), is introduced", and in ¶0094, where it recites "WUS may include scheduling information"); receive a second configuration from the base station to configure the UE with a second search space of the PDCCH, wherein the second search space is used for monitoring a power saving signal used for indicating wake-up information associated with a Discontinuous Reception (DRX) functionality (Fig. 1-16 & ¶0063 - *when the UE receives the configuration information of the physical layer power saving signal (referring to Wake up signal, WUS, see ¶0058) transmitted by the base station, wherein the physical layer power saving signal is used to perform a specific power saving operation, and then the UE monitors the physical layer power saving signal on the preconfigured time frequency resource, and performs a corresponding power saving operation based on whether the physical layer power saving signal is monitored, .. starts monitoring the PDCCH while waking up from the sleep mode.* Fig. 6 & ¶0097 - *When the UE applies the long DRX cycle, the On-Duration of a long DRX cycle corresponds to one WUS, that is, the WUS and the On-Duration of the long DRX cycle is an one-to-one correspondence.* Fig. 6 & ¶0100 - *when the UE applies a long DRX cycle, one WUS can be configured to correspond to N On-Durations, and N and M can be configured separately. That is, when UE applies long DRX cycle corresponding to WUS (i.e., physical layer power saving signal, see ¶0058), the configuration related to long DRX cycle as received by the UE is termed as second configuration as per instant application at least in ¶0087.* Also, Fig. 13 shows a plurality of PDCCH search spaces corresponding to a plurality of physical layer power saving signals (i.e., WUS with a plurality of DRX functionalities, such as short DRX cycle or long DRX cycle as shown in Fig.6 along with disclosures at least in ¶0097, ¶0101), see ¶0173. Fig. 13 & ¶0175 - each physical layer power saving (i.e., WUS with first configuration (short DRX cycle) or WUS with second configuration (long DRX cycle)) is used to perform the UE to start

or stop monitoring the PDCCH on the corresponding PDCCH search space (interpreted as PDCCH search space corresponding to second configuration (WUS associated with long DRX cycle, DRX functionality)); monitor the first search space in response to the UE being in a DRX active time of the DRX functionality, wherein the DRX active time is a time during which the UE monitors the PDCCH (§10054 - When DRX is used in the connected mode, each DRX cycle includes an On-Duration... The UE needs to monitor the PDCCH during the On-Duration.... The UE wakes up at the starting position of the On-Duration of each DRX cycle to start the drx-onDurationTimer, that is, to start to monitor the PDCCH. Also, Fig. 13 shows a plurality of PDCCH search spaces corresponding to a plurality of physical layer power saving signals (i.e., WUS with a plurality of DRX functionalities, such as short DRX cycle or long DRX cycle as shown in Fig.6 along with disclosures at least in §10097, §10101), see §10173);

Yet, Wu does not expressly teach not monitoring the second search space in response to the UE being in the DRX active time of the DRX functionality.

However, in the analogous art, Lin expressly discloses not monitoring the second search space in response to the UE being in the DRX active time of the DRX functionality (§10141 - For each DL BWP configured to a UE in a serving cell, the UE is provided by higher layers with a **number of search space sets** where, for **each search space set** (i.e., a plurality of search space) from the number search space sets, the UE is provided the following: a search space set index_s; an association between the search space set_s and a CORESET *p*; a PDCCH monitoring periodicity of *k_s* slots and a PDCCH monitoring offset of *a_s* slots. Fig. 21 & §10271 - time domain configuration 2100 of PoSS-WU associated with C-DRX. Fig. 21 & §10272 - The UE can **skip wake-ups** (interpreted as not monitoring) for the associated OnDuration 2103 if the UE doesn't detect PoSS-WU in associated monitoring occasion 2101).

Therefore, it would have been obvious to one of the ordinary skill in the art before the effective filing date of the claimed invention to combine Wu's invention of a system and a method for monitoring physical downlink control channel to include Lin's invention of a system and a method for power saving signal design in an advanced wireless communication system, because it provides an efficient and dynamic power saving mechanism for both connected mode discontinuous reception (C-DRX) and idle/inactive mode paging in the advanced wireless communication system, such as, 5G new radio access (NR).
(¶0085/¶0161, Lin)

Re. Claims 2 and 12, Wu and Lin teach claims 1 and 11 respectively.

Wu further teaches wherein the first search space includes at least one of a first time and a first frequency resource for the UE to monitor the scheduling signal, and the second search space includes at least one of a second time and a second frequency resource for the UE to monitor the power saving signal. (Fig.1-13 & ¶0173 - *physical layer power saving signal (i.e., WUS with a plurality of DRX functionalities, such as short DRX cycle or long DRX cycle as shown in Fig.6 along with disclosures at least in ¶0097, ¶0101) has a corresponding PDCCH search space, and starting or stopping a monitoring of the PDCCH based on a result of the monitoring of the physical layer power saving signal includes: ¶0174 - starting or stopping the monitoring of the PDCCH of the search space corresponding to the physical layer power saving signal. That is, a plurality of PDCCH search spaces corresponding to a plurality of physical layer power saving signals (i.e., WUS with a plurality of DRX functionalities, such as short DRX cycle or long DRX cycle as shown in Fig.6 along with disclosures at least in ¶0097, ¶0101). Fig. 13 & ¶0175 - each *physical layer power saving (i.e., WUS with first configuration (short DRX cycle) or WUS with second configuration (long DRX cycle))* is used to perform the UE to start or stop monitoring the PDCCH on the corresponding PDCCH search space*

(interpreted as PDCCH search space corresponding to second configuration (WUS associated with long DRX cycle, DRX functionality). Fig. 13 & ¶0178-¶0180 - **configuration information** of the physical layer power saving signal (i.e., WUS with first configuration (short DRX cycle) or WUS with second configuration (long DRX cycle)) includes at least one of the following parameters: **time domain resource position** of the physical layer power saving signal. **frequency domain resource position** of the physical layer power saving signal. That is, a plurality of PDCCH search spaces corresponding to a plurality of physical layer power saving signals do have corresponding time domain resource position and frequency domain resource position for UE to be able to monitor the respective physical layer power saving signals (i.e., WUS with first configuration (short DRX cycle) or WUS with second configuration (long DRX cycle)). Here, both scheduling signal and power saving signal is interpreted as wake up signal (WUS) as per instant application at least in ¶0014 & ¶0094).

Re. Claims 3 and 13, Wu and Lin teach claims 1 and 11 respectively.

Wu also teaches further comprising: determining whether to start a DRX on-duration timer of the DRX functionality according to the wake-up information. (Fig.1-13 & ¶0067 - **when the physical layer power saving signal (i.e., WUS, see ¶0058) is monitored, the drx-onDurationTimer is started at the starting position of the corresponding On-Duration.** Fig. 2 & ¶0071 - **The UE periodically monitors the WUS, and determines whether to start the drx-onDurationTimer at the starting position of the corresponding On-Duration based on the monitoring result of the WUS, that is, to start monitoring the PDCCH).**

Re. Claims 7 and 17, Wu and Lin teach claims 1 and 11 respectively.

Wu also teaches further wherein the not monitoring the second search space comprises: not monitoring the second search space while a DRX inactivity timer of the DRX functionality is running.

(¶0112 -when the *drx-InactivityTimer* .. running, if the base station will not schedule the UE, the base station may transmit a *physical layer signal* (i.e., WUS, see ¶0068) to indicate the UE to *stop monitoring the PDCCH*. Also, Fig. 13 shows a *plurality of PDCCH search spaces* corresponding to a *plurality of physical layer power saving signals* (i.e., WUS with a plurality of DRX functionalities, such as short DRX cycle or long DRX cycle as shown in Fig.6 along with disclosures at least in ¶0097, ¶0101), see ¶0173).

6. **Claims 4 and 14** are rejected under 35 U.S.C. 103 as being unpatentable over Wu, in view of Lin, further in view of He et al. (2019/0254110), He hereinafter.

Re. Claims 4 and 14, Wu and Lin teach claims 1 and 11.

Yet, Wu and Lin do not **expressly** teach wherein the power saving signal is further used for indicating a bandwidth part switch of a cell.

However, in the analogous art, He **explicitly** discloses wherein the power saving signal is further used for indicating a bandwidth part switch of a cell. (Fig.1-2 & Fig. 19 & ¶0182 - *Information fields of WUS can include a BWP indicator field to indicate a BWP for the UE to switch to, when needed, before the next DRX cycle starts. Fig.1-2 & Fig. 19 & ¶0184 - a WUS indicating to a UE to monitor PDCCH for PDSCH/PUSCH scheduling in the next DRX cycle and also indicates to the UE to switch a BWP from a default BWP to another active BWP*).

Therefore, it would have been obvious to one of the ordinary skill in the art before the effective filing date of the claimed invention to combine Wu's invention of a system and a method for monitoring physical downlink control channel and Lin's invention of a system and a method for power saving signal design in an advanced wireless communication system to include He's invention of a system and a method for power saving at a user equipment, because it enables power savings for a user equipment in a new radio systems, such as 5G/NR mobile communication system. (¶0007, He)

7. **Claims 9 and 19** are rejected under 35 U.S.C. 103 as being unpatentable over Wu, in view of Lin, further in view of Guo et al. (2019/0190582), Guo hereinafter.

Re. Claims 9 and 19, Wu and Lin teach claims 1 and 11.

Yet, Wu and Lin do not **expressly teach** not monitoring the second search space in response to the UE performing a beam failure recovery procedure **or** the UE monitoring a third search space on the PDCCH, wherein the third search space is configured for the UE to monitor a beam failure response from the base station.

However, in the analogous art, Guo **explicitly discloses** not monitoring the second search space in response to the UE performing a beam failure recovery procedure (Fig.1/Fig.11 & ¶0352 - *a UE can be requested to **stop monitoring old control sets** (a plurality of old CORESETs, see ¶0350) after receiving the gNB response for the beam failure recovery request. Examiner interprets that only one of the claim features to be mapped because of the presence of the conjunction “**of**” in the limitation) **or** the UE monitoring a third search space on the PDCCH, wherein the third search space is configured for the UE to monitor a beam failure response from the base station.*

Therefore, it would have been obvious to one of the ordinary skill in the art before the effective filing date of the claimed invention to combine Wu's invention of a system and a method for monitoring physical downlink control channel and Lin's invention of a system and a method for power saving signal design in an advanced wireless communication system to include Guo's invention of a system and a method for beam reporting in next generation wireless communication systems, because it eliminates UE requiring monitoring PDCCH in multiple search spaces during beam failure recovery procedure. (¶0030/¶0354, Guo)

8. **Claims 10 and 20** are rejected under 35 U.S.C. 103 as being unpatentable over Wu, in view of Lin, further in view of Kim et al. (2021/0022202), Kim hereinafter.

Re. Claims 10 and 20, Wu and Lin teach claims 1 and 11.

Yet, Wu and Lin do not **expressly** teach wherein the power saving signal is only received from a special cell (SpCell) of the base station.

However, in the analogous art, Kim **explicitly** discloses wherein the power saving signal is only received from a special cell (SpCell) of the base station. (§0019 - FIG. 9 is a flowchart of a process for receiving a WUS at a UE. §0142 - In step 925, the UE receives the configuration information related to the carrier aggregation from the eNB, and sets two or more serving cells. The eNB may set a particular serving cell to which the WUS is transmitted. ...the particular serving cell may be an **spCell** such as a PCell...WUS may be transmitted in all the activated serving cells).

Therefore, it would have been obvious to one of the ordinary skill in the art before the effective filing date of the claimed invention to combine Wu's invention of a system and a method for monitoring physical downlink control channel and Lin's invention of a system and a method for power saving signal design in an advanced wireless communication system to include Kim's invention of a system and a method for performing discontinuous reception in a wireless communication system, because it helps in saving power consumption of a user device when wake up signal (WUS) is applied in carrier aggregation as used in the advanced wireless communication system. (§0134, Kim).

Allowable Subject Matter

9. **Claim 5-6, 8, 15-16 and 18** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
10. The following is a statement of reasons for the indication of allowable subject matter: The Examiner has conducted a search of Patent and Non-Patent Literature and was unable to find any prior art which solely or in combination with another reference teaches the limitation of:

Claim 5 - starting a DRX on-duration timer of the DRX functionality in response to not receiving the power saving signal in the second search space.

Claim 6 - depends on claim 5.

Claim 15 - start a DRX on-duration timer of the DRX functionality in response to not receiving the power saving signal in the second search space.

Claim 16 - depends on claim 15.

Claim 8 - not monitoring the second search space in response to the UE performing a random access procedure, wherein the UE performs the random access procedure in response to one of: a random access response window is running after transmitting a first random access preamble; and the UE has not received the scheduling signal on the PDCCH indicating a new transmission addressed to a Cell Radio Network Temporary Identifier (C-RNTI) of the UE after successful reception of a random access response corresponding to a second random access preamble not selected by the UE among contention-based random access preambles.

Claim 18 - *not monitoring the second search space in response to the UE performing a random access procedure, wherein the UE performs the random access procedure in response to one of: a random access response window is running after transmitting a first random access preamble; and the UE has not received the scheduling signal on the PDCCH indicating a new transmission addressed to a Cell Radio Network Temporary Identifier (C-RNTI) of the UE after successful reception of a random access response corresponding to a second random access preamble not selected by the UE among contention-based random access preambles.*

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- ✦ Islam et al. (2020/0037396); See ¶0023, ¶0032, ¶0037-¶0050 , ¶0054, ¶0056, ¶0058, ¶0059, ¶0061-¶0069, ¶0094, ¶0164, ¶0186 along with Fig.6-15.
- ✦ Zhou et al. (2020/0092814); See ¶0459, ¶0461, ¶0480, ¶0485, ¶0486, ¶0510, ¶0516, ¶0521-¶0522 along with Fig. 32-45
- ✦ 3GPP TSG RAN WG1 #96bis; **R1- 1905368**, Source: CATT, Title: PDCCH based power saving signal/channel design; Xi'an, China, 8th – 12th April,2019 . See §2.1, §2.2,§3.
- ✦ 3GPP TSG RAN WG1 #96bis; **R1-1905371**, Source: CATT, Title: PDCCH skipping and switching of PDCCH monitoring periodicity; Xi'an, China, 8th – 12th April, 2019. See §2.1, §2.2,§3.
- ✦ 3GPP TSG RAN WG1 RAN1 Meeting #96bis; **R1-1904461**, Source: Samsung; Title: On PDCCH-based power saving signal/channel, Xi'an, China, 8th – 12th April, 2019. See §2.1,§3.1.
- ✦ 3GPP TSG RAN WG1 Meeting #96bis; **R1-1903988**, Source: Huawei, HiSilicon; Title: PDCCH based power saving signal/channel, Xi'an, China, 8 – 12 April, 2019. See §2.1, §2.2,§2.3, §2.4, §2.6, §2.7.

Yet, none of the those references teach limitation of the objected claims as highlighted above.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MOHAMMED SHAMSUL CHOWDHURY whose telephone number is (571)272-0485. The examiner can normally be reached on Monday-Thursday 9 AM- 6 PM EST (Friday Var.).

