IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of: Joon Bae KIM	)	Group Art Unit:
Application No.:	)	Examiner:
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Atty. File No.: 8365-87-PUS-CON-7	)	

For: HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

PRELIMINARY AMENDMENT

Dear Commissioner:

Prior to the initial review of the above-identified patent application by the Examiner, please enter the following Preliminary Amendment. Although Applicants do not believe that any fees are due based upon the filing of this Preliminary Amendment, please charge any such fees to Deposit Account 19-1970.

Please amend the above-identified patent application as follows:

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

Amendments to the Claims are shown in the listing of claims which begin on page 3 of this paper.

Remarks begin on page 4 of this paper.

AMENDMENTS TO THE SPECIFICATION

Please amend the first paragraph of the application beneath the heading "RELATED APPLICATION DATA":

[0001] This application is a continuation of U.S. Patent Application No. 16/780,589, filed February 3, 2020, which is a continuation of U.S. Patent Application no. 16/394,490, filed April 25, 2019, now U.S. Patent No. 10,554,459, which is a continuation of U.S. Patent Application No. 16/125,206, filed September 7, 2018, now U.S. Patent No. 10,291,449, which is a continuation of U.S. Patent Application No. 15/958,519, filed April 20, 2018, now U.S. Patent No. 10,079,707, which is a continuation of U.S. Patent Application No. 15/476,284, filed March 31, 2017, now U.S. Patent No. 9,973,361, which is a continuation of U.S. Patent Application No. 15/350,418, filed November 14, 2016, now U.S. Patent No. 9,614,566, which is a continuation of U.S. Patent No. 13/376,856, filed February 8, 2012, now U.S. Patent No. 9,584,262, which is a national stage application under 35 U.S.C. 371 of PCT Application No. PCT/US2010/046088, having an international filing date of August 20, 2010, which designated the United States, which PCT application claims the benefit of and priority under 35 U.S.C. §119(e) to U.S. Patent Application No. 61/235,909, filed August 21, 2009, entitled "Header Repetition Scheme in Packet-Based OFDM Systems," each of which are~~is~~ incorporated herein by reference in their~~its~~ entirety.

AMENDMENTS TO THE CLAIMS

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

Listing of Claims:

1-59. (Cancelled)

60. (New) An Orthogonal Frequency Division Multiplexing (OFDM) communications transmitter capable of generating a first packet type comprising a first header field.

REMARKS/ARGUMENTS

By this amendment, claims 1-59 are canceled without prejudice or disclaimer and new claim 60 has been added.

Applicant requests examination on the merits.

Applicant believes that the pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned.

The Commissioner is hereby authorized to charge to Deposit Account No. 19-1970 any fees under 37 C.F.R. §§ 1.16 and 1.17 that may be required by this paper and to credit any overpayment to that Account. If any extension of time is required in connection with the filing of this paper and has not been separately requested, such extension is hereby Petitioned.

Respectfully submitted,

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Date: December 29, 2020

HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS

RELATED APPLICATION DATA

[0001] This application claims the benefit of and priority under 35 U.S.C. §119(e) to U.S. Patent Application No. 61/235,909, filed August 21, 2009, entitled "Header Repetition Scheme in Packet-Based OFDM Systems," which is incorporated herein by reference in its entirety.

FIELD

[0002] An exemplary aspect of this invention relates to communications systems. More specifically, exemplary methods, systems, means, protocols and computer-readable storage media, are directed toward header repetition in a communications environment.

BACKGROUND

[0003] Conventional multi-user communications system use frame-based (or packet-based) transmission to communication between two or more users over a shared channel based on Orthogonal Frequency Division Multiplexing (OFDM) – (OFDM is also sometimes referred to as multicarrier modulation.) A packet is usually formed by a preamble, header, and payload, and transmitted using time-sharing or contention-based media access methods. An example of such a system includes IEEE 802.11 (Wireless LAN), IEEE 802.16 (WiMAX), and ITU G.9960 (G.hn). These systems use OFDM transmission, which is also sometimes referred to as Discrete Multi-Tone (DMT) which divides the transmission frequency band into multiple subcarriers (also referred to as tones or sub-channels), with each sub-carrier individually modulating a bit or a collection of bits.

[0004] The header contains important control information for the receiver to decode the payload properly, and also provides information about the packet length for virtual carrier sensing. Hence, it is essential to decode the header reliably. In G.9960, which is incorporated herein by reference in its entirety, and should be familiar to those skilled in the art, the header containing PHY_H bits (header information block) is carried over one or two OFDM symbols (D = 1 or 2), and within each symbol, multiple header information blocks are repeated over the entire frequency band. (See Editor for G.9960, "ITU-T

Recommendation G.9960: Next generation wire-line based home networking transceivers – Foundation," ITU-T SG15/Q4, Jan. 2009) The default value of D is 1, but expanding it to 2 in some cases is under discussion. See, for example, "G.hn: PHY-Frame Header Extension," ITU Temporary Document ITU-T SG-15/Q4 09CC-046, August 2009, and ITU Temporary Document ITU-T SG15/Q4 09XC-100 entitled "G.hn: Using Two Symbols for the Header of PHY Frame on Coax," July, 2009, filed in the priority application and incorporated herein by reference in their entirety.

[0005] The possibility of carrying more than PHY_H bits in the header (H = 1 or 2) is also under discussion as disclosed in the "G.hn: PHY-Frame Header Extension" article and in "G.hn: Extended PHY Frame Header," ITU-T SG15/Q4 09XC-119, July 2009, filed in the priority application and incorporated herein by reference in their entirety.

SUMMARY

[0006] One exemplary technique discussed herein is allowing different values of D in a single domain where nodes are operating in different portions of frequency bands. For the power-line medium, G.9960 has defined two overlapped baseband bandplans, 50MHz-PB and 100MHz-PB. The possibility of having narrower bandplans such as 25MHz-PB and 12.5MHz-PB are under discussion in order to support, for example, SmartGrid applications.

[0007] In this exemplary scenario, the level of frequency diversity is different depending on the bandplan, hence providing different header decodability if D is fixed to 1. If D is fixed to 2, then it increases reliability for the narrowband devices, but may also unnecessarily increase overhead for the wide-band devices.

[0008] An exemplary aspect is therefore directed to techniques to accommodate different repetitions schemes (D = 1, ..., D_{MAX} and H = 1, ..., H_{MAX}) in a single domain, and still allow devices to communicate with one another. D_{MAX} and H_{MAX} can be 2 or larger than 2.

[0009] As illustrated in Fig. 1, various header repetition schemes are illustrated where D, H = 1 or 2. In Fig. 1, the second instance of a block with the same label is a copy of the prior block. The modulation of the copied block may not be exactly the same as the original version. For example, the label "Header Ext" emphasizes the fact that it may contain different header information than the "Header." The payload after the header

may be omitted in some cases (e.g., ACK, RTS/CTS, etc.).

[0010] The repetition scheme expands similarly with larger values of D_{MAX} and H_{MAX}. An exemplary aspect focuses on dealing with different values of D, with different values of H capable of being supported in a straightforward way as discussed in the paper G.hn: PHY-Frame Header Extension.

[0011] On exemplary aspect is directed toward receiver detection of D with variable repetition. More specifically, in accordance with this exemplary embodiment, the transmitter selects (or determines), the at least one D value. The selection may be at its own discretion, or may be based on information communicated between one or more receivers, or based on instruction(s) from one or more other receivers and/or a domain master. Selection may depend on the number of available sub-carriers (or the bandwidth) of the bandplan the transmitter operates on and/or the receiver(s) operates on. In accordance with this exemplary embodiment, a receiving node in the domain should be able to decode packets sent by the transmitter without knowing D a priori (i.e. prior to decoding the packet header).

[0012] Another exemplary aspect is for a transmitter to carry, insert or otherwise communicate the value of D in the header so that all nodes know how many OFDM symbols are carrying header information. The receiver(s) starts processing the header by decoding one OFDM header symbol. If the receiver decodes it successfully, then the receiver knows how many more OFDM symbols (D-1) are carrying header information for a given frame. If the receiver fails to obtain the header information from the OFDM header symbol (i.e., the header decoding fails), then the receiver can try to decode two OFDM header symbols, and so on. The decoding of each additional OFDM header symbol provides additional diversity thereby increasing the likelihood of decoding the header information correctly.

[0013] Another exemplary aspect is directed to a fixed repetition scheme per domain. More specifically, a domain master can select (or determine) one or more fixed D values for at least one node in the domain. For example, the domain master may select one fixed value for all nodes in a domain. Selection may depend on the number of available sub-carriers (or the bandwidth) of the bandplans that the domain members operate on. The domain master may change the value of D dynamically. A node in the domain first needs to determine the D that the domain master has set (or

selected/determined).

[0014] On exemplary aspect is for the domain master to carry, insert or otherwise communicate the selected value of D in the header of the MAP frame while also using this D value for the transmission of the MAP header as described above. In this case, a node will be able to determine the value of D using the methods described above. After this value is determined by a node, the node can use this value until it is changed or updated by, for example, a domain master, another transceiver, etc.

[0015] Another exemplary aspect is for the domain master to carry, insert or otherwise communicate the selected value of D in the MAP while using a fixed D for the header of the MAP frame (e.g., pre-defined per medium or D_{MAX}). The D value in the MAP will be used for non-MAP frames/packets. In this case, a node in the domain may not need multiple levels of header decode process as described in above. Also in this exemplary method, the MAP may be sent with a different D value than the D value used for other (non-MAP) frames/packets.

[0016] Another exemplary aspect is directed toward a fixed repetition scheme per TXOP.

[0017] More specifically, in addition, or alternatively, the domain master may select (or determine) a D value per TXOP. This selection may be at its own discretion, or based on information communicated between one or more transceivers or receivers, or based on instruction from one or more transceivers or receivers. Selection may depend on the number of available sub-carriers (and/or the bandwidth) of the bandplan the transmitter/transceiver operates on and/or the receiver(s) operates on.

[0018] An exemplary technique is to include D in the TXOP descriptor transmitted in the MAP so that all nodes know in advance what value of D is used for that TXOP. The TXOP descriptor is the part of the MAP message which can be communicated via the MAP frame as discussed above.

[0019] Any of the above aspects and further aspects may be located in a network management system or network operation device that is located inside or outside the network and/or the transceiver(s). The network operation or management device that is located inside or outside the network may be managed and/or operated by a user, consumer, service provider or power utility provider, a governmental entity, or the like.

BRIEF DESCRIPTION ON THE DRAWINGS

[0020] The exemplary embodiments of the invention will be described in detail, with reference to the following figures, wherein:

[0021] Fig. 1 illustrates exemplary header repetition schemes;

[0022] Fig. 2 illustrates an exemplary transceiver;

[0023] Fig. 3 illustrates an exemplary communications environment;

[0024] Fig. 4 is a flowchart outlining an exemplary method of a header repetition scheme;

[0025] Fig. 5 is a flowchart outlining another exemplary method for a header repetition scheme;

[0026] Fig. 6 is a flowchart outlining yet another exemplary method for a header repetition scheme;

[0027] Fig. 7 is a flowchart outlining another exemplary method for a header repetition scheme; and

[0028] Fig. 8 is a flowchart outlining another method of an exemplary header repetition scheme.

DETAILED DESCRIPTION

[0029] The exemplary embodiments of this invention will be described in relation to communications systems, as well as protocols, techniques and methods for header repetition, such as in a DSL or multimode multicarrier communications environment, a home network or an access network, or in general any communications network operating using any communications protocol(s). Examples of such home or access networks include home powerline networks, access powerline networks, home coaxial cable network, access coaxial cable network, wireless home networks, wireless corporate networks, home telephone networks and access telephone networks. However, it should be appreciated that in general, the systems, methods, and techniques of this invention will work equally well for other types of communications environments, networks, and/or protocols.

[0030] The exemplary systems and methods of this invention will also be described in relation to wired or wireless modems and/or a software and/or a hardware testing module, a telecommunications test device, or the like, such as a DSL modem, an ADSL

modem, and xDSL modem, a VDSL modem, a line card, a G.hn transceiver, a MOCA transceiver, a Homeplug® transceiver, a power line modem, a wired or wireless modem, test equipment, a multicarrier transceiver, a wireless wide/local area network system, a satellite communications system, a network-based communications systems, such as an IP, Ethernet or ATM system, a modem equipped with diagnostic capabilities, or the like, or a separate programmed general purpose computer having a communications device that is capable of operating in conjunction with any one or more of the following communications protocols: MOCA, Homeplug, IEEE 802.11, IEEE 802.3, IEEE 802.16 (WiMAX), and ITU G.9960 (G.hn), or the like. However, to avoid unnecessarily obscuring the present invention, the following description omits well-known structures, operations and devices that may be shown in block diagram form or are otherwise summarized or known.

[0031] For purposes of explanation, numerous details are set forth in order to provide a thorough understanding of the present invention. It should be appreciated however that the present invention may be practiced in a variety of ways beyond the specific details set forth herein. Furthermore, while the exemplary embodiments illustrated herein show various components of this system collocated, it is to be appreciated that the various components of the system can be located at distant portions of a distributed network, such as a communications network, node, within a Domain Master, and/or the internet, or within a dedicated secured, unsecured, and/or encrypted system and/or within a network operation or management device that is located inside or outside the network. As an example, a Domain Master can also be used to refer to any device, system or module that manages and/or configures any one or more aspects of the network or communications environment.

[0032] Thus, it should be appreciated that the components of the system can be combined into one or more devices, or split between devices, such as a modem, a station, a Domain Master, a network operation or management device, a node or collocated on a particular node of a distributed network, such as a communications network. As will be appreciated from the following description, and for reasons of computational efficiency, the components of the system can be arranged at any location within a distributed network without affecting the operation thereof. For example, the various components can be located in a Domain Master, a node, a domain management

device, such as a MIB, a network operation or management device, or some combination thereof. Similarly, one or more of the functional portions of the system could be distributed between a modem and an associated computing device/system, and/or in a dedicated test and/or measurement device.

[0033] Furthermore, it should be appreciated that the various links 5, including the communications channel(s) connecting the elements can be wired or wireless links or any combination thereof, or any other known or later developed element(s) capable of supplying and/or communicating data to and from the connected elements. The term module as used herein can refer to any known or later developed hardware, software, firmware, or combination thereof, that is capable of performing the functionality associated with that element. The terms determine, calculate, and compute and variations thereof, as used herein are used interchangeable and include any type of methodology, process, technique, mathematical operational or protocol. The terms transceiver and modem are also used interchangeably herein. The terms transmitting modem and transmitting transceiver as well as receiving modem and receiving transceiver are also used interchangeably herein.

[0034] The term management interface is related to any type of interface between a management entity and/or technician and/or user and a transceiver, such as, a CO-MIB or CPE-MIB as described, for example, in ITU standard G.997.1, which is incorporated herein by reference in its entirety.

[0035] Moreover, while some of the exemplary embodiments described herein are directed toward a transmitter portion of a transceiver performing certain functions, this disclosure is intended to include corresponding receiver-side functionality in both the same transceiver and/or another transceiver, and vice versa.

[0036] Fig. 1 illustrates four different header configurations where D, H, = 1 or 2. Even more specifically, in the first example, H=1 and D=1 with a preamble followed by a header followed by a payload. In a second example H=1 and D=2, with the preamble followed by header 2 that is repeated as header 4, which is followed by the payload. As discussed, the repeated header can be repeated in full or in part. In the third example, H=2 and D=1, such that the preamble is followed by a header which is followed by an extended header and the payload. In the fourth example, H=2 and D=2 such that header 6 is repeated as header 8, and the extended header 3 is repeated as extended header 5,

which is followed by the payload. As discussed, the repeated portions may be exact duplicates.

[0037] As a more specific example, consider the header configuration in the fifth example. In the fifth example, H is again equal to 2 and D is equal to 2 such that header 11 is repeated as header 12, and the extended header 13 is repeated as extended header 14, which is followed by the payload. For this example, the "Header" is limited to a certain number of bits (here arbitrarily illustrated as 10 bits), however, for this example, there are 15 bits of information that need to be included in the header. Thus, 10 bits are included in the "Header" and the remaining 5 bits are included in the "Header Ext." As will be appreciated, the number of information bits to be included in the header, the number of bits the header is capable of carrying and the number of bits the header extended is capable of carrying can be any value(s). The 10 bits in "Header" 11 are repeated in "Header" 12 and the 5 bits in "Header Ext" 13 and repeated in "Header Ext" 14.

[0038] Fig. 2 illustrates an exemplary transceiver or Domain Master 200. In addition to well known componentry, the transceiver or Domain Master 200 includes (for a Domain Master) a MAP determination module 210 and (for a transceiver) a MAP processing or relaying module 210, a header assembly module 220, modulation module 230, demodulation module 240, transmitter 250, encoding module 260, decoding module 270, receiver 280, and controller/processor 290. In general, a Domain Master generally determines a MAP frame for transmission to one or more other transceivers while a transceiver is capable of one or more of receiving and/or relaying the received MAP frame to one or more other transceivers. For ease of discussion, in the following description, the determining and transmitting of a MAP frame will be performed by a Domain Master-type of transceiver and the receiving and/or relaying of a MAP frame will be performed by a non-domain master type of transceiver. However, the description also allows and enables any transceiver (Domain master or non-domain master) to determine, transmit, receiver and/or relay MAP messages.

[0039] In operation, the transceiver or Domain Master 200, cooperating with the MAP determination module or MAP processing or relaying module 210, transmitter 250, and controller/processor 290 transmits a MAP frame that includes a TXOP descriptor. As discussed, this TXOP descriptor contains a bit field that indicates a value for an integer

(D) where the integer D indicates a number of header OFDM symbols that carry header bits. Next, the transceiver or Domain Master 200, cooperating with the header assembly module 220 and transmitter 250 prepares to transmit a second frame having a plurality of header bits using the D header OFDM symbols. Each OFDM symbol carries the plurality of header bits. Then, in cooperation with the modulation module 230, the transceiver or Domain Master 200 modulates the header bit onto the D OFDM symbols. As discussed, this modulation of the header bits onto the D OFDM symbols can occur where the header bits are modulated onto the D OFDM symbols in the same order or can occur where the header bits are modulated onto the D OFDM symbols in a different order. In addition, the encoding module 260 may encode the value of D into a bit field on the header of the second frame. The second frame is then transmitted over the communications channel.

[0040] As discussed, the value of D can be updated based, for example, on information received from another transceiver, on information received from a domain master, can be initiated by the controller/processor 290, or can in general be initiated and/or requested by any other device, wherein the value of D that is updated is different than the previous value of D. With the updated value of D, the above-described steps can be repeated utilizing this updated value of D.

[0041] In accordance with another exemplary operational embodiment, the transceiver or Domain Master 200 transmits a MAP frame that includes the TXOP descriptor and then receives a second frame that has a plurality of header bits that use the D header OFDM symbols. This is followed by the demodulation module 240 demodulating the header bits from the D OFDM symbols that were received. Additionally, the decoding module 270 may decode the value of D from a bit field in the header of the received second frame. As with the previous embodiment, the value of D can be updated with the above steps being repeated.

[0042] In accordance with yet another exemplary operational embodiment, the transceiver 200 first receives the MAP frame that includes the TXOP descriptor with the cooperation of the receiver 280. The transceiver 200, with the cooperation of the header assembly module 220, and transmitter 250, transmits a second frame having a plurality of header bits using the D header OFDM symbols. As with the previous embodiments, the header bits are modulated onto the D OFDM symbols either the same or in a

different order, and the value of D may be encoded in a bit field in the header of the second frame. Again, this can be followed by an updated value of D with the above steps being repeated.

[0043] In yet another exemplary operational embodiment, the transceiver 200 receives a MAP frame that includes the TXOP descriptor, which is followed by the receipt of a second frame that has a plurality of header bits that used the D header OFDM symbols. As with one of the above exemplary embodiments, this is done with the cooperation of the receiver 280, the demodulation module 240 and decoding module 270. Upon receipt, the header bits from the D OFDM symbols can be demodulated and the value of D from a bit field in the header of the second frame may be decoded.