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Phillips can be reached on 571-272-3940. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MOHAMMED S CHOWDHURY/
Examiner, Art Unit 2467

<i>Notice of References Cited</i>	Application/Control No. 16/859,945		Applicant(s)/Patent Under Reexamination TSAI et al.	
	Examiner MOHAMMED S CHOWDHURY		Art Unit 2467	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20200229092-A1	07-2020	WU; Min	H04W76/11	1/1
*	B	US-20190297577-A1	09-2019	Lin; Qiongjie	H04W52/0235	1/1
*	C	US-20190254110-A1	08-2019	He; Chao	H04L5/0048	1/1
*	D	US-20190190582-A1	06-2019	Guo; Li	H04W76/19	1/1
*	E	US-20210022202-A1	01-2021	KIM; Sangbum	H04W76/27	1/1
*	F	US-20200037396-A1	01-2020	Islam; Toufiqul	H04W76/27	1/1
*	G	US-20200092814-A1	03-2020	Zhou; Hua	H04W80/02	1/1
	H					
	I					
	J					
	K					
	L					
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FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
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	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	3GPP TSG RAN WG1 #96bis; R1- 1905368, Source: CATT, Title: PDCCH based power saving signal/channel design; Xi'an, China, 8th – 12th April, 2019 (Year: 2019)
	V	3GPP TSG RAN WG1 #96bis; R1-1905371, Source: CATT, Title: PDCCH skipping and switching of PDCCH monitoring periodicity; Xi'an, China, 8th – 12th April, 2019. (Year: 2019)
	W	3GPP TSG RAN WG1 RAN1 Meeting #96bis; R1-1904461, Source: Samsung; Title: On PDCCH-based power saving signal/channel, Xi'an, China, 8th – 12th April, 2019. (Year: 2019)
	X	3GPP TSG RAN WG1 Meeting #96bis; R1-1903988, Source: Huawei, HiSilicon; Title: PDCCH based power saving signal/channel, Xi'an, China, 8 – 12 April, 2019. (Year: 2019)

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

U.S. Patent and Trademark Office
PTO-892 (Rev. 01-2001)

Notice of References Cited

Part of Paper No. 20210920

<i>Index of Claims</i> 	Application/Control No. 16/859,945	Applicant(s)/Patent Under Reexamination TSAI et al.
	Examiner MOHAMMED S CHOWDHURY	Art Unit 2467

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS										
☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47										
CLAIM		DATE								
Final	Original	10/09/2021								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	○								
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	19	✓								
	20	✓								

Search Notes 	Application/Control No. 16/859,945	Applicant(s)/Patent Under Reexamination TSAI et al.
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CPC - Searched*		
Symbol	Date	Examiner
H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28	09/20/2021	MC

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

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

Search Notes		
Search Notes	Date	Examiner
East Text Search (See search history printout)	09/20/2021	MC
Inventor search (PALM and EAST)	09/20/2021	MC
Assignee Search (PALM and EAST)	09/20/2021	MC
East Search (prior arts & interference) - attached	09/20/2021	MC
No double patenting or 101 or 112(f) /112 (b) issues are found.	09/20/2021	MC
3GPP Technical Specification Search (Relevant documents attached). See PTO-892	09/20/2021	MC
IP.COM (Patent & NPL Search), Google Patent Search (attached)	09/23/2021	MC

/M.C./ Examiner, Art Unit 2467	
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<i>Search Notes</i> 	Application/Control No. 16/859,945	Applicant(s)/Patent Under Reexamination TSAI et al.
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Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
H04W, H04L, Y02D	H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28	09/20/2021	MC

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BIB DATA SHEET

CONFIRMATION NO. 9503

SERIAL NUMBER 16/859,945	FILING or 371(c) DATE 04/27/2020 RULE	CLASS 370	GROUP ART UNIT 2467	ATTORNEY DOCKET NO. US80883	
APPLICANTS FG Innovation Company Limited, Tuen Mun, HONG KONG; INVENTORS HSIN-HSI TSAI, Taipei, TAIWAN; CHIA-HUNG WEI, Hsinchu, TAIWAN; CHIE-MING CHOU, Hsinchu, TAIWAN; ** CONTINUING DATA ***** This appln claims benefit of 62/840,451 04/30/2019 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 05/01/2020					
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and /MOHAMMED SHAMSUL CHOWDHURY/ Acknowledged Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY TAIWAN	SHEETS DRAWINGS ✓ 8	TOTAL CLAIMS ✓ 20	INDEPENDENT CLAIMS ✓ 2
ADDRESS ScienBiziP, PC 550 South Hope Street Suite 2825 Los Angeles, CA 90071 UNITED STATES					
TITLE METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE					
FILING FEE RECEIVED 1720	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"16859945"	US-PGPUB; USPAT	ADJ	ON	2021/09/19 23:32
S2	5	("20180124701" "20180145800" "20180270756" "20180332533" "20200154356").PN.	US-PGPUB; USPAT	ADJ	ON	2021/09/19 23:34
S5	2	((WUS near2 occasion\$1) near25 (drx?ShortCycleTimer or drxShortCycleTimer))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 10:34
S6	0	S5 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/20 10:50
S7	0	((WUS near2 occasion\$1) near25 (drx?ShortCycleTimer or drxShortCycleTimer))	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/20 10:53
S8	2	((WUS near2 occasion\$1) same (drx?ShortCycleTimer or drxShortCycleTimer))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 10:54
S9	22	((WUS near2 occasion\$1) and (drx?ShortCycleTimer or drxShortCycleTimer))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 10:54
S11	17	S9 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/20 10:56
S12	17	S11 and ((search space\$1) or (bandwidth part\$1) or BWP or CORESET\$1)	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:02
S13	5	((WUS near2 occasion\$1) near25 (drx?ShortCycleTimer or drxShortCycleTimer or (short DRX cycle\$1) or (long DRX cycle\$1)))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:08
S14	1	S13 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:08
S15	1	S14 and (H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28).cpc.	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:11
S16	17	S12 and (H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28).cpc.	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:11

S17	0	((WUS near2 occasion\$1) near25 (drx?ShortCycleTimer or drxShortCycleTimer or (short DRX cycle\$1) or (long DRX cycle\$1)))	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/20 11:12
S18	226	((("FG") near3 ("INNOVATION") near3 ("COMPANY") near3 ("LIMITED"))).AS,AANM.	USPAT	ADJ	ON	2021/09/20 11:13
S19	397	((("TSAI") near3 ("HSIN-HSI")) OR ((("WEI") near3 ("CHIA-HUNG")) OR ((("CHOU") near3 ("CHIE-MING")))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	ON	2021/09/20 11:13
S20	96	((WUS near2 occasion) or ("on" duration\$1) or (on?duration\$1)) near25 ((search space\$1) or (bandwidth part\$1) or BWP or CORESET\$1 or (control resource set\$1))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:44
S21	91	S20 and (H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28).cpc.	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:44
S22	70	S21 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:45
S23	434	((DRX or (Discontinuous Reception\$1)) near2 configuration\$1) same ((((((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)))))))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 12:00
S24	414	S23 and (H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28).cpc.	US-PGPUB; USPAT	ADJ	ON	2021/09/20 12:02
S25	177	S24 and ((short near2 DRX) and (long near2 DRX))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 12:04
S26	152	S25 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/20 12:04

S27	62	S26 and (((search space\$1) or (bandwidth part\$1) or BWP or CORESET\$1)	US-PGPUB; USPAT	ADJ	ON	2021/09/20 12:06
S28	61	S27 and ((PDCCH or DCI) near5 monitor\$4)	US-PGPUB; USPAT	ADJ	ON	2021/09/20 13:57
S29	21	S28 and (skip\$4 near15 (PDCCH or DCI))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 13:59
S31	16	S29 and (((((search space\$1) or CORESET\$1) near25 (PDCCH)) and (((search space\$1) or CORESET\$1) near25 (((((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4))))))))))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 15:32
S32	15	S31 and (random access)	US-PGPUB; USPAT	ADJ	ON	2021/09/20 15:51
S33	15	S31 and (random)	US-PGPUB; USPAT	ADJ	ON	2021/09/20 15:51
S34	13	S31 and (random access response)	US-PGPUB; USPAT	ADJ	ON	2021/09/20 15:52
S35	11	S31 and (((random access response) or (random access procedure)) near25 monitor\$5 near25 (PDCCH or (((((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4))))))))))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 15:54

S36	0	S31 and (((random access response) or (random access procedure)) near25 monitor\$5 near25 ((((((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4))))))))))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 15:56
S37	1	S23 and (((random access response) or (random access procedure)) near25 monitor\$5 near25 ((((((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4))))))))))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 15:58
S38	1	(((random access response) or (random access procedure)) near25 monitor\$5 near25 ((((((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4))))))))))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 15:59

S39	2	((random access response) or (random access procedure)) near25 monitor\$5 near25 ((((((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4))))))))	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/20 16:01
S40	0	S39 and (@ad or @rlad or @prad or @ptad)<"20190430"	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/20 16:04
S41	2	((receiv\$3 or obtain\$3 or accept\$3 or acquir\$4 or transmit\$4 or report\$5 or send\$3 or forward\$3 or transmission\$1) near25 ((DRX or (Discontinuous Reception\$1)) near2 configuration\$1) near25 (monitor\$3 near5 PDCCH) near25 ((search space\$1) or CORESET\$1))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 18:19
S42	2	S41 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/20 18:20
S43	20	((DRX or (Discontinuous Reception\$1)) near2 configuration\$1) near25 (monitor\$3 near5 PDCCH) near25 ((search space\$1) or CORESET\$1))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 18:21
S44	12	S43 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/20 18:21
S45	63	((DRX or (Discontinuous Reception\$1)) near2 configuration\$1) near25 ((search space\$1) or CORESET\$1))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 18:25
S46	93	((DRX or (Discontinuous Reception\$1)) near2 configuration\$1) near25 ((search space\$1) or CORESET\$1 or (bandwidth part\$1) or BWP))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 18:26
S49	1,101	((bandwidth part\$1) or BWP) near5 ((search space\$1) or CORESET\$1 or (control resource set\$1))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 20:12
S50	811	S49 and (H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or	US-PGPUB; USPAT	ADJ	ON	2021/09/20 20:13

		H04L5/0094 or Y02D30/70 or H04W76/28).cpc.				
S51	655	S50 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/20 20:13
S60	2	((active time) near25 (unnecessary or ("not" near2 requir\$4)) near25 monitor\$4 near25 ((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)))	US-PGPUB; USPAT	ADJ	ON	2021/09/21 09:10
S61	0	S60 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/21 09:11
S65	25	((active time) near25 outside) and ((active time) near25 inside)	US-PGPUB; USPAT	ADJ	ON	2021/09/21 10:17
S66	10	S65 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/21 10:18
S67	106	((active time) near25 monitor\$4 near25 ((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)))	US-PGPUB; USPAT	ADJ	ON	2021/09/21 10:30
S68	69	S67 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/21 10:32
S70	196	((receiv\$3 or obtain\$3 or accept\$3 or acquir\$4 or transmit\$4 or send\$3) near25 ((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or	US-PGPUB; USPAT	ADJ	ON	2021/09/21 13:45

		(LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4))) near25 monitor\$5 near25 PDCCCH				
S71	175	S70 and (H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28).cpc.	US-PGPUB; USPAT	ADJ	ON	2021/09/21 13:50
S72	140	S71 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/21 13:50
S73	87	S72 and ((search space\$1) or CORESET\$1)	US-PGPUB; USPAT	ADJ	ON	2021/09/21 17:19
S74	62	((((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)) near25 start\$4 near25 ((on?duration) or ("on" duration)))	US-PGPUB; USPAT	ADJ	ON	2021/09/21 18:04
S75	46	S74 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/21 18:05
S77	2	((WUS near2 occasion\$1) near25 (ShortCycleTimer\$1 or Short?CycleTimer\$1 or Short?Cycle?Timer\$1 or ShortCycle?Timer\$1))	US-PGPUB; USPAT	ADJ	ON	2021/09/21 20:15
S78	0	((WUS near2 occasion\$1) near25 (ShortCycleTimer\$1 or Short?CycleTimer\$1 or	USOCR; FPRS; EPO; JPO;	ADJ	ON	2021/09/21 20:19

		Short?Cycle?Timer\$1 or ShortCycle?Timer\$1))	DERWENT; IBM_TDB			
S79	2	((WUS near2 occasion\$1) same (ShortCycleTimer\$1 or Short?CycleTimer\$1 or Short?Cycle?Timer\$1 or ShortCycle?Timer\$1))	US-PGPUB; USPAT	ADJ	ON	2021/09/21 20:19
S80	22	((WUS near2 occasion\$1) and (ShortCycleTimer\$1 or Short?CycleTimer\$1 or Short?Cycle?Timer\$1 or ShortCycle?Timer\$1))	US-PGPUB; USPAT	ADJ	ON	2021/09/21 20:20
S81	17	S80 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/21 20:23
S82	17	S81 and ((search space\$1) or CORESET\$1)	US-PGPUB; USPAT	ADJ	ON	2021/09/21 20:25
S83	4	"2020164020"	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/21 22:11
S84	201	((power saving signal) or (LU?WUR) or (LUWUR) or WUR or (wakeup radio) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)) near25 (short near2 (cycle\$1 or DRX))	US-PGPUB; USPAT	ADJ	ON	2021/09/22 11:19
S85	313	((power saving signal) or (LU?WUR) or (LUWUR) or WUR or (wakeup radio) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)) near25 (long near2 (cycle\$1 or DRX))	US-PGPUB; USPAT	ADJ	ON	2021/09/22 11:20
S86	99	S84 and S85	US-PGPUB; USPAT	ADJ	ON	2021/09/22 11:21

S87	85	S86 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/22 11:25
S88	56	(skip\$5 or prohibit\$5 or stop\$4 or halt\$4) near15 monitor\$4 ((power saving signal) or (LU?WUR) or (LUWUR) or WUR or (wakeup radio) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4))	US-PGPUB; USPAT	ADJ	ON	2021/09/22 13:10
S89	47	S88 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/22 13:12
S90	34	S89 and ((search space\$1) or CORESET\$1)	US-PGPUB; USPAT	ADJ	ON	2021/09/22 13:16
S91	54	((power saving signal) or (LU?WUR) or (LUWUR) or WUR or (wakeup radio) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)) near25 (switch\$4 or chang\$4) near25 ((bandwidth part\$1) or BWP))	US-PGPUB; USPAT	ADJ	ON	2021/09/22 15:40
S92	33	S91 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/22 15:42
S93	72	((start\$4 or restart\$4) near25 (InactivityTimer\$1 or ("on"?duration\$1) or ("on"duration\$1)) near25 ((power saving signal) or (LU?WUR) or (LUWUR) or WUR or (wakeup radio) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or	US-PGPUB; USPAT	ADJ	ON	2021/09/22 16:23

		(wake?up signal\$4) or (wakeup signal\$4)))				
S94	54	S93 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/22 16:24
S95	0	S93 and ("not" near15 (receiv\$3 or obtain\$3 or accept\$3 or reception\$1 or acquir\$4))	US-PGPUB; USPAT	ADJ	ON	2021/09/22 16:29
S96	27	("not" near15 (receiv\$3 or obtain\$3 or accept\$3 or reception\$1 or acquir\$4))	US-PGPUB; USPAT	ADJ	ON	2021/09/22 16:29
S97	15	((start\$3 or restart\$4) near25 (InactivityTimer\$1 or ("on"?duration\$1) or ("on"duration\$1)) near25 ((power saving signal) WUR or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$3) or (wakeup signal\$3)))	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/22 16:45
S98	8	S97 and (@ad or @rlad or @prad or @ptad)<"20190430"	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/22 16:55
S99	2	(skip\$5 or prohibit\$5 or stop\$4 or halt\$4) near25 monitor\$4 near25 ((power saving signal) or (LU?WUR) or (LUWUR) or WUR or (wakeup radio) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)) near25 (InactivityTimer\$1 or Inactivity?Timer\$1)	US-PGPUB; USPAT	ADJ	ON	2021/09/22 17:57
S100	0	S99 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/22 17:59
S101	0	(skip\$3 or prohibit\$3 or stop\$3 or halt\$3) near25 monitor\$3 near25 ((power saving signal) or WUR or (wakeup radio) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/22 18:01

		mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$1) or (wakeup signal\$1)) near25 (InactivityTimer\$1 or Inactivity?Timer\$1)				
S102	50	(skip\$5 or prohibit\$5 or stop\$4 or halt\$4) near25 monitor\$4 near25 (InactivityTimer\$1 or Inactivity?Timer\$1)	US-PGPUB; USPAT	ADJ	ON	2021/09/22 18:02
S103	55	(skip\$5 or prohibit\$5 or stop\$4 or halt\$4) near55 monitor\$4 near55 (InactivityTimer\$1 or Inactivity?Timer\$1)	US-PGPUB; USPAT	ADJ	ON	2021/09/22 18:03
S104	56	(skip\$5 or prohibit\$5 or stop\$4 or halt\$4) near55 monitor\$4 near55 (InactivityTimer\$1 or Inactivity?Timer\$1 or drxInactivityTimer\$1)	US-PGPUB; USPAT	ADJ	ON	2021/09/22 18:04
S105	50	S104 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/22 18:04
S106	305	((power saving signal) or (LU?WUR) or (LUWUR) or WUR or (wakeup radio) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)) near25 (random access)	US-PGPUB; USPAT	ADJ	ON	2021/09/22 19:57
S107	13	((power saving signal) or (LU?WUR) or (LUWUR) or WUR or (wakeup radio) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)) near25 (beam failure\$1)	US-PGPUB; USPAT	ADJ	ON	2021/09/22 19:58
S108	295	S106 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/22 20:00
S109	102	S108 and (H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28).cpc.	US-PGPUB; USPAT	ADJ	ON	2021/09/22 20:01

S110	11	S107 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/22 20:01
S111	38	((power saving signal) or (LU?WUR) or (LUWUR) or WUR or (wakeup radio) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)) near25 (random access)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/22 20:38
S112	29	S111 and (@ad or @rlad or @prad or @ptad)<"20190430"	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/22 20:39
S113	7	((power saving signal) or (LU?WUR) or (LUWUR) or WUR or (wakeup radio) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)) near25 (beam failure\$1)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/22 20:39
S114	4	S113 and (@ad or @rlad or @prad or @ptad)<"20190430"	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/22 20:40
S115	30	S109 and (RAR or (random access response\$1))	US-PGPUB; USPAT	ADJ	ON	2021/09/22 20:43
S116	24	((skip\$5 or prohibit\$5 or stop\$4 or halt\$4 or "not") near25 monitor\$4 near25 ((beam failure recovery) or (beam?failure\$1 recover\$3)))	US-PGPUB; USPAT	ADJ	ON	2021/09/22 21:43
S117	24	S116 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/22 21:43
S119	5	((power saving signal) OR (LU?WUR) OR (LUWUR) OR WUR OR (wakeup radio) OR (wakeup command\$1) OR (wake?up	US-PGPUB; USPAT	ADJ	ON	2021/09/23 10:56

		command\$1) OR (wakeup adj2 (message\$1 OR packet\$1)) OR (wake?up adj2(message\$1 OR packet\$1)) OR (wakeup signal\$1) OR (wake?up signal\$1) OR (wakeup mode\$1) OR (wake?up mode\$1) OR (wake?up sequence\$1) OR (wake up sequence\$1) OR (wake up) OR (wake?up) OR WUS OR (wake?up signal\$4) OR (wakeup signal\$4)) near25 (transmit\$4 OR report\$5 OR send\$3 OR forward\$3 OR transmission\$1 OR receiv\$3 OR obtain\$3 OR accept\$3 OR reception\$1 OR incoming OR acquir\$4) near25 ((special cell) OR SpCell)				
S120	1	S119 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/23 10:59
S121	0	((power saving signal) OR (LU?WUR) OR (LUWUR) OR WUR OR (wakeup radio) OR (wakeup command\$1) OR (wake?up command\$1) OR (wakeup adj2 (message\$1 OR packet\$1)) OR (wake?up adj2(message\$1 OR packet\$1)) OR (wakeup signal\$1) OR (wake?up signal\$1) OR (wakeup mode\$1) OR (wake?up mode\$1) OR (wake?up sequence\$1) OR (wake up sequence\$1) OR (wake up) OR (wake?up) OR WUS OR (wake?up signal\$4) OR (wakeup signal\$4)) near25 (transmit\$4 OR report\$5 OR send\$3 OR forward\$3 OR transmission\$1 OR receiv\$3 OR obtain\$3 OR accept\$3 OR reception\$1 OR incoming OR acquir\$4) near25 ((special cell) OR SpCell)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/23 10:59
S122	8	((power saving signal) OR (LU?WUR) OR (LUWUR) OR WUR OR (wakeup radio) OR (wakeup command\$1) OR (wake?up command\$1) OR (wakeup adj2 (message\$1 OR packet\$1)) OR (wake?up adj2(message\$1 OR packet\$1)) OR (wakeup signal\$1) OR (wake?up signal\$1) OR (wakeup mode\$1) OR (wake?up mode\$1) OR (wake?up sequence\$1) OR (wake up sequence\$1) OR (wake up) OR (wake?up) OR WUS OR (wake?up signal\$4) OR (wakeup signal\$4)) near25 ((special cell) OR SpCell)	US-PGPUB; USPAT	ADJ	ON	2021/09/23 11:02
S123	1	S122 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/23 11:03

S124	32	((((((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)))))) same ((special cell) OR SpCell)	US-PGPUB; USPAT	ADJ	ON	2021/09/23 11:14
S125	13	S124 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/23 11:19
S129	0	((("Hannibal") near3 ("IP") near3 ("LLC"))).AS,AANM.	US-PGPUB; USPAT	ADJ	ON	2021/10/09 12:29

10/9/2021 12:30:43 PM

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[illegible]

Doc code: IDS

PTO/SB/08a (03-15)

Doc description: Information Disclosure Statement (IDS) Filed

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	16859945
	Filing Date	2020-04-27
	First Named Inventor	HSIN-HSI TSAI
	Art Unit	
	Examiner Name	
	Attorney Docket Number	US80883

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	2	20180124701	A1	2018-05-03	JHANG et al.		
	3	20180270756	A1	2018-09-20	BHATTAD et al.		
	4	20200154356	A1	2020-05-14	BHATTAD et al.		
	5	20180332533	A1	2018-11-15	BHATTAD et al.		
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	Filing Date		2020-04-27
	First Named Inventor	HSIN-HSI TSAI	
	Art Unit		
	Examiner Name		
Attorney Docket Number		US80883	

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	1	108012314	CN	A	2018-05-08	MEDIATEK INC	Corresponding to US201800124701 (A1)	×
	2	201842801	TW	A	2018-12-01	QUALCOMM INC	Corresponding to US.20180270756 (A1) US.20200154356 (A1)	☒
	3	201902264	TW	A	2019-01-01	QUALCOMM INC	Corresponding to US.20180332533 (A1)	☒

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Examiner Signature	/MOHAMMED S CHOWDHURY/ (09/22/2021)	Date Considered	09/22/2021
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¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	16859945
	Filing Date	2020-04-27
	First Named Inventor	HSIN-HSI TSAI
	Art Unit	
	Examiner Name	
	Attorney Docket Number	US80883

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Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Amir Bahrami/	Date (YYYY-MM-DD)	2021-06-11
Name/Print	Amir Bahrami	Registration Number	70460

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(search space) (drx) (monitoring) (pdcch) (wus) before priority 20190430

Search filters and results summary:

- Search filters: search space, drx, monitoring, pdcch, wus
- Sort by: Relevance
- Results / page: 10
- Language: English
- Status: Priority
- Publication: 2019-04-30
- Classification: H04L

Wake-up signal (wus) and wake-up receiver (wur) in a communication device

Abstract: A method for communication includes a user equipment (UE) periodically awaking to monitor for a wake-up signal (WUS) in a wake-up signal search space, and a corresponding PDCCH search space. The WUS can be relatively small. During DRX/IDRX cycles, the UE may enter deep sleep, to when exiting deep sleep.

Power saving signals in wireless communication

Abstract: A method for communication includes a user equipment (UE) periodically awaking to monitor for a wake-up signal (WUS) in a wake-up signal search space, and a corresponding PDCCH search space. The WUS can be relatively small. During DRX/IDRX cycles, the UE may enter deep sleep, to when exiting deep sleep.

Method and apparatus for power savings at a user equipment

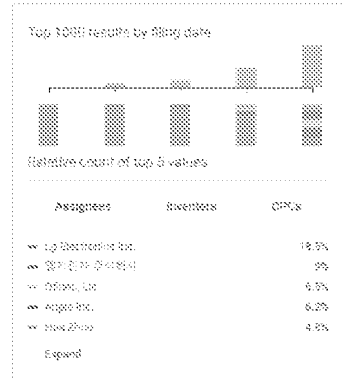
Abstract: A method for communication includes a user equipment (UE) periodically awaking to monitor for a wake-up signal (WUS) in a wake-up signal search space, and a corresponding PDCCH search space. The WUS can be relatively small. During DRX/IDRX cycles, the UE may enter deep sleep, to when exiting deep sleep.

How to receive paging messages and wireless devices

Abstract: A method for communication includes a user equipment (UE) periodically awaking to monitor for a wake-up signal (WUS) in a wake-up signal search space, and a corresponding PDCCH search space. The WUS can be relatively small. During DRX/IDRX cycles, the UE may enter deep sleep, to when exiting deep sleep.

Monitoring method of physical downlink control channel, terminal equipment and ...

Abstract: A method for communication includes a user equipment (UE) periodically awaking to monitor for a wake-up signal (WUS) in a wake-up signal search space, and a corresponding PDCCH search space. The WUS can be relatively small. During DRX/IDRX cycles, the UE may enter deep sleep, to when exiting deep sleep.



EAST Search History

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S52	757	((("FG") near3 ("INNOVATION") near3 ("COMPANY") near3 ("LIMITED"))).AS,AANM.	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:13
S53	372	((("TSAI") near3 ("HSIN-HSI")) OR (("WEI") near3 ("CHIA-HUNG")) OR (("CHOU") near3 ("CHIE-MING"))).INV.	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:14
S54	24	(configuration\$1 and ((search space\$1) or (bandwidth part\$1) or BWP or CORESET\$1) and (sav\$3) and (DRX or (Discontinuous Reception\$1))).clm.	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:16
S55	4	S52 and S54	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:17
S57	4	S53 and S54	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:18
S58	24	S54 and (H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28).cpc.	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:18
S59	14	S58 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:18
S118	24	((skip\$5 or prohibit\$5 or stop\$4 or halt\$4 or "not") near25 monitor\$4 near25 ((beam failure recovery) or (beam?failure\$1 recover\$3)))	US-PGPUB; USPAT	ADJ	ON	2021/09/22 21:43
S130	0	((("Hannibal") near3 ("IP") near3 ("LLC"))).AS,AANM.	US-PGPUB; USPAT	ADJ	ON	2021/10/09 12:29

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Doc code: IDS

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Doc description: Information Disclosure Statement (IDS) Filed

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	Art Unit	
	Examiner Name	
	Attorney Docket Number	US80883

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	1	20180145800	A1	2018-05-24	SAMSUNG ELECTRONICS CO LTD	the whole document		
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Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²ⁱ	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1	109155931	CN	A	2019-01-04	HUAWEI TECHNOLOGIES CO LTD	At least the Abstract	×
	2	108012314	CN	A	2018-05-08	MEDIATEK INC	At least the Abstract	☒
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		16859945
	Filing Date		2020-04-27
	First Named Inventor	HSIN-HSI TSAI	
	Art Unit		
	Examiner Name		
Attorney Docket Number		US80883	

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
	1	Qualcomm Incorporated, "UE power saving for PDCCH monitoring", 3GPP TSG RAN WG1 #87, R1-1612065, 18 Nov.2016(18.11.2016), the whole document	
	2	Qualcomm Incorporated, "Advanced Grant Indication for UE Power Saving", 3GPP TSG RAN WG1 NR AdHoc#3, R1-1716418, 21 Sep.2017(21.09.2017), the whole document	

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EXAMINER SIGNATURE

Examiner Signature: /MOHAMMED S CHOWDHURY/ (09/25/2021) Date Considered: 09/25/2021

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	16859945
	Filing Date	2020-04-27
	First Named Inventor	HSIN-HSI TSAI
	Art Unit	
	Examiner Name	
	Attorney Docket Number	US80883

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Alvin Koan/	Date (YYYY-MM-DD)	2020-10-18
Name/Print	Alvin Koan	Registration Number	68468

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE	REQUEST ID
16/859,945	04/27/2020	HSIN-HSI TSAI	HANN013-US-PAT	153734

Acknowledgement of Change to Small Entity Status

The entity status change request below filed through Private PAIR on 12/06/2021 has been accepted.

CERTIFICATIONS:

Change of Entity Status:

☒ Applicant asserting small entity status. See 37 CFR 1.27.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

This portion must be completed by the signatory or signatories making the entity status change in accordance with 37 CFR 1.4(d)(4).

Signature:	/Do Hyung Kim/
Name:	Do Hyung Kim
Registration Number:	66487

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 16/859,945		Filing Date 04/27/2020		☐ To be Mailed	
ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO									
APPLICATION AS FILED - PART I									
FOR		(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE (\$)		FEE (\$)			
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))		N/A	N/A	N/A					
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))		N/A	N/A	N/A					
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))		N/A	N/A	N/A					
TOTAL CLAIMS (37 CFR 1.16(i))		minus 20 =	*	x \$50 =					
INDEPENDENT CLAIMS (37 CFR 1.16(h))		minus 3 =	*	x \$230 =					
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))		If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).							
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))									
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL					
APPLICATION AS AMENDED - PART II									
		(Column 1)		(Column 2)	(Column 3)				
AMENDMENT	01/12/2022	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 18	Minus	** 20	= 0	x \$50 =		0	
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0	x \$240 =		0	
	☐ Application Size Fee (37 CFR 1.16(s))								
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
						TOTAL ADD'L FEE		0	
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=	x \$0 =			
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x \$0 =			
	☐ Application Size Fee (37 CFR 1.16(s))								
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
						TOTAL ADD'L FEE			
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.						SLIE			
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".						/KIMBERLY D WILLIAMS/			
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The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.									

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: TSAI, Hsin-Hsi
Serial No.: 16/859,945
Filing Date: April 27, 2020
Group Art Unit: 2467
Examiner: CHOWDHURY, Mohammed Shamsul
Confirmation No.: 9503
Title: METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL
 MONITORING AND RELATED DEVICE

Mail Stop - AMENDMENT
Commissioner For Patents
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Dear Commissioner:

RESPONSE AND REMARKS

In response to the Office Action dated October 15, 2021, Applicants respectfully request that the Examiner reconsider the rejection of the claims in view of the following amendments and remarks. Please amend the Application as follows:

Amendments to the Claims begin on page 2 of this paper.

Remarks/Arguments begin on page 7 of this paper.

Amendments to Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Currently Amended) A method for a user equipment (UE) monitoring a physical downlink control channel (PDCCH), the method comprising:

receiving a first configuration from a base station to configure the UE with a first search space of the PDCCH, wherein the first search space is used for monitoring a scheduling signal used for indicating scheduling information;

receiving a second configuration from the base station to configure the UE with a second search space of the PDCCH, wherein the second search space is used for monitoring a power saving signal used for indicating wake-up information associated with a Discontinuous Reception (DRX) functionality;

in response to not receiving the power saving signal while monitoring the second search space, starting a DRX on-duration timer of the DRX functionality;

monitoring the first search space in response to the UE being in a DRX active time of the DRX functionality, wherein the DRX active time is a time during which the UE monitors the PDCCH; and

not monitoring the second search space in response to the UE being in the DRX active time of the DRX functionality.