[0044] Fig. 3 illustrates an exemplary communications environment that includes a first transceiver or domain master 310 and a second transceiver 320. While not illustrated in Fig. 3, there could be one or more additional transceivers that act as relays to pass the various informational messages and data exchanged between the transceivers to thereby facilitate communication between the first transceiver or domain master 310 and the second transceiver 320.

[0045] In operation, the transceiver and/or domain master 310, cooperating with the MAP determination module or MAP processing or relaying module 210, transmitter 250, and controller/processor 290 transmits a MAP frame that includes a TXOP descriptor over the communications channel to the second transceiver 320. As discussed, this TXOP descriptor contains a bit field that indicates a value for an integer (D) where the integer D indicates a number of header OFDM symbols that carry header bits. Next, the transceiver/domain master 310, cooperating with the header assembly module 220 and transmitter 250 prepares to transmit a second frame to transceiver 320 having a plurality of header bits using the D header OFDM symbols. Each OFDM symbol carries the plurality of header bits. Then, in cooperation with the modulation module 230, the transceiver/domain master 310 modulates the header bit onto the D OFDM symbols. As discussed, this modulation of the header bits onto the D OFDM symbols can occur where the header bits are modulated onto the D OFDM symbols in the same order or can occur where the header bits are modulated onto the D OFDM symbols in a different order. In addition, the encoding module 260 may encode the value of D into a bit field on the header of the second frame. The second frame is then transmitted over the

communications channel to the second transceiver 320.

[0046] As discussed, the value of D can be updated based, for example, on information received from another transceiver, on information received from a domain master, can be initiated by the controller/processor 290, or can in general be initiated and/or requested by any other device, wherein the value of D that is updated is different than a previous value of D. With the updated value of D, the above-described steps can be repeated utilizing this updated value of D.

[0047] In accordance with another exemplary operational embodiment, the transceiver/domain master 310 transmits a MAP frame that includes the TXOP descriptor to the second transceiver 320 and then receives from the second transceiver 320 a second frame that has a plurality of header bits that use the D header OFDM symbols. This is followed by the transceiver/domain master's 310 demodulation module 240 demodulating the header bits from the D OFDM symbols that were received. Additionally, the decoding module 270 of the transceiver/domain master 310 decodes the value of D from the bit in the header of the received second frame. As with the previous embodiment, the value of D can be updated with the above steps being repeated.

[0048] In accordance with yet another exemplary operational embodiment, the transceiver/domain master 310 first receives the MAP frame that includes the TXOP descriptor from the second transceiver 320 with the cooperation of the receiver 280 in the transceiver/domain master 310. The transceiver/domain master 310, with the cooperation of the header assembly module 220, and transmitter 250, transmits a second frame having a plurality of header bits using the D header OFDM symbols to the second transceiver 320. As with the previous embodiments, the header bits are modulated onto the D OFDM symbols either the same or in a different order, and the value of D encoded in a bit field in the header of the second frame. Again, this can be followed by an updated value of D with the above steps being repeated.

[0049] In yet another exemplary operational embodiment, the transceiver/domain master 310 receives a MAP frame from the transceiver 320 that includes the TXOP descriptor, which is followed by the receipt of a second frame that has a plurality of header bits that used the D header OFDM symbols. As with one of the above embodiments, this is done with the cooperation of the receiver 280, the demodulation

module 240 and decoding module 270. Upon receipt, the header bits from the D OFDM symbols can be demodulated and the value of D from a bit field in the header of the second frame decoded. Again, this can be followed by an updated value of D with the above steps being repeated.

[0050] Fig. 4 illustrates an exemplary method of packet transmission. In particular, control begins in step S400 and continues to step S410. In step S410, a MAP frame is transmitted, with the MAP frame including a TXOP descriptor. As discussed, the TXOP descriptor can contain a bit field that indicates a value for an integer (D) wherein the integer D indicates a number of header OFDM symbols that carry header bits. The TXOP descriptor could contain multiple bit fields that indicate more than a value for the integer D as well. Next, in step S420, a second frame is prepared for transmission, the second frame having a plurality of header bits using D header OFDM symbols. Then, in step S430, the value of D is encoded into a bit field in the header of the second frame. Control then continues to step S440.

[0051] In step S440, the header bits are modulated onto the D OFDM symbols in either the same order or in a different order. Then, in step S450, the second frame is transmitted with control continuing to step S460.

[0052] In step S460, the value of D can optionally be updated with steps S410-S450 being repeated. Control then continues to step S470 where the control sequence ends.

[0053] Fig. 5 illustrates an exemplary method of packet reception. In particular, control begins in step S500 and continues to step S510. In step S510, a MAP frame is received, with the MAP frame including a TXOP descriptor. As discussed, the TXOP descriptor contains a bit field that indicates a value for an integer (D) wherein the integer D indicates a number of header OFDM symbols that carry header bits. Next, in step S520, a second frame is received, the second frame having a plurality of header bits that used the D header OFDM symbols. Then, in step S530, the header bits are demodulated from the D OFDM symbols in the same order or in a different order. Control then continues to step S540.

[0054] In step S540, the value of D is decoded from a bit field in the header of the second frame. Then, in step S550, the value of D can optionally be updated with steps S510-S540 being repeated. Control then continues to step S560 where the control sequence ends.

[0055] Fig. 6 illustrates an exemplary method of packet communication. In particular, control begins in step S600 in a first transceiver or Domain Master and continues to step S610. In step S610, a MAP frame is transmitted to a second transceiver, with the MAP frame including a TXOP descriptor. For the second transceiver, control begins in step S602 and continues to step S604 where the MAP frame including the TXOP descriptor is received.

[0056] Next, in step S620, a second frame is prepared for transmission and transmitted to the second transceiver, the second frame having a plurality of header bits using D header OFDM symbols. As discussed the header bits are modulated onto the D OFDM symbols with the TXOP descriptor containing a bit field that indicates a value for a integer (D) wherein the integer D indicates a number of header OFDM symbols that carry header bits. The TXOP descriptor could contain multiple bit fields that indicate more than a value for the integer D as well. Additionally, the header bits can be modulated onto the D OFDM symbols in the same order or in a different order and the value of D encoded into a bit field in the header of the second frame. Control for the first transceiver then continues to step S630 where the control sequence ends.

[0057] In step S606, the second frame is received, the second frame having the plurality of header bits that used the D header OFDM symbols. Then, in step S608, the header bits are demodulated from the D OFDM symbols in the same order or in a different order with control continuing to step S612.

[0058] In step S612, the value of D is decoded from the bit field in the header of the second frame. Then, in step S612, the value of D can optionally be updated with steps S610, S620 and S604-S612 being repeated. Control then continues to step S616 where the control sequence ends.

[0059] Fig. 7 illustrates an exemplary method of packet communication. In particular, control begins in step S700 in a first transceiver or Domain Master and continues to step S710. In step S710, a MAP frame is transmitted to a second transceiver, with the MAP frame including a TXOP descriptor. Control then continues to step S720 where the control sequence ends.

[0060] For the second transceiver, control begins in step S702 and continues to step S704 where after receipt of the MAP frame that includes the TXOP descriptor, a second frame is prepared by the second transceiver for transmission, the second frame having a

plurality of header bits using D header OFDM symbols. Then, in step S706, the value of D is encoded into a bit field in the header of the second frame with control continuing to step S708.

[0061] In step S708, the header bits are modulated onto the D OFDM symbols in the same order or in a different order. Then, in step S712, the second frame is transmitted with control continuing to step S714.

[0062] In step S714, the value of D can optionally be updated with steps S710 and S704-S712 being repeated. Control then continues to step S716 where the control sequence ends.

[0063] Fig. 8 illustrates another exemplary method of packet communication. In particular, control begins in step S800 in a first transceiver or Domain Master and continues to step S810. In step S810, a MAP frame is transmitted to a second transceiver, optionally being relayed by one or more other transceivers, with the MAP frame including a TXOP descriptor. Control then continues to step S820 where the control sequence ends. The relaying of one or more of the MAP frame and second frame as discussed herein is not limited to this specific embodiment, but could also occur in any of the other embodiments disclosed herein.

[0064] For the second transceiver, control begins in step S802 and continues to step S804 where the MAP frame that includes the TXOP descriptor is received. Next, in step S806 a second frame is prepared by the second transceiver for transmission, the second frame having a plurality of header bits using D header OFDM symbols. Then, in step S808, the value of D is encoded into a bit field in the header of the second frame with control continuing to step S812.

[0065] In step S812, the header bits are modulated onto the D OFDM symbols in the same order or in a different order. Then, in step S814, the second frame is transmitted with control continuing to step S816.

[0066] In step S816, the value of D can optionally be updated with steps S810 and S804-S814 being repeated using the updated value of D. Control then continues to step S818 where the control sequence ends.

[0067] As used herein the terms network and domain have the same meaning and are used interchangeably. Also, the terms receiver, receiving node and receiving transceiver have the same meaning and are used interchangeably. Similarly, the terms

transmitter, transmitting node and transmitting transceiver have the same meaning and are used interchangeably. The terms transceiver and modem also have the same meaning and are used interchangeably. While the term home network has been used in this description, the description is not limited to home networks but in fact applies also to any network, such as enterprise networks, business networks, or any network with a plurality of connected nodes. The terms transceiver, node and modem have the same meaning and are used interchangeably in the description. The term frame and packet have the same meaning and are used interchangeably in the description. The term header and PHY-frame header have the same meaning and are used interchangeably in the description.

[0068] The terms network and home network have the same meaning and are used interchangeably in the description. While the term Home network has been used in this description, the description is not limited to home networks but in fact applies also to any network, such as enterprise networks, business networks, or any network with a plurality of connected nodes.

[0069] While the above-described methods and systems can be described with respect to a port (or endpoint) in a network, they can also be implemented in a dedicated module such as a test or network optimization module. This dedicated module could be plugged into the network and act as a Domain Master or with the cooperation of the Domain Master could initiate the various measurement techniques, gather the measurements from the port(s) in the network, analyze the measurements and use the measured information to detect and diagnose problems in the network and/or to optimize or improve the performance of a network.

[0070] While the above-described flowcharts have been discussed in relation to a particular sequence of events, it should be appreciated that one or more changes to this sequence can occur without materially effecting the operation of the embodiments. Additionally, the exact sequence of events need not occur as set forth in the exemplary embodiments. The exemplary techniques illustrated herein are not limited to the specifically illustrated embodiments but can also be utilized with the other exemplary embodiments and each described feature is individually and separately claimable. Moreover, the steps in the flowcharts are optional, with some of or all of the steps being performed.

[0071] The above-described methods and systems and can be implemented in a software module, a software and/or hardware testing module, a telecommunications test device, a DSL modem, an ADSL modem, an xDSL modem, a VDSL modem, a linecard, a G.hn transceiver, a MOCA transceiver, a Homeplug transceiver, a powerline modem, a wired or wireless modem, test equipment, a multicarrier transceiver, a wired and/or wireless wide/local area network system, a satellite communication system, network-based communication systems, such as an IP, Ethernet or ATM system, a modem equipped with diagnostic capabilities, or the like, or on a separate programmed general purpose computer having a communications device or in conjunction with any of the following communications protocols: CDSL, ADSL2, ADSL2+, VDSL1, VDSL2, HDSL, DSL Lite, IDSL, RADSL, SDSL, UDSL, MOCA, G.hn, Homeplug® or the like.

[0072] Additionally, the systems, methods and protocols of this invention can be implemented on a special purpose computer, a programmed microprocessor or microcontroller and peripheral integrated circuit element(s), an ASIC or other integrated circuit, a digital signal processor, a flashable device, a hard-wired electronic or logic circuit such as discrete element circuit, a programmable logic device such as PLD, PLA, FPGA, PAL, a modem, a transmitter/receiver, any comparable means, or the like. In general, any device (or one or more equivalent means) capable of implementing a state machine that is in turn capable of implementing the methodology illustrated herein can be used to implement the various communication/measurement methods, protocols and techniques according to this invention.

[0073] Furthermore, the disclosed methods may be readily implemented in software stored on a non-transitory computer-readable storage media using object or object-oriented software development environments that provide portable source code that can be used on a variety of computer or workstation platforms. Alternatively, the disclosed system may be implemented partially or fully in hardware using standard logic circuits or VLSI design. Whether software or hardware is used to implement the systems in accordance with this invention is dependent on the speed and/or efficiency requirements of the system, the particular function, and the particular software or hardware systems or microprocessor or microcomputer systems being utilized. The communication systems, methods and protocols illustrated herein can be readily implemented in hardware and/or software using any known or later developed systems

or structures, devices and/or software by those of ordinary skill in the applicable art from the functional description provided herein and with a general basic knowledge of the computer and telecommunications arts.

[0074] Moreover, the disclosed methods may be readily implemented in software that can be stored on a computer-readable storage medium, executed on programmed general-purpose computer with the cooperation of a controller and memory, a special purpose computer, a microprocessor, or the like. The systems and methods of this invention can be implemented as a program embedded on personal computer such as an applet, JAVA® or CGI script, as a resource residing on a server or computer workstation, as a routine embedded in a dedicated communication system or system component, or the like. The system can also be implemented by physically incorporating the system and/or method into a software and/or hardware system, such as the hardware and software systems of a test/modem device.

[0075] While the invention is described in terms of exemplary embodiments, it should be appreciated that any of the aspects of the invention described herein in connection with the exemplary embodiments could be separately and individually claimed and one or more of the features of the various embodiments can be combined with one or more features discussed in relation to one or more other embodiments.

[0076] While the exemplary embodiments illustrated herein discuss the various components collocated, it is to be appreciated that the various components of the system can be located a distant portions of a distributed network, such as a telecommunications network and/or the Internet or within a dedicated communications network. Thus, it should be appreciated that the components of the system can be combined into one or more devices or collocated on a particular node of a distributed network, such as a telecommunications network. As will be appreciated from the following description, and for reasons of computational efficiency, the components of the communications network can be arranged at any location within the distributed network without affecting the operation of the system.

[0077] It is therefore apparent that there has been provided, in accordance with the present invention, systems and methods for header repetition in OFDM systems. While this invention has been described in conjunction with a number of embodiments, it is evident that many alternatives, modifications and variations would be or are apparent to

those of ordinary skill in the applicable arts. Accordingly, it is intended to embrace all such alternatives, modifications, equivalents and variations that are within the spirit and scope of this invention.

Claims:

1. An OFDM communication method comprising:

transmitting or receiving a Media Access Plan (MAP) frame comprising a Transmission Opportunity (TXOP) descriptor, wherein the TXOP descriptor contains a bit field that indicates a value for an integer, D, wherein the integer D indicates a number of header OFDM symbols that carry header bits; and

transmitting or receiving a second frame having a plurality of header bits using D header OFDM symbols, wherein each OFDM header symbol carries the plurality of header bits.

2. The method of claim 1, further comprising modulating the header bits onto the D OFDM symbols

3. The method of claim 1, further comprising demodulating the header bits from the D OFDM symbols

4. The method of claim 1, further comprising modulating the header bits onto the D OFDM symbols, wherein the header bits are modulated onto the D OFDM symbols in the same order.

5. The method of claim 1, further comprising modulating the header bits onto the D OFDM symbols, wherein the header bits are modulated onto the D OFDM symbols in a different order.

6. The method of claim 1, further comprising demodulating the header bits from the D OFDM symbols, wherein the header bits were modulated onto the D OFDM symbols in a different order.

7. The method of claim 1, further comprising demodulating the header bits from the D OFDM symbols, wherein the header bits were modulated onto the D OFDM symbols in the same order.

8. The method of claim 1, further comprising encoding the value of D into a bit field in a header of the second frame.

9. The method of claim 1, further comprising decoding the value of D from a bit field in a header of the second frame.

10. The method of claim 1, wherein a header of the second frame comprises a bit field that indicates the value for D.

11. The method of claim 1, wherein the MAP frame is transmitted or received with a fixed value for D.

12. The method of claim 11, wherein the fixed value for D is equal to the maximum value for D.

13. The method of claim 1, wherein the plurality header bits of header bits in the D OFDM symbols are modulated or demodulated in the same order.

14. The method of claim 1, wherein the plurality header bits of header bits in the D OFDM symbols are modulated or demodulated in a different order.

15. The method of claim 1, wherein D can take on the values of 1 and 2.

16. The method of claim 1, wherein D can take on the values of 1 and 2 and a fixed value of D for the MAP frame is 2.

17. The method of claim 1, further comprising updating the value of D contained in the TXOP descriptor, wherein the updated value of D is different than the original value of D.

18. The method of claim 17, wherein one or more of the steps in claims 2-16 are repeated with the updated value of D.

19. An OFDM transceiver capable of transmitting or receiving a Media Access Plan (MAP) frame comprising a Transmission Opportunity (TXOP) descriptor, wherein the TXOP descriptor contains a bit field that indicates a value for an integer, D, wherein the integer D indicates a number of header OFDM symbols that carry header bits and transmitting or receiving a second frame having a plurality of header bits using D header OFDM symbols, wherein each OFDM header symbol carries the plurality of header bits.

20. An OFDM system comprising a first transceiver capable of transmitting or receiving a Media Access Plan (MAP) frame comprising a Transmission Opportunity (TXOP) descriptor, wherein the TXOP descriptor contains a bit field that indicates a value for an integer, D, wherein the integer D indicates a number of header OFDM symbols that carry header bits and a second transceiver capable of transmitting or receiving a second frame having a plurality of header bits using D header OFDM symbols, wherein each OFDM header symbol carries the plurality of header bits.

21. Claim 19 or 20, further comprising a modulation module capable of modulating the header bits onto the D OFDM symbols

22. Claim 19 or 20, further comprising a demodulation module capable of demodulating the header bits from the D OFDM symbols

23. Claim 19 or 20, further comprising a modulation module capable of modulating the header bits onto the D OFDM symbols, wherein the header bits are modulated onto the D OFDM symbols in the same order.

24. Claim 19 or 20, further comprising a modulation module capable of modulating the header bits onto the D OFDM symbols, wherein the header bits are modulated onto the D OFDM symbols in a different order.

25. Claim 19 or 20, further comprising a demodulation module capable of demodulating the header bits from the D OFDM symbols, wherein the header bits were modulated onto the D OFDM symbols in a different order.

26. Claim 19 or 20, further comprising a demodulation module capable of demodulating the header bits from the D OFDM symbols, wherein the header bits were modulated onto the D OFDM symbols in the same order.

27. Claim 19 or 20, wherein the value of D is encoded into a bit field in a header of the second frame.

28. Claim 19 or 20, wherein the value of D is decoded from a bit field in a header of the second frame.

29. Claim 19 or 20, wherein a header of the second frame comprises a bit field that indicates the value for D.

30. Claim 19 or 20, wherein the MAP frame is transmitted or received with a fixed value for D.

31. Claim 30, wherein the fixed value for D is equal to the maximum value for D.

32. Claim 19 or 20, wherein the plurality header bits of header bits in the D OFDM symbols are modulated or demodulated in the same order.

33. Claim 19 or 20, wherein the plurality header bits of header bits in the D OFDM symbols are modulated or demodulated in a different order.

34. Claim 19 or 20, wherein D can take on the values of 1 and 2.

35. Claim 19 or 20, wherein D can take on the values of 1 and 2 and a fixed value of D for the MAP frame is 2.

36. Claim 19 or 20, wherein the value of D contained in the TXOP descriptor is updated, wherein the updated value of D is different than the original value of D.

37. Claim 36, wherein one or more of the steps in claims 21-35 are repeated with the updated value of D.

38. An OFDM communication system comprising:

means for transmitting or receiving a Media Access Plan (MAP) frame comprising a Transmission Opportunity (TXOP) descriptor, wherein the TXOP descriptor contains a bit field that indicates a value for an integer, D, wherein the integer D indicates a number of header OFDM symbols that carry header bits; and

means for transmitting or receiving a second frame having a plurality of header bits using D header OFDM symbols, wherein each OFDM header symbol carries the plurality of header bits.