2. (Original) The method of claim 1, wherein the first search space includes at least one of a first time and a first frequency resource for the UE to monitor the scheduling signal, and the second search space includes at least one of a second time and a second frequency resource for the UE to monitor the power saving signal.

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

determining whether to start a DRX on-duration timer of the DRX functionality according to the wake-up information.

4. (Original) The method of claim 1, wherein the power saving signal is further used for indicating a bandwidth part switch of a cell.
5. (Canceled)
6. (Currently Amended) The method of claim 15, wherein the power saving signal is not received in the second search space in response to when at least one of the UE does not monitor the second search space ~~or~~ and the UE unsuccessfully decodes the power saving signal.
7. (Original) The method of claim 1, wherein the not monitoring the second search space comprises:
 - not monitoring the second search space while a DRX inactivity timer of the DRX functionality is running.
8. (Original) The method of claim 1, further comprising:
 - not monitoring the second search space in response to the UE performing a random access procedure, wherein the UE performs the random access procedure in response to one of:
 - a random access response window is running after transmitting a first random access preamble; and
 - the UE has not received the scheduling signal on the PDCCH indicating a new transmission addressed to a Cell Radio Network Temporary Identifier (C-RNTI) of the UE after successful reception of a random access response corresponding to a second random access preamble not selected by the UE among contention-based random access preambles.
9. (Currently Amended) The method of claim 1, further comprising:
 - not monitoring the second search space in response to at least one of the UE performing a beam failure recovery procedure ~~or~~ and the UE monitoring a third search space on the PDCCH, wherein the third search space is configured for the UE to monitor a beam failure response from the base station.

10. (Original) The method of claim 1, wherein the power saving signal is only received from a special cell (SpCell) of the base station.

11. (Currently Amended) A user equipment (UE) monitoring a physical downlink (DL) control channel (PDCCH) in a wireless communication system, the UE comprising:

a processor, for executing computer-executable instructions; and

a non-transitory machine-readable medium, coupled to the processor, for storing the computer-executable instructions, wherein the computer-executable instructions instruct the processor to:

receive a first configuration from a base station to configure the UE with a first search space of the PDCCH, wherein the first search space is used for monitoring a scheduling signal used for indicating scheduling information;

receive a second configuration from the base station to configure the UE with a second search space of the PDCCH, wherein the second search space is used for monitoring a power saving signal used for indicating wake-up information associated with a Discontinuous Reception (DRX) functionality;

in response to not receiving the power saving signal while monitoring the second search space, start a DRX on-duration timer of the DRX functionality;

monitor the first search space in response to the UE being in a DRX active time of the DRX functionality, wherein the DRX active time is a time during which the UE monitors the PDCCH; and

not monitoring the second search space in response to the UE being in the DRX active time of the DRX functionality.

12. (Original) The UE of claim 11, wherein the first search space includes at least one of a first time and a first frequency resource for the UE to monitor the scheduling signal, and the second search space includes at least one of a second time and a second frequency resource for the UE to monitor the power saving signal.

13. (Original) The UE of claim 11, wherein the computer-executable instructions further instruct the processor to:

determine whether to start a DRX on-duration timer of the DRX functionality according to the wake-up information.

14. (Original) The UE of claim 11, wherein the power saving signal is further used for indicating a bandwidth part switch of a cell.

15. (Canceled)

16. (Currently Amended) The UE of claim 11~~5~~, wherein the computer-executable instructions further instruct the processor to:

not receive the power saving signal in the second search space in response to when at least one of the UE does not monitor the second search space ~~or~~ and the UE unsuccessfully decodes the power saving signal.

17. (Original) The UE of claim 11, wherein the computer-executable instructions further instruct the processor to:

not monitor the second search space while a DRX inactivity timer of the DRX functionality is running.

18. (Original) The UE of claim 11, wherein the computer-executable instructions further instruct the processor to:

not monitoring the second search space in response to the UE performing a random access procedure, wherein the UE performs the random access procedure in response to one of:

a random access response window is running after transmitting a first random access preamble; and

the UE has not received the scheduling signal on the PDCCH indicating a new transmission addressed to a Cell Radio Network Temporary Identifier (C-RNTI) of the UE after successful

reception of a random access response corresponding to a second random access preamble not selected by the UE among contention-based random access preambles.

19. (Currently Amended) The UE of claim 11, wherein the computer-executable instructions further instruct the processor to:

not monitor the second search space in response to at least one of the UE performing a beam failure recovery procedure ~~or~~ and the UE monitoring a third search space of the PDCCH, wherein the third search space is configured for the UE to monitor a beam failure response from the base station.

20. (Original) The UE of claim 11, wherein the power saving signal is only received from a special cell (SpCell) of the base station.

REMARKS

Applicant replies within 3 months to the Office Action dated October 15, 2021.

Claims 1, 6, 9, 11, 16, and 19 are hereby amended.

Claims 5 and 15 are hereby canceled.

Claims ___ are hereby added.

Claims ___ remain pending in the present application.

Reconsideration of the claims is respectfully requested. The Applicant makes the aforementioned amendments and subsequent arguments to place this application in condition for allowance. Alternatively, the Applicant makes these amendments and offers these arguments to properly frame the issues for appeal. In this Response, the Applicant makes no admission concerning any now moot rejection or objection, and affirmatively denies any position, statement or averment of the Examiner that is not specifically addressed herein.

Section 103(a) Rejection

The Examiner rejects Claims 1-3, 7, 11-13 and 17 under 35 U.S.C. §103(a) over U.S. Patent Publication No. 2020-0229092 (“*Wu*”) in view of U.S. Patent Publication No. 2019-0297577 (“*Lin*”). The Examiner also rejects Claims 4 and 14 under 35 U.S.C. §103(a) over *Wu* in view of *Lin* and further in view of U.S. Patent Publication No. 2019-0254110 (“*He*”). The Examiner also rejects Claims 9 and 19 under 35 U.S.C. §103(a) over *Wu* in view of *Lin* and further in view of U.S. Patent Publication No. 2019-0190582 (“*Guo*”). The Examiner also rejects Claims 10 and 20 under 35 U.S.C. §103(a) over *Wu* in view of *Lin* and further in view of U.S. Patent Publication No. 2021-0022202 (“*Kim*”).

Applicant thanks Examiner Chowdhury for identifying allowable subject matter in claims 5, 6, 8, 16, 16, and 18, each of which depends, directly or indirectly, on claim 1 or 15. Applicant does not necessarily agree with these rejections, but amends independent claims 1 and 11 (without prejudice or disclaimer) to incorporate the allowable subject matter of claims 5 and 15, respectively in order to expedite prosecution.

For at least these reasons, independent claims 1 and 15 are allowable under 35 U.S.C. §103. Dependent claims 2-4, 7, 9, 10, 12-14, 17, 19, and 20 variously depend from independent claims 1 and 15 and are, therefore, patentable at least by virtue of dependence. Accordingly, Applicant

respectfully requests that the rejection of Claims 1-4, 7, 9-14, 17, 19, and 20 under 35 U.S.C. §103 be withdrawn.

Allowable Subject Matter

Applicant thanks Examiner Chowdhury for identifying allowable subject matter in dependent claims 5, 6, 8, 15, 16, and 18.

CONCLUSION

Applicant's arguments are made without prejudice or disclaimer. By not responding to additional statements made by the Examiner, Applicant does not acquiesce to the additional statements. The distinctions between the applied references and the claims are provided as examples only and are sufficient to overcome the rejections. Applicant reserves the right to discuss additional or other distinctions in a later response or on appeal, if appropriate.

In view of the above remarks, Applicant respectfully requests withdrawal of all rejections of the pending claims. Accordingly, Applicant respectfully requests allowance of the pending claims. The Examiner is invited to telephone the undersigned at the Examiner's convenience, if that would help further prosecution of the subject application. The Commissioner is authorized to charge any fees due to Deposit Account No.602766.

Respectfully submitted,

/Do Hyung Kim/

Dated: January 12, 2022

Do Hyung Kim
Attorney of Applicant
Reg. No. 66487

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Electronic Acknowledgement Receipt	
EFS ID:	44731383
Application Number:	16859945
International Application Number:	
Confirmation Number:	9503
Title of Invention:	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE
First Named Inventor/Applicant Name:	HSIN-HSI TSAI
Customer Number:	116201
Filer:	Do Hyung Kim/Julie Mcleod
Filer Authorized By:	Do Hyung Kim
Attorney Docket Number:	HANN013-US-PAT
Receipt Date:	12-JAN-2022
Filing Date:	27-APR-2020
Time Stamp:	17:14:56
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2022_01_12_Response_Filed.pdf	52138 9f79fd4627abcd033f6311c4458b10c3c62d2be6	yes	9

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	6
	Applicant Arguments/Remarks Made in an Amendment	7	9
Warnings:			
Information:			
Total Files Size (in bytes):			52138
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116201 7590 02/18/2022
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Suite 1130
Dallas, TX 75234

EXAMINER

CHOWDHURY, MOHAMMED SHAMSUL

ART UNIT PAPER NUMBER

2467

DATE MAILED: 02/18/2022

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/859,945	04/27/2020	HSIN-HSI TSAI	HANN013-US-PAT	9503

TITLE OF INVENTION: METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$600	\$0.00	\$0.00	\$600	05/18/2022

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

116201 7590 02/18/2022
Sul Lee
3030 Lyndon B Johnson Fwy
Suite 1130
Dallas, TX 75234

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/859,945	04/27/2020	HSIN-HSI TSAI	HANN013-US-PAT	9503

TITLE OF INVENTION: METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$600	\$0.00	\$0.00	\$600	05/18/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
CHOWDHURY, MOHAMMED SHAMSUL	2467	370-311000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☐ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☐ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/859,945	04/27/2020	HSIN-HSI TSAI	HANN013-US-PAT	9503
116201	7590	02/18/2022	EXAMINER	
Sul Lee			CHOWDHURY, MOHAMMED SHAMSUL	
3030 Lyndon B Johnson Fwy			ART UNIT	
Suite 1130			PAPER NUMBER	
Dallas, TX 75234			2467	
DATE MAILED: 02/18/2022				

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.** Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b) (2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 16/859,945	Applicant(s) TSAI et al.	
	Examiner MOHAMMED S CHOWDHURY	Art Unit 2467	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 01/12/2022.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 1-4,6-14 and 16-20. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a) ☐ All b) ☐ Some* c) ☐ None of the:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. ____.

3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)	5. ☐ Examiner's Amendment/Comment
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date ____.	6. ☒ Examiner's Statement of Reasons for Allowance
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material ____.	7. ☐ Other ____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date ____.	

/M.S.C./ Examiner, Art Unit 2467	/HASSAN A PHILLIPS/ Supervisory Patent Examiner, Art Unit 2467
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Detailed action

1. The notice of allowance is in response to applicant's arguments/remarks filed on **01/12/2022** for response of the office action mailed on **10/15/2021**.
2. The text of those sections of Title 35 U.S. Code not included in this section can be found in the prior office action. The prior office actions are incorporated herein by reference. In particular, the observations with respect to claim language, and response to previously presented arguments.

Notice of Pre-AIA or AIA Status

3. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Response to Arguments

4. Applicant's arguments with respect to claims **1-4, 6-14** and **16-20** (*renumbered 1-18, respectively*) along with arguments presented in remarks filed on **01/12/2022** have been fully considered and are persuasive. The objections/rejections of these claims have accordingly been withdrawn.

Allowable Subject Matter

5. Claims **1-4, 6-14** and **16-20** (*renumbered 1-18, respectively*) are allowed in light of applicant's arguments filed on **01/12/2022** and in light of prior art(s) of record.

Reasons for Allowance

6. The following is a statement of reasons for the indication of allowable subject matter: the prior art taken either singularly or in a combination fails to anticipate or fairly suggest the limitations of the independent claims, in such a manner that rejection under 35 U.S.C. 102 or 103 would be proper.
7. Applicant rolled up limitations from **objected dependent claims 5 and 15** to respective **independent claims 1 and 11** by cancelling **dependent claims 5 and 15**. Claims **2-4** and **6-10** are allowable for depending on **independent claim 1**, claims **12-14** and **16-20** are allowable for depending on **independent claim 11**.
8. A new search was conducted both in EAST and NPL databases (ip.com and google.com), no other prior arts were found either singularly or in combination with cited references, would result a proper rejection that would have anticipated or made obvious combination of all the steps disclosed in the amended **independent claims 1 and 11** with proper motivation at or before the effective filing date of the instant application.
9. Any comments considered necessary by applicant must be submitted no later than payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MOHAMMED SHAMSUL CHOWDHURY whose telephone number is (571)272-0485. The examiner can normally be reached on Monday-Thursday 9 AM- 6 PM EST (Friday Var.).

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at <http://www.uspto.gov/interviewpractice>.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Phillips can be reached on 571-272-3940. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M.S.C. /
Examiner, Art Unit 2467

/HASSAN A PHILLIPS/
Supervisory Patent Examiner, Art Unit 2467

<i>Index of Claims</i> 	Application/Control No. 16/859,945	Applicant(s)/Patent Under Reexamination TSAI et al.
	Examiner MOHAMMED S CHOWDHURY	Art Unit 2467

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS									
☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47									
CLAIM		DATE							
Final	Original	10/09/2021	01/30/2022						
1	1	✓	=						
2	2	✓	=						
3	3	✓	=						
4	4	✓	=						
-	5	○	-						
5	6	○	=						
6	7	✓	=						
7	8	○	=						
8	9	✓	=						
9	10	✓	=						
10	11	✓	=						
11	12	✓	=						
12	13	✓	=						
13	14	✓	=						
-	15	○	-						
14	16	○	=						
15	17	✓	=						
16	18	○	=						
17	19	✓	=						
18	20	✓	=						

<i>Search Notes</i> 	Application/Control No. 16/859,945	Applicant(s)/Patent Under Reexamination TSAI et al.
	Examiner MOHAMMED S CHOWDHURY	Art Unit 2467

CPC - Searched*		
Symbol	Date	Examiner
H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28	09/20/2021	MC
H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28	01/30/2022	MC

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

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

/M.C./ Examiner, Art Unit 2467	
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Search Notes 	Application/Control No. 16/859,945	Applicant(s)/Patent Under Reexamination TSAI et al.
	Examiner MOHAMMED S CHOWDHURY	Art Unit 2467

Search Notes		
Search Notes	Date	Examiner
East Text Search (See search history printout)	09/20/2021	MC
Inventor search (PALM and EAST)	09/20/2021	MC
Assignee Search (PALM and EAST)	09/20/2021	MC
East Search (prior arts & interference) - attached	09/20/2021	MC
No double patenting or 101 or 112(f) /112 (b) issues are found.	09/20/2021	MC
3GPP Technical Specification Search (Relevant documents attached). See PTO-892	09/20/2021	MC
IP.COM (Patent & NPL Search), Google Patent Search (attached)	09/23/2021	MC
Applicant rolled up limitations from objected dependent claims 5 and 15 to respective independent claims 1 and 11 by cancelling dependent claims 5 &15 and a new search was conducted both in EAST and NPL databases (ip.com and google.com), no other prior arts were found either singularly or in combination with cited references, would result a proper rejection that would have anticipated or made obvious combination of all the steps disclosed in independent claims 1 and 11 with proper motivation at or before the effective filling date of the instant application.	01/30/2022	MC
Updated IP.COM (Patent & NPL Search), Google Patent Search (attached)	01/30/2022	MC

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
H04W, H04L, Y02D	H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28	09/20/2021	MC
H04W, H04L, Y02D	H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28	01/30/2022	MC

/M.C./ Examiner, Art Unit 2467	
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Issue Classification 	Application/Control No. 16/859,945	Applicant(s)/Patent Under Reexamination TSAI et al.
	Examiner MOHAMMED S CHOWDHURY	Art Unit 2467

CPC						
Symbol					Type	Version
H04W	/	52	/	0235	F	2013-01-01
H04W	/	52	/	0216	I	2013-01-01
H04W	/	72	/	042	I	2013-01-01

CPC Combination Sets						
Symbol			Type	Set	Ranking	Version
	/		/			

/MOHAMMED S CHOWDHURY/ Examiner, Art Unit 2467 (Assistant Examiner)	30 January 2022 (Date)	Total Claims Allowed: 18	
/HASSAN A PHILLIPS/ Supervisory Patent Examiner, Art Unit 2467 (Primary Examiner)	04 February 2022 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure Fig. 6

U.S. Patent and Trademark Office

Part of Paper No.: 20220130

Issue Classification 	Application/Control No. 16/859,945	Applicant(s)/Patent Under Reexamination TSAI et al.
	Examiner MOHAMMED S CHOWDHURY	Art Unit 2467

INTERNATIONAL CLASSIFICATION			
CLAIMED			
H04W52/02	/	52	/ 02
H04W72/04	/	72	/ 04
NON-CLAIMED			
/		/	

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS
370	311

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

/MOHAMMED S CHOWDHURY/ Examiner, Art Unit 2467 (Assistant Examiner)	30 January 2022 (Date)	Total Claims Allowed: 18	
/HASSAN A PHILLIPS/ Supervisory Patent Examiner, Art Unit 2467 (Primary Examiner)	04 February 2022 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure Fig. 6

Issue Classification 	Application/Control No. 16/859,945	Applicant(s)/Patent Under Reexamination TSAI et al.
	Examiner MOHAMMED S CHOWDHURY	Art Unit 2467

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47															
CLAIMS															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	9	10	17	19										
2	2	10	11	18	20										
3	3	11	12												
4	4	12	13												
-	5	13	14												
5	6	-	15												
6	7	14	16												
7	8	15	17												
8	9	16	18												

/MOHAMMED S CHOWDHURY/ Examiner, Art Unit 2467 (Assistant Examiner)	30 January 2022 (Date)	Total Claims Allowed: 18	
/HASSAN A PHILLIPS/ Supervisory Patent Examiner, Art Unit 2467 (Primary Examiner)	04 February 2022 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure Fig. 6



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United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

BIB DATA SHEET

CONFIRMATION NO. 9503

SERIAL NUMBER 16/859,945	FILING or 371(c) DATE 04/27/2020 RULE	CLASS 370	GROUP ART UNIT 2467	ATTORNEY DOCKET NO. HANN013-US-PAT	
APPLICANTS Hannibal IP LLC, Frisco, TX; INVENTORS HSIN-HSI TSAI, Taipei, TAIWAN; CHIA-HUNG WEI, Hsinchu, TAIWAN; CHIE-MING CHOU, Hsinchu, TAIWAN; ** CONTINUING DATA ***** This appln claims benefit of 62/840,451 04/30/2019 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 05/01/2020					
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☒ No Verified and /MOHAMMED SHAMSUL CHOWDHURY/ Acknowledged Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY TAIWAN	SHEETS DRAWINGS ✓ 8	TOTAL CLAIMS 18 ~~20~~	INDEPENDENT CLAIMS ✓ 2
ADDRESS Sul Lee 3030 Lyndon B Johnson Fwy Suite 1130 Dallas, TX 75234 UNITED STATES					
TITLE METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE					
FILING FEE RECEIVED 1720	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"16859945"	US-PGPUB; USPAT	ADJ	ON	2021/09/19 23:32
S2	5	("20180124701" "20180145800" "20180270756" "20180332533" "20200154356").PN.	US-PGPUB; USPAT	ADJ	ON	2021/09/19 23:34
S5	2	((WUS near2 occasion\$1) near25 (drx?ShortCycleTimer or drxShortCycleTimer))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 10:34
S6	0	S5 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/20 10:50
S7	0	((WUS near2 occasion\$1) near25 (drx?ShortCycleTimer or drxShortCycleTimer))	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/20 10:53
S8	2	((WUS near2 occasion\$1) same (drx?ShortCycleTimer or drxShortCycleTimer))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 10:54
S9	22	((WUS near2 occasion\$1) and (drx?ShortCycleTimer or drxShortCycleTimer))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 10:54
S11	17	S9 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/20 10:56
S12	17	S11 and ((search space\$1) or (bandwidth part\$1) or BWP or CORESET\$1)	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:02
S13	5	((WUS near2 occasion\$1) near25 (drx?ShortCycleTimer or drxShortCycleTimer or (short DRX cycle\$1) or (long DRX cycle\$1)))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:08
S14	1	S13 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:08
S15	1	S14 and (H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28).cpc.	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:11
S16	17	S12 and (H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28).cpc.	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:11

S17	0	((WUS near2 occasion\$1) near25 (drx?ShortCycleTimer or drxShortCycleTimer or (short DRX cycle\$1) or (long DRX cycle\$1)))	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/20 11:12
S18	226	((("FG") near3 ("INNOVATION") near3 ("COMPANY") near3 ("LIMITED"))).AS,AANM.	USPAT	ADJ	ON	2021/09/20 11:13
S19	397	((("TSAI") near3 ("HSIN-HSI")) OR ((("WEI") near3 ("CHIA-HUNG")) OR ((("CHOU") near3 ("CHIE-MING"))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	ADJ	ON	2021/09/20 11:13
S20	96	((WUS near2 occasion) or ("on" duration\$1) or (on?duration\$1)) near25 ((search space\$1) or (bandwidth part\$1) or BWP or CORESET\$1 or (control resource set\$1))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:44
S21	91	S20 and (H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28).cpc.	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:44
S22	70	S21 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:45
S23	434	((DRX or (Discontinuous Reception\$1)) near2 configuration\$1) same ((((((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)))))))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 12:00
S24	414	S23 and (H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28).cpc.	US-PGPUB; USPAT	ADJ	ON	2021/09/20 12:02
S25	177	S24 and ((short near2 DRX) and (long near2 DRX))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 12:04

S26	152	S25 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/20 12:04
S27	62	S26 and ((search space\$1) or (bandwidth part\$1) or BWP or CORESET\$1)	US-PGPUB; USPAT	ADJ	ON	2021/09/20 12:06
S28	61	S27 and ((PDCCH or DCI) near5 monitor\$4)	US-PGPUB; USPAT	ADJ	ON	2021/09/20 13:57
S29	21	S28 and (skip\$4 near15 (PDCCH or DCI))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 13:59
S31	16	S29 and (((((search space\$1) or CORESET\$1) near25 (PDCCH)) and (((search space\$1) or CORESET\$1) near25 ((((((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4))))))))))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 15:32
S32	15	S31 and (random access)	US-PGPUB; USPAT	ADJ	ON	2021/09/20 15:51
S33	15	S31 and (random)	US-PGPUB; USPAT	ADJ	ON	2021/09/20 15:51
S34	13	S31 and (random access response)	US-PGPUB; USPAT	ADJ	ON	2021/09/20 15:52
S35	11	S31 and (((random access response) or (random access procedure)) near25 monitor\$5 near25 (PDCCH or (((((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up	US-PGPUB; USPAT	ADJ	ON	2021/09/20 15:54

		sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4))))))				
S36	0	S31 and (((random access response) or (random access procedure)) near25 monitor\$5 near25 (((((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4))))))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 15:56
S37	1	S23 and (((random access response) or (random access procedure)) near25 monitor\$5 near25 (((((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4))))))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 15:58
S38	1	(((random access response) or (random access procedure)) near25 monitor\$5 near25 (((((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or	US-PGPUB; USPAT	ADJ	ON	2021/09/20 15:59

		(wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4))))))				
S39	2	((random access response) or (random access procedure)) near25 monitor\$5 near25 ((((((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4))))))	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/20 16:01
S40	0	S39 and (@ad or @rlad or @prad or @ptad)<"20190430"	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/20 16:04
S41	2	((receiv\$3 or obtain\$3 or accept\$3 or acquir\$4 or transmit\$4 or report\$5 or send\$3 or forward\$3 or transmission\$1) near25 ((DRX or (Discontinuous Reception\$1)) near2 configuration\$1) near25 (monitor\$3 near5 PDCCH) near25 ((search space\$1) or CORESET\$1))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 18:19
S42	2	S41 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/20 18:20
S43	20	((DRX or (Discontinuous Reception\$1)) near2 configuration\$1) near25 (monitor\$3 near5 PDCCH) near25 ((search space\$1) or CORESET\$1))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 18:21
S44	12	S43 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/20 18:21
S45	63	((DRX or (Discontinuous Reception\$1)) near2 configuration\$1) near25 ((search space\$1) or CORESET\$1))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 18:25

S46	93	((DRX or (Discontinuous Reception\$1)) near2 configuration\$1) near25 ((search space\$1) or CORESET\$1 or (bandwidth part\$1) or BWP))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 18:26
S49	1,101	((bandwidth part\$1) or BWP) near5 ((search space\$1) or CORESET\$1 or (control resource set\$1))	US-PGPUB; USPAT	ADJ	ON	2021/09/20 20:12
S50	811	S49 and (H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28).cpc.	US-PGPUB; USPAT	ADJ	ON	2021/09/20 20:13
S51	655	S50 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/20 20:13
S60	2	((active time) near25 (unnecessary or ("not" near2 requir\$4)) near25 monitor\$4 near25 ((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)))	US-PGPUB; USPAT	ADJ	ON	2021/09/21 09:10
S61	0	S60 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/21 09:11
S65	25	((active time) near25 outside) and ((active time) near25 inside)	US-PGPUB; USPAT	ADJ	ON	2021/09/21 10:17
S66	10	S65 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/21 10:18
S67	106	((active time) near25 monitor\$4 near25 ((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or	US-PGPUB; USPAT	ADJ	ON	2021/09/21 10:30

		(wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)))				
S68	69	S67 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/21 10:32
S70	196	((receiv\$3 or obtain\$3 or accept\$3 or acquir\$4 or transmit\$4 or send\$3) near25 ((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4))) near25 monitor\$5 near25 PDCCH	US-PGPUB; USPAT	ADJ	ON	2021/09/21 13:45
S71	175	S70 and (H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28).cpc.	US-PGPUB; USPAT	ADJ	ON	2021/09/21 13:50
S72	140	S71 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/21 13:50
S73	87	S72 and ((search space\$1) or CORESET\$1)	US-PGPUB; USPAT	ADJ	ON	2021/09/21 17:19
S74	62	((((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup	US-PGPUB; USPAT	ADJ	ON	2021/09/21 18:04

		signal\$4)) near25 start\$4 near25 ((on?duration) or ("on" duration)))				
S75	46	S74 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/21 18:05
S77	2	((WUS near2 occasion\$1) near25 (ShortCycleTimer\$1 or Short?CycleTimer\$1 or Short?Cycle?Timer\$1 or ShortCycle?Timer\$1))	US-PGPUB; USPAT	ADJ	ON	2021/09/21 20:15
S78	0	((WUS near2 occasion\$1) near25 (ShortCycleTimer\$1 or Short?CycleTimer\$1 or Short?Cycle?Timer\$1 or ShortCycle?Timer\$1))	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/21 20:19
S79	2	((WUS near2 occasion\$1) same (ShortCycleTimer\$1 or Short?CycleTimer\$1 or Short?Cycle?Timer\$1 or ShortCycle?Timer\$1))	US-PGPUB; USPAT	ADJ	ON	2021/09/21 20:19
S80	22	((WUS near2 occasion\$1) and (ShortCycleTimer\$1 or Short?CycleTimer\$1 or Short?Cycle?Timer\$1 or ShortCycle?Timer\$1))	US-PGPUB; USPAT	ADJ	ON	2021/09/21 20:20
S81	17	S80 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/21 20:23
S82	17	S81 and ((search space\$1) or CORESET\$1)	US-PGPUB; USPAT	ADJ	ON	2021/09/21 20:25
S83	4	"2020164020"	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/21 22:11
S84	201	((power saving signal) or (LU?WUR) or (LUWUR) or WUR or (wakeup radio) or (wakeup command\$1) or (wake?up command\$1) or (wake?up adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)) near25 (short near2 (cycle\$1 or DRX))	US-PGPUB; USPAT	ADJ	ON	2021/09/22 11:19

S85	313	((power saving signal) or (LU?WUR) or (LUWUR) or WUR or (wakeup radio) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)) near25 (long near2 (cycle\$1 or DRX))	US-PGPUB; USPAT	ADJ	ON	2021/09/22 11:20
S86	99	S84 and S85	US-PGPUB; USPAT	ADJ	ON	2021/09/22 11:21
S87	85	S86 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/22 11:25
S88	56	(skip\$5 or prohibit\$5 or stop\$4 or halt\$4) near15 monitor\$4 ((power saving signal) or (LU?WUR) or (LUWUR) or WUR or (wakeup radio) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4))	US-PGPUB; USPAT	ADJ	ON	2021/09/22 13:10
S89	47	S88 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/22 13:12
S90	34	S89 and ((search space\$1) or CORESET\$1)	US-PGPUB; USPAT	ADJ	ON	2021/09/22 13:16
S91	54	((((power saving signal) or (LU?WUR) or (LUWUR) or WUR or (wakeup radio) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup	US-PGPUB; USPAT	ADJ	ON	2021/09/22 15:40

		signal\$4)) near25 (switch\$4 or chang\$4) near25 ((bandwidth part\$1) or BWP))				
S92	33	S91 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/22 15:42
S93	72	((start\$4 or restart\$4) near25 (InactivityTimer\$1 or ("on"?duration\$1) or ("on"duration\$1)) near25 ((power saving signal) or (LU?WUR) or (LUWUR) or WUR or (wakeup radio) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)))	US-PGPUB; USPAT	ADJ	ON	2021/09/22 16:23
S94	54	S93 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/22 16:24
S95	0	S93 and ("not" near15 (receiv\$3 or obtain\$3 or accept\$3 or reception\$1 or acquir\$4))	US-PGPUB; USPAT	ADJ	ON	2021/09/22 16:29
S96	27	("not" near15 (receiv\$3 or obtain\$3 or accept\$3 or reception\$1 or acquir\$4))	US-PGPUB; USPAT	ADJ	ON	2021/09/22 16:29
S97	15	((start\$3 or restart\$4) near25 (InactivityTimer\$1 or ("on"?duration\$1) or ("on"duration\$1)) near25 ((power saving signal) WUR or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$3) or (wakeup signal\$3)))	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/22 16:45
S98	8	S97 and (@ad or @rlad or @prad or @ptad)<"20190430"	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/22 16:55
S99	2	(skip\$5 or prohibit\$5 or stop\$4 or halt\$4) near25 monitor\$4 near25 ((power saving signal) or (LU?WUR) or (LUWUR) or WUR or (wakeup radio) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up	US-PGPUB; USPAT	ADJ	ON	2021/09/22 17:57

		adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wakeup signal\$1) or (wakeup mode\$1) or (wakeup mode\$1) or (wakeup sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)) near25 (InactivityTimer\$1 or Inactivity?Timer\$1)				
S100	0	S99 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/22 17:59
S101	0	(skip\$3 or prohibit\$3 or stop\$3 or halt\$3) near25 monitor\$3 near25 ((power saving signal) or WUR or (wakeup radio) or (wakeup command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$1) or (wakeup signal\$1)) near25 (InactivityTimer\$1 or Inactivity?Timer\$1)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/22 18:01
S102	50	(skip\$5 or prohibit\$5 or stop\$4 or halt\$4) near25 monitor\$4 near25 (InactivityTimer\$1 or Inactivity?Timer\$1)	US-PGPUB; USPAT	ADJ	ON	2021/09/22 18:02
S103	55	(skip\$5 or prohibit\$5 or stop\$4 or halt\$4) near55 monitor\$4 near55 (InactivityTimer\$1 or Inactivity?Timer\$1)	US-PGPUB; USPAT	ADJ	ON	2021/09/22 18:03
S104	56	(skip\$5 or prohibit\$5 or stop\$4 or halt\$4) near55 monitor\$4 near55 (InactivityTimer\$1 or Inactivity?Timer\$1 or drxInactivityTimer\$1)	US-PGPUB; USPAT	ADJ	ON	2021/09/22 18:04
S105	50	S104 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/22 18:04
S106	305	((power saving signal) or (LU?WUR) or (LUWUR) or WUR or (wakeup radio) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1)	US-PGPUB; USPAT	ADJ	ON	2021/09/22 19:57

		or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)) near25 (random access)				
S107	13	((power saving signal) or (LU?WUR) or (LUWUR) or WUR or (wakeup radio) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)) near25 (beam failure\$1)	US-PGPUB; USPAT	ADJ	ON	2021/09/22 19:58
S108	295	S106 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/22 20:00
S109	102	S108 and (H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28).cpc.	US-PGPUB; USPAT	ADJ	ON	2021/09/22 20:01
S110	11	S107 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/22 20:01
S111	38	((power saving signal) or (LU?WUR) or (LUWUR) or WUR or (wakeup radio) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)) near25 (random access)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/22 20:38
S112	29	S111 and (@ad or @rlad or @prad or @ptad)<"20190430"	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/22 20:39
S113	7	((power saving signal) or (LU?WUR) or (LUWUR) or WUR or (wakeup radio) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/22 20:39