39. The system of claim 38, further comprising means for modulating the header bits onto the D OFDM symbols

40. The system of claim 38, further comprising means for demodulating the header bits from the D OFDM symbols

41. The system of claim 38, further comprising means for modulating the header bits onto the D OFDM symbols, wherein the header bits are modulated onto the D OFDM symbols in the same order.

42. The system of claim 38, further comprising means for modulating the header bits onto the D OFDM symbols, wherein the header bits are modulated onto the D OFDM symbols in a different order.

43. The system of claim 38, further comprising means for demodulating the header bits from the D OFDM symbols, wherein the header bits were modulated onto the D OFDM symbols in a different order.

44. The system of claim 38, further comprising means for demodulating the header bits from the D OFDM symbols, wherein the header bits were modulated onto the D OFDM symbols in the same order.

45. The system of claim 38, further comprising means for encoding the value of D into a bit field in a header of the second frame.

46. The system of claim 38, further comprising means for decoding the value of D from a bit field in a header of the second frame.

47. The system of claim 38, wherein a header of the second frame comprises a bit field that indicates the value for D.

48. The system of claim 38, wherein the MAP frame is transmitted or received with a fixed value for D.

49. The system of claim 48, wherein the fixed value for D is equal to the maximum value for D.

50. The system of claim 38, wherein the plurality header bits of header bits in the D OFDM symbols are modulated or demodulated in the same order.

51. The system of claim 38, wherein the plurality header bits of header bits in the D OFDM symbols are modulated or demodulated in a different order.

52. The system of claim 38, wherein D can take on the values of 1 and 2.

53. The system of claim 38, wherein D can take on the values of 1 and 2 and a fixed value of D for the MAP frame is 2.

54. The system of claim 38, further comprising means for updating the value of D contained in the TXOP descriptor, wherein the updated value of D is different than the original value of D.

55. The system of claim 54, wherein one or more of the steps in claims 39-53 are repeated with the updated value of D.

56. A non-transitory computer-readable information storage media having processor-executable instructions stored thereon that, if executed by a processor, are capable of performing the steps in any one or more of claims 1-18.

57. Claim 19, wherein the OFDM transceiver is a domain master.

58. Claim 20, wherein the first transceiver is a domain master.

59. Any one or more of the features as described herein.

ABSTRACT

An OFDM communication system is described that allows different values of D in a single domain where nodes are operating in different portions of frequency bands. For the power-line medium, G.9960 has defined two overlapped baseband bandplans, 50MHz-PB and 100MHz-PB. In this exemplary scenario, the level of frequency diversity is different depending on the bandplan, hence providing different header decodibility if D is fixed to 1. If D is fixed to 2, then it increases reliability for the narrowband devices, but may also unnecessarily increase overhead for the wide-band devices. An exemplary aspect is therefore directed to techniques to accommodate different repetitions schemes (D = 1, ..., D_{MAX} and H = 1, ..., H_{MAX}) in a single domain, and still allow devices to communicate with one another where D_{MAX} and H_{MAX} can be larger than 2.

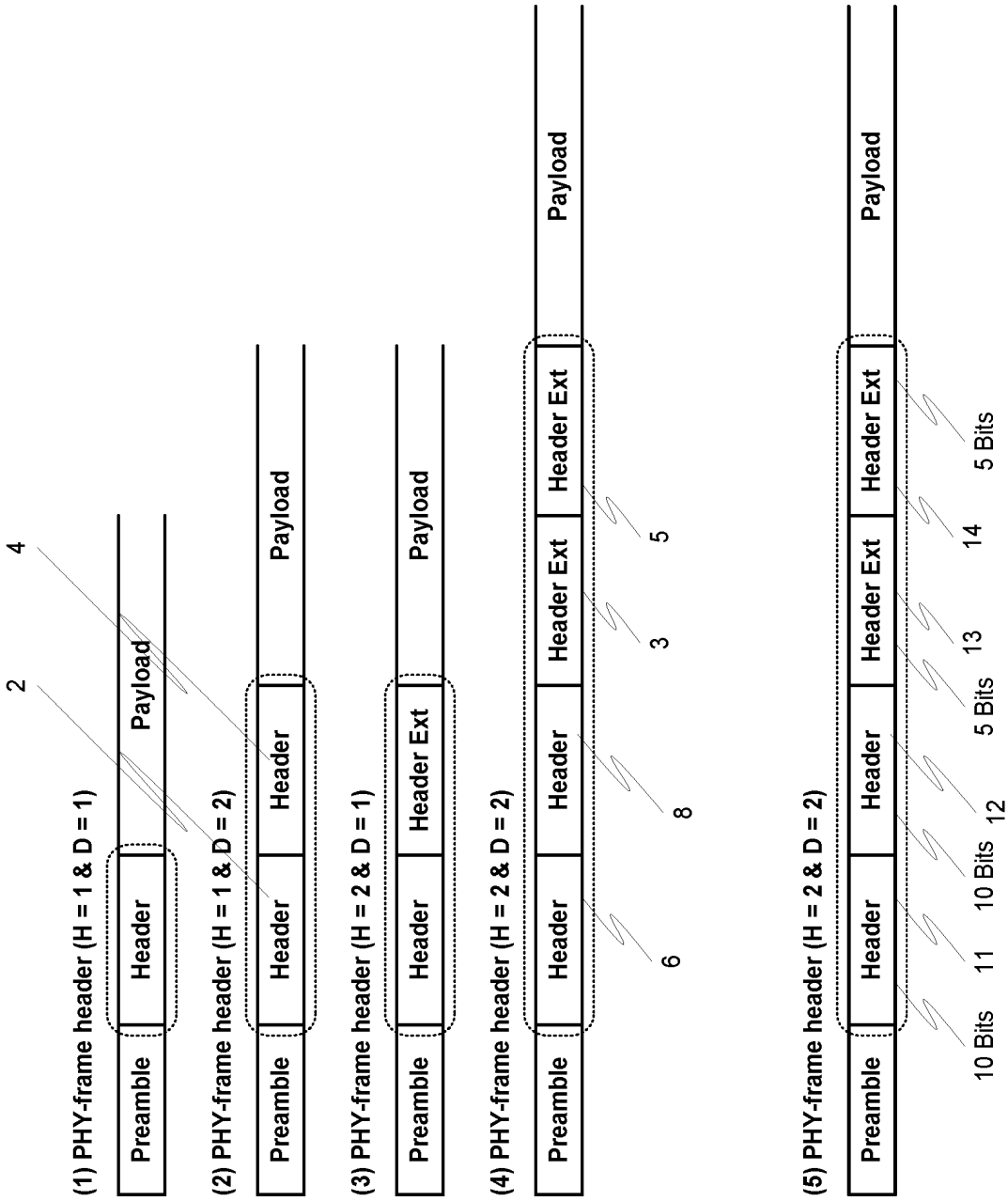
(1) PHY-frame header (H = 1 & D = 1)
Preamble
Header
Payload
(2) PHY-frame header (H = 1 & D = 2)
Preamble
Header
Payload
(3) PHY-frame header (H = 2 & D = 1)
Preamble
Header
Header Ext
Payload
(4) PHY-frame header (H = 2 & D = 2)
Preamble
Header
Header Ext
Header Ext
Payload
(5) PHY-frame header (H = 2 & D = 2)
Preamble
Header
Header
Header Ext
Header Ext
Payload
2
4
6
8
3
5
10 Bits
11
10 Bits
12
5 Bits
13
14
5 Bits

Fig. 1

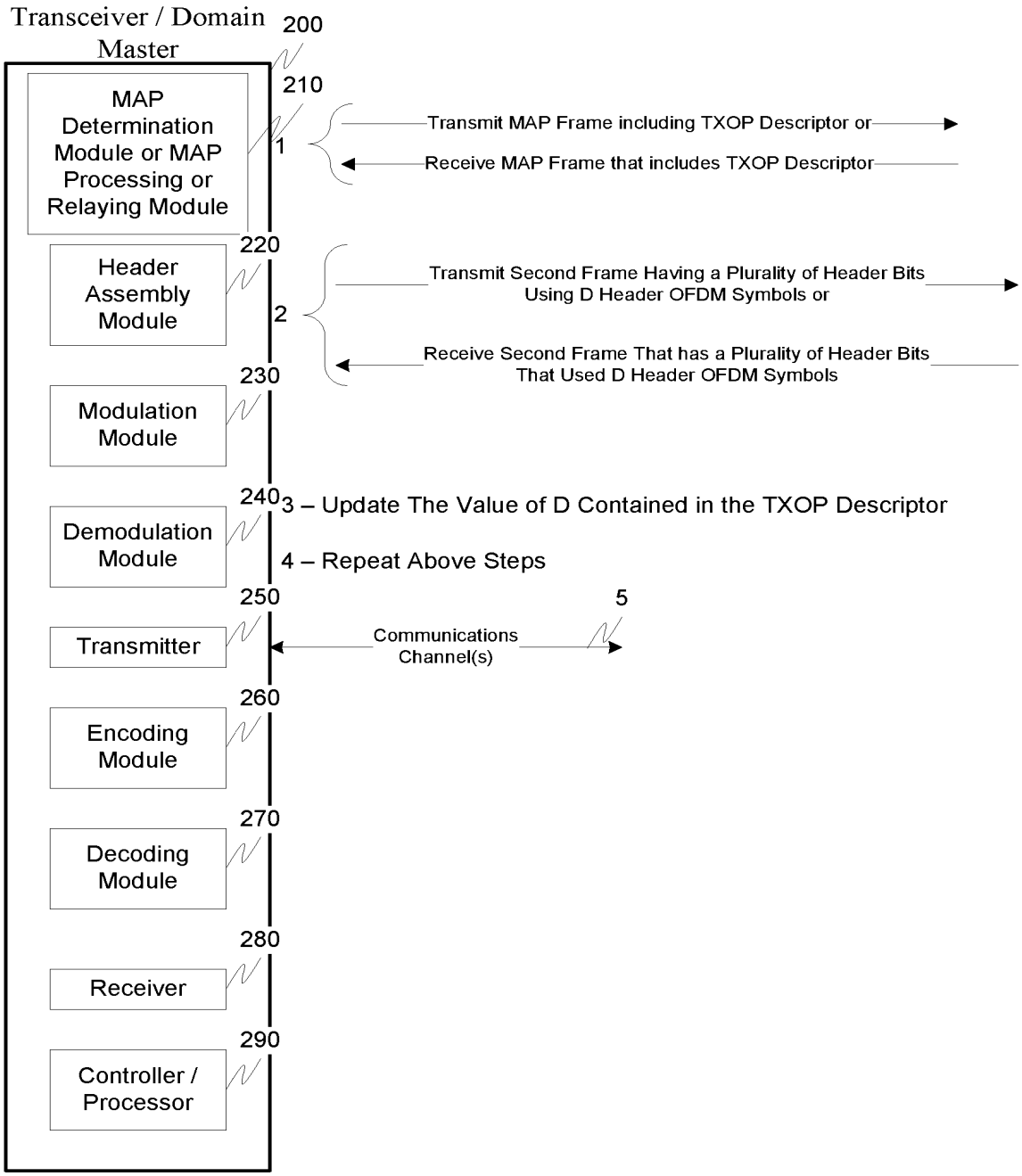
Transceiver / Domain Master
200
MAP Determination Module or MAP Processing or Relaying Module
210
1
Transmit MAP Frame including TXOP Descriptor or
Receive MAP Frame that includes TXOP Descriptor
Header Assembly Module
220
2
Transmit Second Frame Having a Plurality of Header Bits Using D Header OFDM Symbols or
Receive Second Frame That has a Plurality of Header Bits That Used D Header OFDM Symbols
Modulation Module
230
Demodulation Module
240
3 – Update The Value of D Contained in the TXOP Descriptor
4 – Repeat Above Steps
Transmitter
250
Communications Channel(s)
5
Encoding Module
260
Decoding Module
270
Receiver
280
Controller / Processor
290