		(wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)) near25 (beam failure\$1)				
S114	4	S113 and (@ad or @rlad or @prad or @ptad)<"20190430"	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/22 20:40
S115	30	S109 and (RAR or (random access response\$1))	US-PGPUB; USPAT	ADJ	ON	2021/09/22 20:43
S116	24	((skip\$5 or prohibit\$5 or stop\$4 or halt\$4 or "not") near25 monitor\$4 near25 ((beam failure recovery) or (beam?failure\$1 recover\$3)))	US-PGPUB; USPAT	ADJ	ON	2021/09/22 21:43
S117	24	S116 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/22 21:43
S119	5	((power saving signal) OR (LU?WUR) OR (LUWUR) OR WUR OR (wakeup radio) OR (wakeup command\$1) OR (wake?up command\$1) OR (wakeup adj2 (message\$1 OR packet\$1)) OR (wake?up adj2(message\$1 OR packet\$1)) OR (wakeup signal\$1) OR (wake?up signal\$1) OR (wakeup mode\$1) OR (wake?up mode\$1) OR (wake?up sequence\$1) OR (wake up sequence\$1) OR (wake up) OR (wake?up) OR WUS OR (wake?up signal\$4) OR (wakeup signal\$4)) near25 (transmit\$4 OR report\$5 OR send\$3 OR forward\$3 OR transmission\$1 OR receiv\$3 OR obtain\$3 OR accept\$3 OR reception\$1 OR incoming OR acquir\$4) near25 ((special cell) OR SpCell)	US-PGPUB; USPAT	ADJ	ON	2021/09/23 10:56
S120	1	S119 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/23 10:59
S121	0	((power saving signal) OR (LU?WUR) OR (LUWUR) OR WUR OR (wakeup radio) OR (wakeup command\$1) OR (wake?up command\$1) OR (wakeup adj2 (message\$1 OR packet\$1)) OR (wake?up adj2(message\$1 OR packet\$1)) OR (wakeup signal\$1) OR (wake?up signal\$1) OR (wakeup mode\$1) OR (wake?up mode\$1) OR (wake?up sequence\$1) OR (wake up sequence\$1) OR (wake up) OR (wake?up) OR WUS OR (wake?up	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2021/09/23 10:59

		signal\$4) OR (wakeup signal\$4)) near25 (transmit\$4 OR report\$5 OR send\$3 OR forward\$3 OR transmission\$1 OR receive\$3 OR obtain\$3 OR accept\$3 OR reception\$1 OR incoming OR acquire\$4) near25 ((special cell) OR SpCell)				
S122	8	((power saving signal) OR (LU?WUR) OR (LUWUR) OR WUR OR (wakeup radio) OR (wakeup command\$1) OR (wake?up command\$1) OR (wakeup adj2 (message\$1 OR packet\$1)) OR (wake?up adj2(message\$1 OR packet\$1)) OR (wakeup signal\$1) OR (wake?up signal\$1) OR (wakeup mode\$1) OR (wake?up mode\$1) OR (wake?up sequence\$1) OR (wake up sequence\$1) OR (wake up) OR (wake?up) OR WUS OR (wake?up signal\$4) OR (wakeup signal\$4)) near25 ((special cell) OR SpCell)	US-PGPUB; USPAT	ADJ	ON	2021/09/23 11:02
S123	1	S122 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/23 11:03
S124	32	(((((Low Power Wake Up Radio\$1) or (power saving signal) or (LU?WUR) or (LUWUR) or (LU near2 WUR) or (Wake?up adj radio) or (WUR) or (wakeup radio) or (wakeup receiver\$1) or (wakeup command\$1) or (wake?up command\$1) or (wakeup adj2 (message\$1 or packet\$1)) or (wake?up adj2(message\$1 or packet\$1)) or (wakeup signal\$1) or (wake?up signal\$1) or (wakeup mode\$1) or (wake?up mode\$1) or (wake?up sequence\$1) or (wake up sequence\$1) or (wake up) or (wake?up) or WUS or (wake?up signal\$4) or (wakeup signal\$4)))))) same ((special cell) OR SpCell)	US-PGPUB; USPAT	ADJ	ON	2021/09/23 11:14
S125	13	S124 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/23 11:19
S129	0	((("Hannibal") near3 ("IP") near3 ("LLC"))).AS,AANM.	US-PGPUB; USPAT	ADJ	ON	2021/10/09 12:29
S131	10,796	((WUS or (wake\$2?up) or (wake\$3 up)) near15 sleep\$4 near25 (time\$3 or occasion))	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:11
S132	10,798	((WUS or (wake\$3?up) or (wake\$3 up)) near15 sleep\$4 near25 (time\$3 or occasion))	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:12

S133	2,849	S132 and (H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28).cpc.	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:12
S134	2,730	S133 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:12
S136	18	S134 and S135	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:13
S137	56	((WUS or (wake\$3?up) or (wake\$3 up)) near15 sleep\$4 near25 (time\$3 or occasion)) same (CORESET\$1 or (search space\$1) or BWP or bandwidth?part\$1 or (bandwidth part\$1)))	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:21
S138	43	S137 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:22
S139	37	S138 and (H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28).cpc.	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:22
S140	2	((WUS or (wake\$3?up) or (wake\$3 up)) near15 sleep\$4 near25 (time\$3 or occasion)) same (CORESET\$1 or (search space\$1) or BWP or bandwidth?part\$1 or (bandwidth part\$1)))	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2022/01/30 19:26
S141	13	(start\$4 or re?start\$4 or restart\$4) near15 timer\$1 near25 ((WUS or (wake\$3?up) or (wake\$3 up)) near10 occasion)	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:41
S142	14	(start\$4 or re?start\$4 or restart\$4) near35 timer\$1 near35 ((WUS or (wake\$3?up) or (wake\$3 up)) near15 occasion)	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:42
S143	21	(start\$4 or re?start\$4 or restart\$4) near35 (timer\$1 or drx?onDurationTimer or onDurationTimer or on?DurationTimer or on?Duration?Timer) near35 ((WUS or (wake\$3?up) or (wake\$3 up)) near15 occasion)	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:43
S144	11	S143 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:44
S145	4	(start\$4 or re?start\$4 or restart\$4) near35 (timer\$1 or drx?onDurationTimer or onDurationTimer or on?DurationTimer or on?Duration?Timer) near35 ((WUS or (wake\$3?up) or (wake\$3 up)) near15 occasion)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2022/01/30 19:45

S146	0	S145 and (@ad or @rlad or @prad or @ptad)<"20190430"	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2022/01/30 19:46
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EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S52	757	((("FG") near3 ("INNOVATION") near3 ("COMPANY") near3 ("LIMITED"))).AS,AANM.	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:13
S53	372	((("TSAI") near3 ("HSIN-HSI")) OR (("WEI") near3 ("CHIA-HUNG")) OR (("CHOU") near3 ("CHIE-MING"))).INV.	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:14
S54	24	(configuration\$1 and ((search space\$1) or (bandwidth part\$1) or BWP or CORESET\$1) and (sav\$3) and (DRX or (Discontinuous Reception\$1))).clm.	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:16
S55	4	S52 and S54	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:17
S57	4	S53 and S54	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:18
S58	24	S54 and (H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28).cpc.	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:18
S59	14	S58 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2021/09/20 11:18
S118	24	((skip\$5 or prohibit\$5 or stop\$4 or halt\$4 or "not") near25 monitor\$4 near25 ((beam failure recovery) or (beam?failure\$1 recover\$3)))	US-PGPUB; USPAT	ADJ	ON	2021/09/22 21:43
S130	0	((("Hannibal") near3 ("IP") near3 ("LLC"))).AS,AANM.	US-PGPUB; USPAT	ADJ	ON	2021/10/09 12:29
S148	3	((WUS or (wake\$3?up) or (wake\$3 up)) near15 sleep\$4 near25 (time\$3 or occasion)) same (CORESET\$1 or (search space\$1) or BWP or bandwidth?part\$1 or (bandwidth part\$1))).clm.	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:26
S149	921	((("FG") near3 ("INNOVATION") near3 ("COMPANY") near3 ("LIMITED"))).AS,AANM.	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:27

S150	0	S149 and S148	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:27
S151	409	((("TSAI") near3 ("HSIN-HSI")) OR (("WEI") near3 ("CHIA-HUNG")) OR (("CHOU") near3 ("CHIE-MING"))).INV.	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:27
S152	0	S151 and S148	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:27
S153	18	((power saving signal\$1) and (DRX or (Discontinuous Reception))).clm.	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:29
S154	0	S148 and S153	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:30
S155	2	S149 and S153	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:30
S156	18	S153 and (H04W52/0235 or H04W52/0216 or H04W72/042 or H04L5/0053 or H04L5/0094 or Y02D30/70 or H04W76/28).cpc.	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:32
S157	13	S156 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:32
S158	17	((power saving signal\$1) and (DRX or (Discontinuous Reception) and (start\$3 near15 timer\$1))).clm.	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:36
S159	13	S158 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:36
S160	2	((start\$4 or re?start\$4 or restart\$4) near35 (timer\$1 or drx?onDurationTimer or onDurationTimer or on?DurationTimer or on?Duration?Timer) near35 ((WUS or (wake\$3?up) or (wake\$3 up)) near15 occasion)).clm.	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:46
S161	1	S160 and (@ad or @rlad or @prad or @ptad)<"20190430"	US-PGPUB; USPAT	ADJ	ON	2022/01/30 19:46

1/30/2022 7:48:30 PM

C:\Users\mchowdhury3\Documents\EAST\Workspaces\16859945\16859945_Allowance.wsp

[illegible]

X *Abutilon* *retrofractum* X *Downson* *...* X *Strobiloides*
 Society: *Referance* *...* Groupby: *none* *...* Deduplicate by: *Family* *...* Sortby: *none* *...*

WATERWORKS Watermark Embedded - Watermark Embedded - First Printing, Inc.
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 Upon issue up from USA made and/or receiving a valid allocation, WATER may continue
 monitoring certain (e.g., one or more) word(s) substrings for the ... In fact, it's a WATER-specific
 search space may be introduced by e.g., only intended for EPDCN. However, search space
 may be located at the EPDCN region.

It was found that signal is generated and is received
00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000

and with the associated RF of the UCI that receives the function now identified. This PRISM monitoring can be a part of the GNR activities of WFOU. In one or more embodiments, WFOU can receive independent information according at least to search results as found and/or other configurations.

A method for communication includes a user equipment (UE) periodically searching to monitor for a downlink signal (DL-SIG) in a wake-up signal search zone, and a corresponding PDCCH search space (SS) can be relatively small. For low PDCCH search zone, this UE may enter sleep state, so when active data

[illegible]

The WFSF may ignore the ESE (e.g., WUS) or assume the WUS is the pointer and consider PDCCH in the associated search space. The WFSF may consider PDCCH according to a DRX cycle (e.g., see a section to discuss DRX control that may be independent of the

940 SP US 6,444,141 (2002/05/06) 15652. (Class Re.) Swearing Engineering Co., Ltd.
Priority 2000-08-14 of 2000-08-14/2001-01-16 (date of first filing)



TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA/82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	16/859,945
Filing Date	04/27/2020
First Named Inventor	Hsin-Hsi Tsai
Title	METHOD OF PHYSICAL DOWNLINK CONTROL MONITORING AND RELATED DEVICE
Art Unit	2467
Examiner Name	Mohammed Shamsul Chowdhury
Attorney Docket Number	63465-0001-0001

SIGNATURE of Applicant or Patent Practitioner

Signature	/Marcella M. Bodner/	Date (Optional)	
Name	Marcella M. Bodner	Registration Number	46,561
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			
NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.			
☒ *Total of <u>1</u> forms are submitted.			

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

POWER OF ATTORNEY BY APPLICANT

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

Application Number	Filing Date
16/859,945	04/27/2020

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

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- OR**
- ☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

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OR

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City

State

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Country

Telephone

Email

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

Hannibal IP LLC

- ☐ Inventor or Joint Inventor (title not required below)
- ☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)
- ☒ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)
- ☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

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

Signature	<i>Khaied Fekih-Romdhane</i>	Date (Optional)	4/28/22
Name	Khaied Fekih-Romdhane		
Title	Manager		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ Total of forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

Electronic Acknowledgement Receipt	
EFS ID:	45600961
Application Number:	16859945
International Application Number:	
Confirmation Number:	9503
Title of Invention:	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE
First Named Inventor/Applicant Name:	HSIN-HSI TSAI
Customer Number:	116201
Filer:	Marcella M. Bodner/James Dade
Filer Authorized By:	Marcella M. Bodner
Attorney Docket Number:	HANN013-US-PAT
Receipt Date:	29-APR-2022
Filing Date:	27-APR-2020
Time Stamp:	15:53:44
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
------------------------	----

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Power of Attorney	64365-0001_POA_04302022.pdf	263534 792d709c1977a25a8715c05cadac40b9da8ea833	no	2

Warnings:

Information:	
Total Files Size (in bytes):	263534
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.	



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/859,945	04/27/2020	HSIN-HSI TSAI	63465-0001-0001

CONFIRMATION NO. 9503

POA ACCEPTANCE LETTER

155240
Cole Schotz, P.C.
Court Plaza North 25 Main Street
Hackensack, NJ 07601



Date Mailed: 05/02/2022

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/29/2022.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/ttran/



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/859,945	04/27/2020	HSIN-HSI TSAI	HANN013-US-PAT

CONFIRMATION NO. 9503

POWER OF ATTORNEY NOTICE



116201
Sul Lee
3030 Lyndon B Johnson Fwy
Suite 1130
Dallas, TX 75234

Date Mailed: 05/02/2022

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/29/2022.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at (571) 272-4000 or (571) 272-4200 or 1-888-786-0101.

/tran/

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

~~46201~~-----~~7500~~
~~Sul Lee~~
~~3030 Lyndon B Johnson Fwy~~
~~Suite 1130~~
~~Dallas, TX 75234~~

02/18/2022

155240

Cole Schotz, P.C.
Court Plaza North 25 Main Street
Hackensack, NJ 07601

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

James J. Dade	(Typed or printed name)
/James J. Dade/	(Signature)
May 12, 2022	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/859,945	04/27/2020	HSIN-HSI TSAI	HANN013-US-PAT	9503

TITLE OF INVENTION: METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$600	\$0.00	\$0.00	\$600	05/18/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
CHOWDHURY, MOHAMMED SHAMSUL	2467	370-311000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Marcella M. Bodner

2 Cole Schotz, P.C.

3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

Hannibal IP LLC

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Frisco, Texas

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

4b. Method of Payment: (Please first reapply any previously paid fee shown above)

☒ Electronic Payment via EFS-Web ☐ Enclosed check ☐ Non-electronic payment by credit card (Attach form PTO-2038)

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. Change in Entity Status (from status indicated above)

☐ Applicant certifying micro entity status. See 37 CFR 1.29

☐ Applicant asserting small entity status. See 37 CFR 1.27

☐ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Marcella M. Bodner/

Date May 12, 2022

Typed or printed name Marcella M. Bodner

Registration No. 46,561

Electronic Patent Application Fee Transmittal				
Application Number:		16859945		
Filing Date:		27-Apr-2020		
Title of Invention:		METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE		
First Named Inventor/Applicant Name:		HSIN-HSI TSAI		
Filer:		Marcella M. Bodner/James Dade		
Attorney Docket Number:		63465-0001-0001		
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	2501	1	600	600

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				600

Electronic Acknowledgement Receipt	
EFS ID:	45694586
Application Number:	16859945
International Application Number:	
Confirmation Number:	9503
Title of Invention:	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE
First Named Inventor/Applicant Name:	HSIN-HSI TSAI
Customer Number:	155240
Filer:	Marcella M. Bodner/James Dade
Filer Authorized By:	Marcella M. Bodner
Attorney Docket Number:	63465-0001-0001
Receipt Date:	12-MAY-2022
Filing Date:	27-APR-2020
Time Stamp:	11:08:43
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$ 600
RAM confirmation Number	E20225BB08552836
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	64365-0101_Issue_Fee_Payment_p.pdf	117953	no	1
			93ab6667861e490c68f858809de20eb37ebe6c88		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	38161	no	2
			b534b4504102840ae3feabb51449e941c59e8ae5		
Warnings:					
Information:					
Total Files Size (in bytes):			156114		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. New Applications Under 35 U.S.C. 111 If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. National Stage of an International Application under 35 U.S.C. 371 If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. New International Application Filed with the USPTO as a Receiving Office If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-22)

Approved for use through 05/31/2024. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	16859945
	Filing Date	2020-04-27
	First Named Inventor	Hsin-Hsi Tsai
	Art Unit	2467
	Examiner Name	Mohammed Shamsul Chowdhury
	Attorney Docket Number	64365-0101

U.S.PATENTS							Remove	
Examiner Initial*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear		
	1							
If you wish to add additional U.S. Patent citation information please click the Add button.							Add	
U.S.PATENT APPLICATION PUBLICATIONS							Remove	
Examiner Initial*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear		
	1							
If you wish to add additional U.S. Published Application citation information please click the Add button.							Add	
FOREIGN PATENT DOCUMENTS							Remove	
Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²ⁱ	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1	114051764	CN	A	2022-02-15	FG Innovation Co. Ltd.		
	2	3964019	EP	A	2022-03-09	FG Innovation Co. Ltd.		
	3	202147055079	IN		2021-12-10	FG Innovation Co. Ltd.		

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number		16859945
	Filing Date		2020-04-27
	First Named Inventor	Hsin-Hsi Tsai	
	Art Unit	2467	
	Examiner Name	Mohammed Shamsul Chowdhury	
	Attorney Docket Number	64365-0101	

	4	202046780	TW		2020-12-16	FG Innovation Co. Ltd.		
--	---	-----------	----	--	------------	------------------------	--	--

If you wish to add additional Foreign Patent Document citation information please click the Add button

Add

NON-PATENT LITERATURE DOCUMENTS

Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T ⁵
	1	International Preliminary Report on Patentability issued on November 2, 2021, for International Patent Application No.: PCT/CN2020/087653.	
	2	International Search Report issued on November 5, 2022, for International Patent Application No.: PCT/CN2020/087653.	

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

Add

EXAMINER SIGNATURE

Examiner Signature

Date Considered

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	16859945
	Filing Date	2020-04-27
	First Named Inventor	Hsin-Hsi Tsai
	Art Unit	2467
	Examiner Name	Mohammed Shamsul Chowdhury
	Attorney Docket Number	64365-0101

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Marcella M. Bodner/	Date (YYYY-MM-DD)	2022-05-16
Name/Print	Marcella M. Bodner	Registration Number	46561

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference WO41479	FOR FURTHER ACTION See item 4 below	
International application No. PCT/CN2020/087653	International filing date (<i>day/month/year</i>) 29 April 2020 (29.04.2020)	Priority date (<i>day/month/year</i>) 30 April 2019 (30.04.2019)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant FG INNOVATION COMPANY LIMITED		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|---|
| ☒ | Box No. I | Basis of the report |
| ☐ | Box No. II | Priority |
| ☐ | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| ☐ | Box No. IV | Lack of unity of invention |
| ☒ | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| ☐ | Box No. VI | Certain documents cited |
| ☐ | Box No. VII | Certain defects in the international application |
| ☐ | Box No. VIII | Certain observations on the international application |

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Date of issuance of this report 02 November 2021 (02.11.2021)
	Authorized officer Xin Wang e-mail pct.team2@wipo.int

Form PCT/IR/373 (revised January 2020)

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To: 518109 China 9F,Rongqun building, NO.83 Longguan east Rd.Longhua new Dist., Shenzhen, Guangdong SHENZHEN SCIENBZIP INTELLECTUAL PROPERTY AGENCY CO.,LTD.

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Applicant's or agent's file reference WO41479		Date of mailing <i>(day/month/year)</i> 20 July 2020
International application No. PCT/CN2020/087653		FOR FURTHER ACTION See paragraph 2 below
International filing date <i>(day/month/year)</i> 29 April 2020	Priority date <i>(day/month/year)</i> 30 April 2019	
International Patent Classification (IPC) or both national classification and IPC H04W 76/00(2018.01)i; H04W 52/00(2009.01)i		
Applicant FG Innovation Company Limited		

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/ National Intellectual Property Administration, PRC China 6, Xitucheng Rd., Jimen Bridge, Haidian District, Beijing 100088	Date of completion of this opinion 14 July 2020	Authorized officer LIU,Xinke
Facsimile No. (86—10) 62019451	Telephone No. 86- (010) -62411274	

Form PCT/ISA/237 (Cover sheet) (January 2015)

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/CN2020/087653

Box No. I

Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed.
 - ☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a)).
3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. ☐ forming part of the international application as filed:
 - ☐ in the form of an Annex C/ST.25 text file.
 - ☐ on paper or in the form of an image file.
 - b. ☐ furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. ☐ furnished subsequent to the international filing date for the purposes of international search only:
 - ☐ in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
 - ☐ on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/CN2020/087653

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-20	YES
	Claims	None	NO
Inventive step (IS)	Claims	1-20	YES
	Claims	None	NO
Industrial applicability (IA)	Claims	1-20	YES
	Claims	None	NO

2. Citations and explanations :

- [1] D1: US 2018145800 A1
- [2] D2: CN 108012314 A
- [3] D3: CN 2013229965 A
- [4] D4: Qualcomm Incorporated: "Advanced Grant Indication for UE power Saving", 3GPP TSG RAN WG1 NR AdHoc#3, R1-1716418
- [5] D5: Qualcomm: "UE power saving for PDCCH monitoring", 3GPP TSG-RAN WG1 #87, R1-1612065
- [6] D1 is regarded as the closest prior art to claims 1-20. D1 discloses a method of reducing power consumption in user equipment (UE), and the method involves receiving a discontinuous reception (DRX) configuration from an eNB when the UE is in radio resource control (RRC) connected state with the eNB. The determination (504) is made on whether any UL hybrid automatic repeat request (HARQ) transmission is pending for the UE. The determination is made on whether physical downlink control channel (PDCCH) monitoring mask is included in the DRX configuration if any UL HARQ transmission is pending for the UE. The PDCCH is monitored only on discrete occasions at which UL grant is expected from eNB if the PDCCH monitoring mask is included in the DRX configuration. D2 discloses a method for reducing power consumption of e.g. mobile phone, and the method involves selecting one of scheduling request offsets with largest overlap from set of scheduling request offsets to determine period-extended scheduling request configuration. D3 discloses a method for designing next radio physical downlink control channel of wireless communications network, and the method involves monitoring search space for downlink control information messages in accordance with configuration parameters. D4 discloses a method of Advanced Grant Indication for UE power saving. D5 discloses a method of UE power saving for PDCCH monitoring.
- [7] Novelty
- [8] D1-D5 do not disclose the technical features: (1) monitoring the first search space in response to the UE being in a DRX active time of the DRX functionality, where the DRX active time is a time during which the UE monitors the PDCCH. (2) not monitoring the second search space in response to the UE being in the DRX active time of the DRX functionality. In other words, D1-D5 do not individually disclose the subject-matter of independent claims 1 and 11, therefore claims 1 and 11 meet the criteria set out in PCT Article 33(2) with respect to novelty.
- [9] Thus, dependent claims 2-10, 12-20 also meet the criteria set out in PCT Article 33(2) with respect to novelty.
- [10] Inventive Step
- [11] It would not be obvious for a person skilled in the art to derive the technical solutions of claims 1-20 through various combinations of D1-D5 and common knowledge. Therefore, claims 1-20 involve an inventive step in the sense of PCT Article 33(3).
- [12] Industrial Applicability

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/CN2020/087653

Box No. V

**Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step and industrial applicability;
citations and explanations supporting such statement**

[13] The technical solutions of claims 1-20 can be made or used in the industry, and thus are industrially applicable in the sense of PCT Article 33(4).

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference WO41479	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/CN2020/087653	International filing date (<i>day/month/year</i>) 29 April 2020	(Earliest) Priority Date (<i>day/month/year</i>) 30 April 2019
Applicant FG Innovation Company Limited		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of:

- ☒ the international application in the language in which it was filed.
☐ a translation of the international application into _____ which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (see Box No. II).

3. ☐ **Unity of invention is lacking** (see Box No. III).

4. With regard to the **title**,

- ☒ the text is approved as submitted by the applicant.
☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

- ☒ the text is approved as submitted by the applicant.
☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

- a. the figure of the **drawings** to be published with the abstract is Figure No. 5
☒ as suggested by the applicant.
☐ as selected by this Authority, because the applicant failed to suggest a figure.
☐ as selected by this Authority, because this figure better characterizes the invention.
- b. ☐ none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2020/087653

A. CLASSIFICATION OF SUBJECT MATTER

H04W 76/00(2018.01)i; H04W 52/00(2009.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H04W; H04L

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

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

EPTXT;USTXT;WOTXT;CNTXT;CNABS;VEN;CNKI;3GPP:DRX, second, wak+ up, WUS, sleep, short, long, PDCCH, sav+, power, active, tim+, listen+, first, monitor+, UE, search space, configure, not, no, stop, activ+, inactiv+, on-duration, timer, cycle, NR, 5G

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2018145800 A1 (SAMSUNG ELECTRONICS CO LTD) 24 May 2018 (2018-05-24) see the whole document	1-20
A	CN 108012314 A (MEDIATEK INC) 08 May 2018 (2018-05-08) see the whole document	1-20
A	CN 109155931 A (HUAWEI TECHNOLOGIES CO LTD) 04 January 2019 (2019-01-04) see the whole document	1-20
A	Qualcomm Incorporated. ""Advanced Grant Indication for UE Power Saving"" 3GPP TSG RAN WG1 NR AdHoc#3, RI-1716418, 21 September 2017 (2017-09-21), see the whole document	1-20
A	Qualcomm Incorporated. ""UE power saving for PDCCH monitoring"" 3GPP TSG RAN WG1 #87, RI-1612065, 18 November 2016 (2016-11-18), see the whole document	1-20



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

“A” document defining the general state of the art which is not considered to be of particular relevance
 “E” earlier application or patent but published on or after the international filing date
 “L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
 “O” document referring to an oral disclosure, use, exhibition or other means
 “P” document published prior to the international filing date but later than the priority date claimed

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

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

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

“&” document member of the same patent family

Date of the actual completion of the international search

12 July 2020

Date of mailing of the international search report

20 July 2020

Name and mailing address of the ISA/CN

**National Intellectual Property Administration, PRC
 6, Xitucheng Rd., Jimen Bridge, Haidian District, Beijing
 100088
 China**

Authorized officer

LIU,Xinke

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2020/087653

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
US	2018145800	A1	24 May 2018	IN	201641040275	A	01 June 2018
CN	108012314	A	08 May 2018	US	2018124701	A1	03 May 2018
				TW	201818761	A	16 May 2018
				IN	201724038487	A	04 May 2018
CN	109155931	A	04 January 2019	AU	2018206592	A1	15 August 2019
				EP	3556134	A4	11 December 2019
				US	2018192405	A1	05 July 2018
				BR	112019014030	A2	04 February 2020
				EP	3556134	A1	23 October 2019
				CN	109347611	B	03 January 2020
				CN	109347611	A	15 February 2019
				WO	2018127109	A1	12 July 2018
				IN	201947028784	A	19 July 2019
				VN	66489	A	25 October 2019

Doc Code: PET.AUTO Document Description: Petition automatically granted by EFS-Web		PTO/SB/140 U.S. Patent and Trademark Office Department of Commerce
Electronic Petition Request	PETITION TO WITHDRAW AN APPLICATION FROM ISSUE AFTER PAYMENT OF THE ISSUE FEE UNDER 37 CFR 1.313(c)	
Application Number	16859945	
Filing Date	27-Apr-2020	
First Named Inventor	HSIN-HSI TSAI	
Art Unit	2467	
Examiner Name		
Attorney Docket Number	64365-0101	
Title	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE	
An application may be withdrawn from issue for further action upon petition by the applicant. To request that the Office withdraw an application from issue, applicant must file a petition under this section including the fee set forth in § 1.17(h) and a showing of good and sufficient reasons why withdrawal of the application from issue is necessary. APPLICANT HEREBY PETITIONS TO WITHDRAW THIS APPLICATION FROM ISSUE UNDER 37 CFR 1.313(c). A grantable petition requires the following items: (1) Petition fee; and (2) One of the following reasons: (a) Unpatentability of one or more claims, which must be accompanied by an unequivocal statement that one or more claims are unpatentable, an amendment to such claim or claims, and an explanation as to how the amendment causes such claim or claims to be patentable; (b) Consideration of a request for continued examination in compliance with § 1.114 (for a utility or plant application only); or (c) Express abandonment of the application. Such express abandonment may be in favor of a continuing application, but not a CPA under 37 CFR 1.53(d).		
Petition Fee		
☒ Small Entity ☐ Micro Entity ☐ Regular Undiscounted		
Reason for withdrawal from issue		

☐ One or more claims are unpatentable ☒ Consideration of a request for continued examination (RCE) (List of Required Documents and Fees) ☐ Applicant hereby expressly abandons the instant application (any attorney/agent signing for this reason must have power of attorney pursuant to 37 CFR 1.32(b)).	
RCE request, submission, and fee. ☐ I certify, in accordance with 37 CFR 1.4(d)(4) that : The RCE request ,submission, and fee have already been filed in the above-identified application on ☒ Are attached.	
THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES I certify, in accordance with 37 CFR 1.4(d)(4) that I am: ☒ An attorney or agent registered to practice before the Patent and Trademark Office who has been given power of attorney in this application. ☐ An attorney or agent registered to practice before the Patent and Trademark Office, acting in a representative capacity. ☐ A sole inventor ☐ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application ☐ A joint inventor; all of whom are signing this e-petition	
Signature	/Marcella M. Bodner/
Name	Marcella M. Bodner
Registration Number	46561

Electronic Patent Application Fee Transmittal				
Application Number:		16859945		
Filing Date:		27-Apr-2020		
Title of Invention:		METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE		
First Named Inventor/Applicant Name:		HSIN-HSI TSAI		
Filer:		Marcella M. Bodner/James Dade		
Attorney Docket Number:		64365-0101		
Filed as Small Entity				
Filing Fees for Utility under 35 USC 111(a)				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
PETITION FEE-37CFR 1.17(H) (GROUP II)	2464	1	70	70
RCE- 1ST REQUEST	2801	1	680	680
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				750



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Decision Date : May 16, 2022

In re Application of :

HSIN-HSI TSAI

DECISION ON PETITION

UNDER CFR 1.313(c)(2)

Application No : 16859945

Filed : 27-Apr-2020

Attorney Docket No : 64365-0101

This is an electronic decision on the petition under 37 CFR 1.313(c)(2), filed May 16, 2022 , to withdraw the above-identified application from issue after payment of the issue fee.