Fig. 2

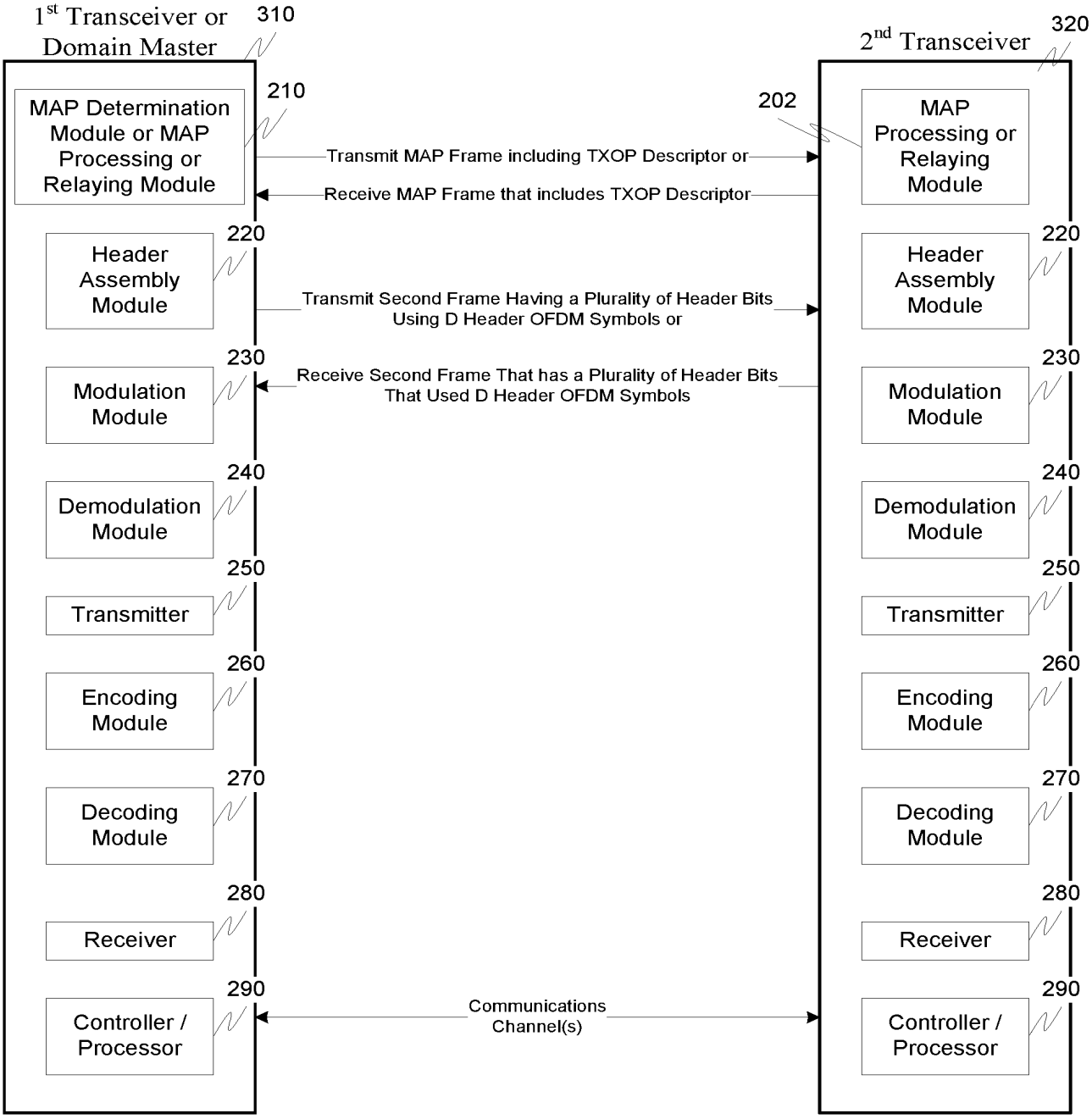
1st Transceiver or Domain Master
310
2nd Transceiver
320
MAP Determination Module or MAP Processing or Relaying Module
210
202
MAP Processing or Relaying Module
Transmit MAP Frame including TXOP Descriptor or
Receive MAP Frame that includes TXOP Descriptor
Header Assembly Module
220
Transmit Second Frame Having a Plurality of Header Bits Using D Header OFDM Symbols or
Modulation Module
230
Receive Second Frame That has a Plurality of Header Bits That Used D Header OFDM Symbols
Demodulation Module
240
Transmitter
250
Encoding Module
260
Decoding Module
270
Receiver
280
Controller / Processor
290
Communications Channel(s)

Fig. 3

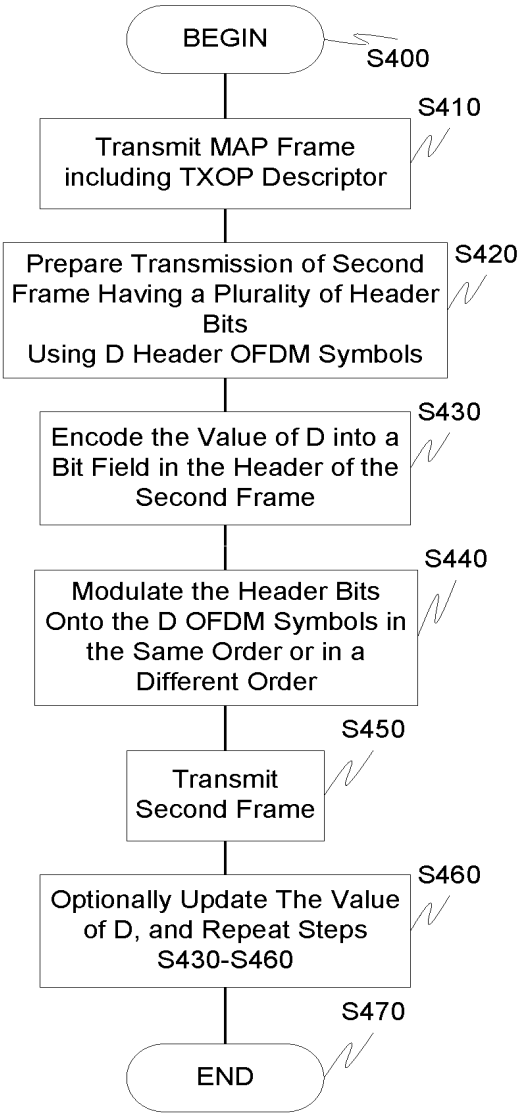
BEGIN
S400
S410
Transmit MAP Frame including TXOP Descriptor
S420
Prepare Transmission of Second Frame Having a Plurality of Header Bits Using D Header OFDM Symbols
S430
Encode the Value of D into a Bit Field in the Header of the Second Frame
S440
Modulate the Header Bits Onto the D OFDM Symbols in the Same Order or in a Different Order
S450
Transmit Second Frame
S460
Optionally Update The Value of D, and Repeat Steps S430-S460
S470
END

Fig. 4

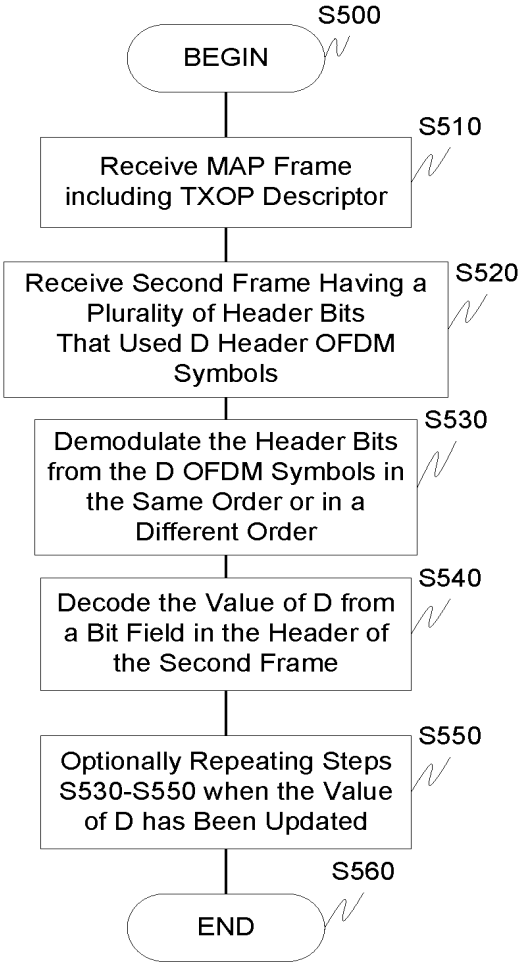
S500
BEGIN
S510
Receive MAP Frame including TXOP Descriptor
S520
Receive Second Frame Having a Plurality of Header Bits That Used D Header OFDM Symbols
S530
Demodulate the Header Bits from the D OFDM Symbols in the Same Order or in a Different Order
S540
Decode the Value of D from a Bit Field in the Header of the Second Frame
S550
Optionally Repeating Steps S530-S550 when the Value of D has Been Updated
S560
END

Fig. 5

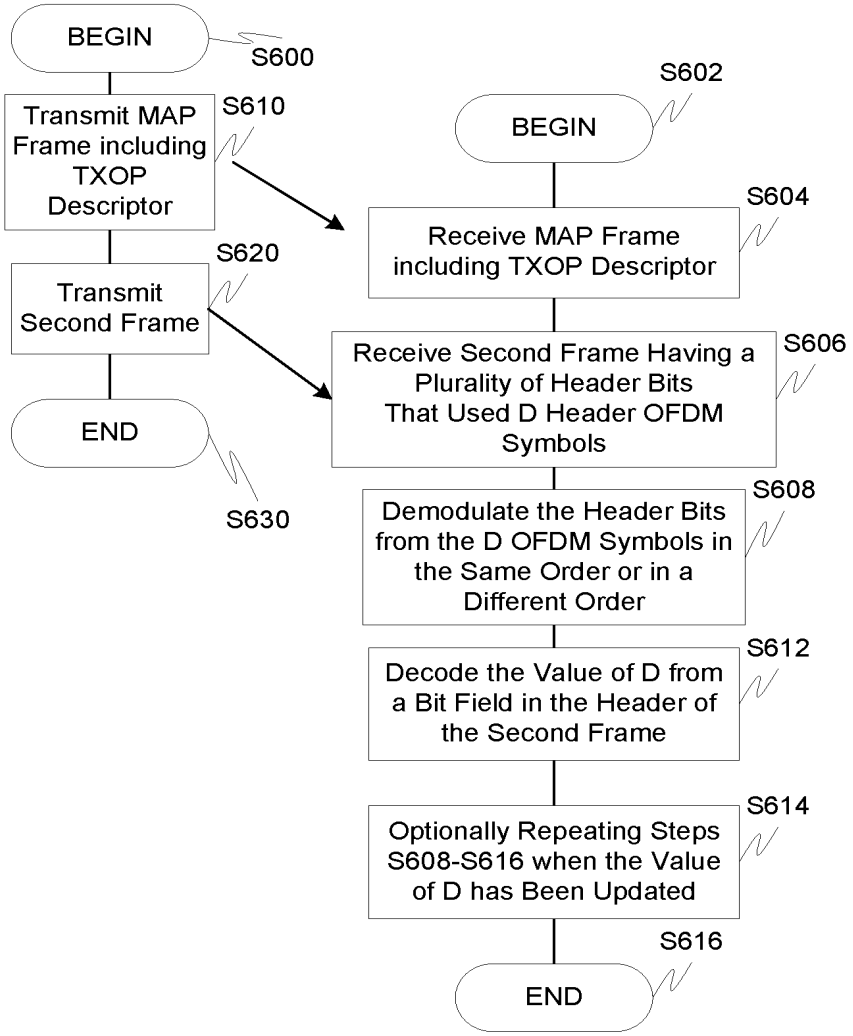
BEGIN
S600
Transmit MAP Frame including TXOP Descriptor
S610
Transmit Second Frame
S620
END
S630
S602
BEGIN
S604
Receive MAP Frame including TXOP Descriptor
S606
Receive Second Frame Having a Plurality of Header Bits That Used D Header OFDM Symbols
S608
Demodulate the Header Bits from the D OFDM Symbols in the Same Order or in a Different Order
S612
Decode the Value of D from a Bit Field in the Header of the Second Frame
S614
Optionally Repeating Steps S608-S616 when the Value of D has Been Updated
S616
END

Fig. 6

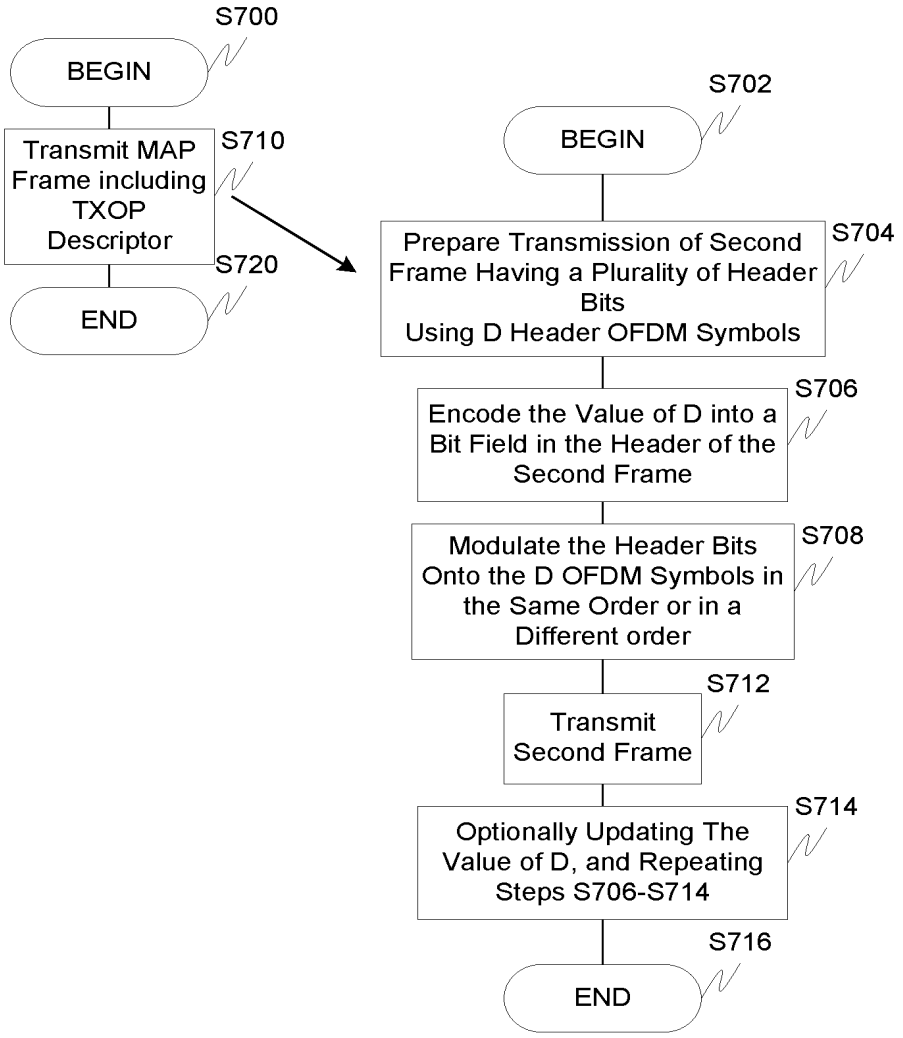
S700
BEGIN
Transmit MAP Frame including TXOP Descriptor
S710
S720
END
S702
BEGIN
Prepare Transmission of Second Frame Having a Plurality of Header Bits Using D Header OFDM Symbols
S704
Encode the Value of D into a Bit Field in the Header of the Second Frame
S706
Modulate the Header Bits Onto the D OFDM Symbols in the Same Order or in a Different order
S708
Transmit Second Frame
S712
Optionally Updating The Value of D, and Repeating Steps S706-S714
S714
END
S716

Fig. 7

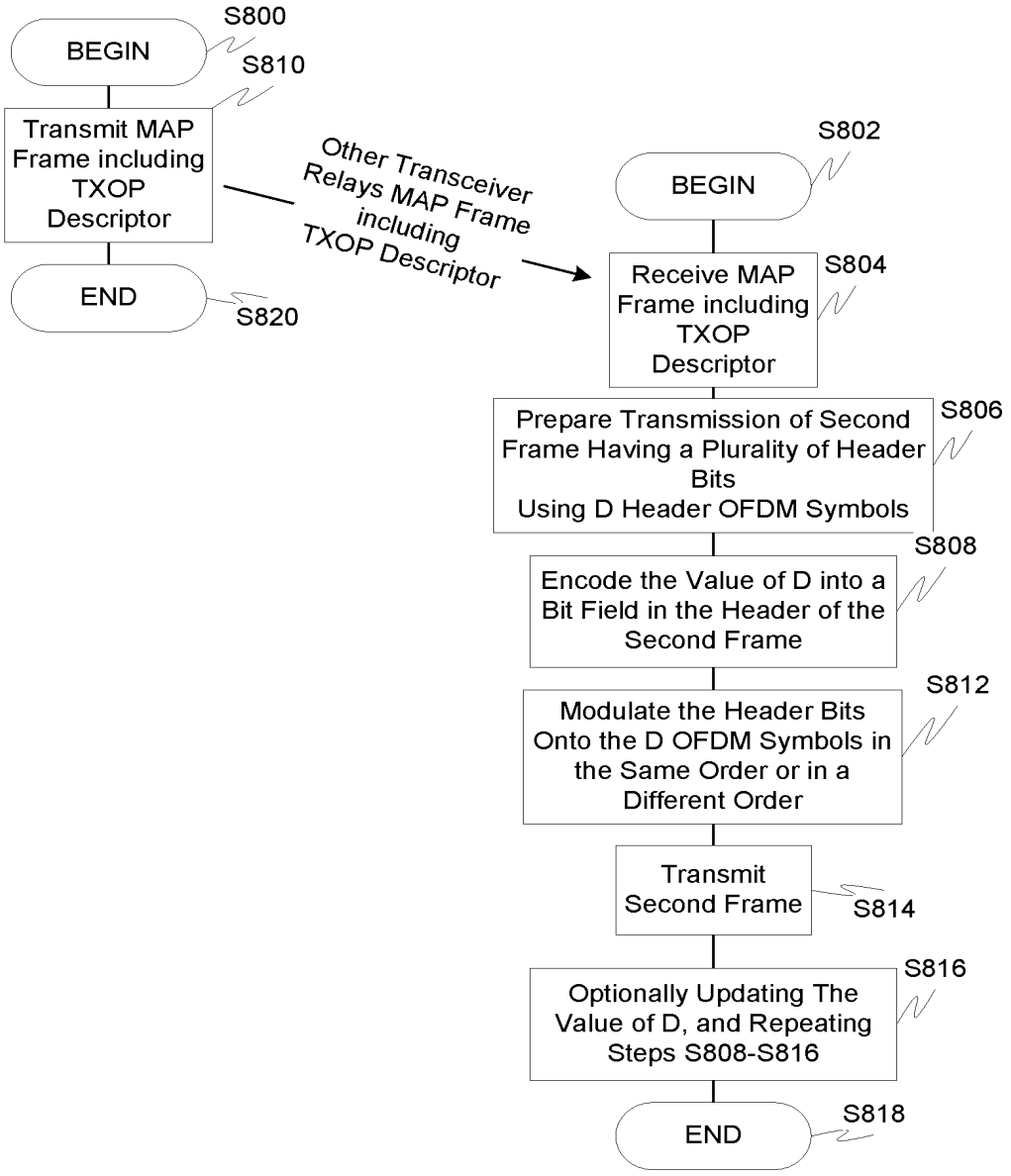
S800
BEGIN
S810
Transmit MAP Frame including TXOP Descriptor
END
S820
Other Transceiver Relays MAP Frame including TXOP Descriptor
S802
BEGIN
S804
Receive MAP Frame including TXOP Descriptor
S806
Prepare Transmission of Second Frame Having a Plurality of Header Bits Using D Header OFDM Symbols
S808
Encode the Value of D into a Bit Field in the Header of the Second Frame
S812
Modulate the Header Bits Onto the D OFDM Symbols in the Same Order or in a Different Order
Transmit Second Frame
S814
S816
Optionally Updating The Value of D, and Repeating Steps S808-S816
S818
END