The petition is **GRANTED**.

The above-identified application is withdrawn from issue for consideration of a submission under 37 CFR 1.114 (request for continued examination). See 37 CFR 1.313(c)(2).

Petitioner is advised that the issue fee paid in this application cannot be refunded. If, however, this application is again allowed, petitioner may request that it be applied towards the issue fee required by the new Notice of Allowance.

Telephone inquiries concerning this decision should be directed to the Patent Electronic Business Center (EBC) at 866-217-9197.

This application file is being referred to Technology Center AU 2467 for processing of the request for continuing examination under 37 CFR 1.114 .

Office of Petitions

Electronic Acknowledgement Receipt	
EFS ID:	45717087
Application Number:	16859945
International Application Number:	
Confirmation Number:	9503
Title of Invention:	METHOD OF PHYSICAL DOWNLINK CONTROL CHANNEL MONITORING AND RELATED DEVICE
First Named Inventor/Applicant Name:	HSIN-HSI TSAI
Customer Number:	155240
Filer:	Marcella M. Bodner/James Dade
Filer Authorized By:	Marcella M. Bodner
Attorney Docket Number:	64365-0101
Receipt Date:	16-MAY-2022
Filing Date:	27-APR-2020
Time Stamp:	15:05:41
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$750
RAM confirmation Number	E20225FF05350086
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Quick Path Information Disclosure Statement	64265-0101_QPIDS_Transmittal.pdf	196385	no	2
			c87fdb1e96129d89311afa8fc9bf0162c1f3362		
Warnings:					
Information:					
2	Request for Continued Examination (RCE)	64365-0101_RCE_05162022.pdf	1693249	no	3
			5be9466050cd25f01bfc9b3ba02e6139e0ade0e6		
Warnings:					
Information:					
3	Information Disclosure Statement (IDS) Form (SB08)	64365-0101-SIDS_05162022.pdf	1364791	no	4
			ce6ecad7071647a0922355bf30e1dcaa33bfc5f1		
Warnings:					
Information:					
A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.					
4	Foreign Reference	64365-0101_CN114051764.pdf	2929138	no	22
			61ca1fc60dfbbb148a62d7960b0bb111f83b65da		
Warnings:					
Information:					
5	Foreign Reference	64365-0101_EP_3964019.pdf	3266796	no	44
			e25c5debcd22722276faldce4cabc391b03488b		
Warnings:					
Information:					

6	Foreign Reference	64365-0101_IN_202147055079.pdf	3840841	no	62
			981b2a13439b580952914c11cad6165d8e06234c		
Warnings:					
Information:					
7	Foreign Reference	64365-0101_TW_202046780.pdf	3632297	no	40
			662c2d2c103982b4f0ef0d5526e73fedd51691ba		
Warnings:					
Information:					
8	Non Patent Literature	64365-0101_IPRP_PCTCN2020087653.pdf	190770	no	5
			93b478389b6e592c8efc0538b7b358fc422fb1		
Warnings:					
Information:					
9	Non Patent Literature	64365-0101_ISR_PCTCN2020087653.pdf	122910	no	3
			a9973652d95fa02b922639c97f2ee7581134abb6		
Warnings:					
Information:					
10	ePetition Request Form	petition-request.pdf	39928	no	2
			19f01d57bfd380fb5dfd20dc481d22daed349ff9		
Warnings:					
Information:					
11	Fee Worksheet (SB06)	fee-info.pdf	40451	no	2
			9a4f149db9d52b1106b1f216b2e80bef252716b2		
Warnings:					
Information:					
Total Files Size (in bytes):			17317556		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

CERTIFICATION AND REQUEST FOR CONSIDERATION OF AN INFORMATION DISCLOSURE STATEMENT FILED AFTER PAYMENT OF THE ISSUE FEE UNDER THE QPIDS PROGRAM	
Non-Provisional Application Number: 16859945	Filing Date: 04/27/2020
First Named Inventor: Hsin-Hsi Tsai	Title of Invention: METHOD OF PHYSICAL DOWNLINK . . .
THE UNDERSIGNED HEREBY CERTIFIES AND REQUESTS THE FOLLOWING FOR THE ABOVE-IDENTIFIED APPLICATION. 1. Consideration is requested of the information disclosure statement (IDS) submitted herewith, which is being filed after payment of the issue fee. 2. Check the box next to the appropriate selection: ☐ Each item of information contained in the IDS was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the IDS. See 37 CFR 1.97(e)(1). OR ☒ No item of information contained in the IDS was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the IDS was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the IDS. See 37 CFR 1.97(e)(2). OR ☐ See attached certification statement in compliance with 37 CFR 1.97(e). 3. Please charge the IDS fee set forth in 37 CFR 1.17(p) to Deposit Account No. <u>602244</u> 4. A Petition to Withdraw from Issue After Payment of the Issue Fee (37 CFR 1.313(c)(2)), including the petition fee set forth in 37 CFR 1.17(h), is submitted herewith as a Web-based ePetition. WARNING: Do not submit the petition as a follow-on paper via EFS-Web. Submit the petition as a Web-based ePetition by signing on to EFS-Web as a registered user, selecting the radio button next to "Existing application/patent," and then selecting the radio button next to "ePetition (for automatic processing and immediate grant, if all petitions requirements are met)." Failure to use the Web-based ePetition interface will result in automatic entry of the RCE. 5. A request for continued examination (RCE) under 37 CFR 1.114 and the RCE fee under 37 CFR 1.17(e) are submitted herewith. 6. The RCE will be treated as a "conditional" RCE. In the event the examiner determines that any item of information contained in the IDS necessitates the reopening of prosecution in the application, the undersigned understands that (i) the RCE will be processed and treated as an RCE under 37 CFR 1.114 and therefore (ii) the IDS fee under 37 CFR 1.17(p) will be returned in accordance with 37 CFR 1.97(b)(4). In the event that no item of information in the IDS necessitates reopening prosecution, the undersigned understands that the RCE will not be processed and the RCE fee under 37 CFR 1.17(e) will be returned. 7. This certification and request is being filed as a Web-based ePetition and is not accompanied by an amendment to the application. Inclusion of an amendment will result in automatic entry of the RCE.	
Signature /Marcella M. Bodner/	Date 05/16/2022
Name (Print/Typed) Marcella M. Bodner	Practitioner Registration Number (If applicable) 46561
Note: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature. If necessary, submit multiple forms for more than one signature, see below.*	
☒ *Total of <u>1</u> forms are submitted.	

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

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Doc code: IDS

PTO/SB/08a (03-15)

Doc description: Information Disclosure Statement (IDS) Filed

Approved for use through 07/31/2016. OMB 0651-0031

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	16859945
	Filing Date	2020-04-27
	First Named Inventor	HSIN-HSI TSAI
	Art Unit	
	Examiner Name	
	Attorney Docket Number	US80883

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	1	20180145800	A1	2018-05-24	~~SAMSUNG ELECTRONICS CO LTD~~ Srivastav et al.	the whole document

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	1	109155931	CN	A	2019-01-04	HUAWEI TECHNOLOGIES CO LTD	At least the Abstract	×
	2	108012314	CN	A	2018-05-08	MEDIATEK INC	At least the Abstract	☒

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Sale Accounting Date:05/17/2022

Sale Item Reference Number	Effective Date
16859945	05/16/2022

Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method
I20225GA02324321	2806	SUBMISSION- INFORMATION DISCLOSURE STMT	\$130.00	Deposit Account



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/859,945	04/27/2020	HSIN-HSI TSAI	64365-0101	9503
155240	7590	05/19/2022	EXAMINER	
Cole Schotz, P.C. Court Plaza North 25 Main Street Hackensack, NJ 07601			CHOWDHURY, MOHAMMED SHAMSUL	
			ART UNIT	PAPER NUMBER
			2467	
			MAIL DATE	DELIVERY MODE
			05/19/2022	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Corrected Notice of Allowability	Application No. 16/859,945	Applicant(s) TSAI et al.	
	Examiner MOHAMMED S CHOWDHURY	Art Unit 2467	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 01/12/2022 & 05/16/2022.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on ____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.

3. ☒ The allowed claim(s) is/are 1-4,6-14 and 16-20. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
Certified copies:
 a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 * Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892) 2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____. 3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____. 4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____.	5. ☐ Examiner's Amendment/Comment 6. ☐ Examiner's Statement of Reasons for Allowance 7. ☐ Other _____.
--	---

/M.S.C./ Examiner, Art Unit 2467	/HASSAN A PHILLIPS/ Supervisory Patent Examiner, Art Unit 2467
-------------------------------------	---

Issue Classification 	Application/Control No. 16/859,945	Applicant(s)/Patent Under Reexamination TSAI et al.
	Examiner MOHAMMED S CHOWDHURY	Art Unit 2467

CPC						
Symbol					Type	Version
H04W	/	52	/	0235	F	2013-01-01
H04W	/	52	/	0216	I	2013-01-01
H04W	/	72	/	042	I	2013-01-01

CPC Combination Sets						
Symbol			Type	Set	Ranking	Version
	/		/			

/MOHAMMED S CHOWDHURY/ Examiner, Art Unit 2467 (Assistant Examiner)	17 May 2022 (Date)	Total Claims Allowed: 18	
/HASSAN A PHILLIPS/ Supervisory Patent Examiner, Art Unit 2467 (Primary Examiner)	18 May 2022 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure Fig. 6

Issue Classification 	Application/Control No. 16/859,945	Applicant(s)/Patent Under Reexamination TSAI et al.
	Examiner MOHAMMED S CHOWDHURY	Art Unit 2467

INTERNATIONAL CLASSIFICATION			
CLAIMED			
H04W52/02	/	52	/ 02
H04W72/04	/	72	/ 04
NON-CLAIMED			
/		/	

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS
370	311

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

/MOHAMMED S CHOWDHURY/ Examiner, Art Unit 2467 (Assistant Examiner)	17 May 2022 (Date)	Total Claims Allowed: 18	
/HASSAN A PHILLIPS/ Supervisory Patent Examiner, Art Unit 2467 (Primary Examiner)	18 May 2022 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure Fig. 6

Issue Classification 	Application/Control No. 16/859,945	Applicant(s)/Patent Under Reexamination TSAI et al.
	Examiner MOHAMMED S CHOWDHURY	Art Unit 2467

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47															
CLAIMS															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	9	10	17	19										
2	2	10	11	18	20										
3	3	11	12												
4	4	12	13												
-	5	13	14												
5	6	-	15												
6	7	14	16												
7	8	15	17												
8	9	16	18												

/MOHAMMED S CHOWDHURY/ Examiner, Art Unit 2467 (Assistant Examiner)	17 May 2022 (Date)	Total Claims Allowed: 18	
/HASSAN A PHILLIPS/ Supervisory Patent Examiner, Art Unit 2467 (Primary Examiner)	18 May 2022 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure Fig. 6

<i>Index of Claims</i> 	Application/Control No. 16/859,945	Applicant(s)/Patent Under Reexamination TSAI et al.
	Examiner MOHAMMED S CHOWDHURY	Art Unit 2467

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS									
☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47									
CLAIM		DATE							
Final	Original	10/09/2021	01/30/2022	05/17/2022					
1	1	✓	=	=					
2	2	✓	=	=					
3	3	✓	=	=					
4	4	✓	=	=					
-	5	O	-	-					
5	6	O	=	=					
6	7	✓	=	=					
7	8	O	=	=					
8	9	✓	=	=					
9	10	✓	=	=					
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12	13	✓	=	=					
13	14	✓	=	=					
-	15	O	-	-					
14	16	O	=	=					
15	17	✓	=	=					
16	18	O	=	=					
17	19	✓	=	=					
18	20	✓	=	=					

Doc code: IDS

PTO/SB/08a (01-22)

Doc description: Information Disclosure Statement (IDS) Filed

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	16859945
	Filing Date	2020-04-27
	First Named Inventor	Hsin-Hsi Tsai
	Art Unit	2467
	Examiner Name	Mohammed Shamsul Chowdhury
	Attorney Docket Number	64365-0101

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Examiner Initial*	Cite No	Foreign Document Number ³	Country Code ²ⁱ	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T ⁵
	1	114051764	CN	A	2022-02-15	FG Innovation Co. Ltd.		
	2	3964019	EP	A	2022-03-09	FG Innovation Co. Ltd.		
	3	202147055079	IN		2021-12-10	FG Innovation Co. Ltd.		

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	16859945
	Filing Date	2020-04-27
	First Named Inventor	Hsin-Hsi Tsai
	Art Unit	2467
	Examiner Name	Mohammed Shamsul Chowdhury
Attorney Docket Number		64365-0101

	4	202046780	TW		2020-12-16	FG Innovation Co. Ltd.		
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	1	International Preliminary Report on Patentability issued on November 2, 2021, for International Patent Application No.: PCT/CN2020/087653.	
	2	International Search Report issued on November 5, 2022, for International Patent Application No.: PCT/CN2020/087653.	

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EXAMINER SIGNATURE

Examiner Signature	/MOHAMMED S CHOWDHURY/ {05/17/2022}	Date Considered	05/17/2022
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. ² Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). ³ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁴ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. ⁵ Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	16859945
	Filing Date	2020-04-27
	First Named Inventor	Hsin-Hsi Tsai
	Art Unit	2467
	Examiner Name	Mohammed Shamsul Chowdhury
	Attorney Docket Number	64365-0101

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Marcella M. Bodner/	Date (YYYY-MM-DD)	2022-05-16
Name/Print	Marcella M. Bodner	Registration Number	46561

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
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Document Code:WFEE

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Refund Accounting Date:05/25/2022

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/859,945	06/21/2022	11368911	64365-0101	9503

155240 7590 06/01/2022
Cole Schotz, P.C.
Court Plaza North 25 Main Street
Hackensack, NJ 07601

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 106 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional inventors):

HSIN-HSI TSAI, Taipei, TAIWAN;
CHIA-HUNG WEI, Hsinchu, TAIWAN;
CHIE-MING CHOU, Hsinchu, TAIWAN;

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Hannibal IP LLC, Frisco, TX;

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IR 103 (Rev. 10/09)