Fig. 8

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS
First Named Inventor/Applicant Name:	Joon Bae KIM
Filer:	Jason Vick/Joanne Vos
Attorney Docket Number:	8365-87-PUS-CON-7

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	320	320
UTILITY SEARCH FEE	1111	1	700	700
UTILITY EXAMINATION FEE	1311	1	800	800
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1820**

Electronic Acknowledgement Receipt

EFS ID:	41513420
Application Number:	17136801
International Application Number:	
Confirmation Number:	2083
Title of Invention:	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS
First Named Inventor/Applicant Name:	Joon Bae KIM
Customer Number:	62574
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	8365-87-PUS-CON-7
Receipt Date:	29-DEC-2020
Filing Date:	
Time Stamp:	16:20:24
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$1820
RAM confirmation Number	E2020BSG20478389
Deposit Account	191970
Authorized User	Joanne Vos

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.16 (National application filing, search, and examination fees)

37 CFR 1.17 (Patent application and reexamination processing fees)

37 CFR 1.19 (Document supply fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	ADS.pdf	1256815 369f8515b072c6977a14b896d6f69e06da85357f	no	9
Warnings:					
Information:					
2	Oath or Declaration filed	Executed_Declaration.pdf	411867 7709c6e554bbf32454248228e2383f461a600c1a	no	2
Warnings:					
Information:					
3		AMEND_PRELIM_01.pdf	89715 36fc5b75b7107fc6c90878d5d6e9c6932dbfe464	yes	4

Multipart Description/PDF files in .zip description

Document Description	Start	End
Preliminary Amendment	1	1
Specification	2	2
Claims	3	3
Applicant Arguments/Remarks Made in an Amendment	4	4

Warnings:					
Information:					
4		SpecificationFINAL.pdf	144119 a976d2e9ee030a407177655fcd842222a0a8be9f	yes	26

Multipart Description/PDF files in .zip description

Document Description	Start	End

	Specification		1	18	
	Claims		19	25	
	Abstract		26	26	
Warnings:					
Information:					
5	Drawings-only black and white line drawings	FiguresFINAL.pdf	129265 8b69029618a1550618762699e85c2700efa54cf8	no	8
Warnings:					
Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	34969 c23345c3c6b55dcb2e46a13a8c0be97af40c03d3	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	2066750		

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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 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	8365-87-PUS-CON-7
	Application Number	
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

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
	Joon	Bae	KIM	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	Lexington	State/Province	MA	Country of Residence i	US

Mailing Address of Inventor:

Address 1	14 Pine Knoll Road		
Address 2			
City	Lexington	State/Province	MA
Postal Code	02420	Country i	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Marcos	C.	TZANNES	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

City	Petaluma	State/Province	CA	Country of Residence i	US

Mailing Address of Inventor:

Address 1	1943 Castle Dr.		
Address 2			
City	Petaluma	State/Province	CA
Postal Code	94954	Country i	US

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).

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	8365-87-PUS-CON-7
	Application Number	
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	62574		
Email Address	jvick@sheridanross.com	Add Email	Remove Email

Application Information:

Title of the Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS		
Attorney Docket Number	8365-87-PUS-CON-7	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	8	**Suggested Figure for Publication (if any)**	

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	62574		

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	8365-87-PUS-CON-7
	Application Number	
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

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)
	Continuation of	16/780589	2020-02-03

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16/780589	Continuation of	16/394490	2019-04-25	10554459	2020-02-04

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16/394490	Continuation of	16/125206	2018-09-07	10291449	2019-05-14

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16/125206	Continuation of	15/958519	2018-04-20	10079707	2018-09-18

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15/958519	Continuation of	15/476284	2017-03-31	9973361	2018-05-15

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15/476284	Continuation of	15/350418	2016-11-14	9614566	2017-04-04

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15/350418	Continuation of	13/376856	2012-02-08	9584262	2017-02-28

Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
13/376856	a 371 of international	PCT/US2010/046088	2010-08-20

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	8365-87-PUS-CON-7
	Application Number	
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
PCT/US2010/046088	Claims benefit of provisional	61/235909	2009-08-21
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.			Add

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).

			Remove
Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.			Add

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	8365-87-PUS-CON-7
	Application Number	
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

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.

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	8365-87-PUS-CON-7
	Application Number	
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

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	APPLIED TRANSFORM, LLC		
Mailing Address Information For Applicant:			
Address 1	101 Great Road		
Address 2	Suite 217		
City	Bedford	**State/Province**	MA
Country	US	Postal Code	01730
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.

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	8365-87-PUS-CON-7
	Application Number	
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

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:

Remove

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	/Jason H. Vick/			Date (YYYY-MM-DD)	2020-12-29
First Name	Jason H.	Last Name	Vick	Registration Number	45285

Additional Signature may be generated within this form by selecting the Add button. Add

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	8365-87-PUS-CON-7
	Application Number	
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

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 CooperationTreaty.

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.

PTO/AIA/01 (06-12)
Approved for use through 01/31/2014. OMB 0651-0032
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 displays a valid OMB control number.

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

Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS

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: Joon Bae Kim Date (Optional): 5/4/16

Signature: Joon Bae Kim

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.

PTO/AIA/01 (06-12)
Approved for use through 01/31/2014. OMB 0651-0032
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 displays a valid OMB control number.

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

Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS

As the below named inventor, I hereby declare that:

This declaration is directed to:

- [x] 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: Marcos C. Tzannes Date (Optional) :_____

Signature: _____

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.

PTO/AIA/80 (07-12)
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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 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: 62574

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 assignments 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: 62574

OR

[ ]	Firm or Individual Name			
	Address			
	City		State	Zip
	Country			
	Telephone		Email	

Assignee Name and Address: APPLIED TRANSFORM, LLC
101 Great Road, Suite 217
Bedford, MA 01730

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	5/3/2016
Name	Marcos Tzannes	Telephone	
Title			

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 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 800-PTO-9199 and select option 2.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:	Group Art Unit:
Joon Bae KIM	Confirmation No.: 2083
Serial No.: 17/136,801	Examiner:
Filed: December 29, 2020	
Atty File No.: 8365-87-PUS-CON-7	INFORMATION DISCLOSURE STATEMENT
Entitled: "HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS"	Electronically Submitted

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

Dear Commissioner:

The references cited on attached Form PTO-1449 are being called to the attention of the Examiner.

☒ Copies of the cited non-patent and/or foreign references are enclosed herewith.

☐ Copies of the cited U.S. patents and/or patent applications are enclosed herewith.

☒ Copies of the cited U.S. patents/unpublished patent applications/patent application publications are not enclosed in accordance with 37 C.F.R. § 1.98(a).

☐ Copies of the cited references are not enclosed, in accordance with 37 C.F.R. § 1.98(d), because the references were cited by or submitted to the U.S. Patent and Trademark Office in prior application Serial No. _____ filed _____, which is relied upon for an earlier filing date under 35 U.S.C. § 120.

☒ To the best of applicants' belief, the pertinence of the foreign-language references are believed to be summarized in the attached English translation/abstracts and/or in the figures, although applicants do not necessarily vouch for the accuracy of the translation.

☒ Examiner's attention is drawn to the following related applications:

- Serial No. 13/376,856 filed Feb. 8, 2012 US Patent No. 9,584,262 (Attorney Ref. No. 8365-87-PUS)
- Serial No. 15/350,418 filed Nov. 14, 2016 US Patent No. 9,614,566 (Attorney Ref. No. 8365-87-PUS-CON)

- Serial No. 15/476,284 filed Mar 31, 2017 US Patent No. 9,973,361 (Attorney Ref. No. 8365-87-PUS-CON-2)
- Serial No. 15/958,519 filed Apr. 20, 2018 US Patent No. 10,079,707 (Attorney Ref. No. 8365-87-PUS-CON-3)
- Serial No. 16/125,206 filed Sept. 7, 2018 US Patent No. 10,291,449 (Attorney Ref. No. 8365-87-PUS-CON-4)
- Serial No. 16/394,490 filed Apr. 25, 2019 US Patent No. 10,554,459 (Attorney Ref. No. 8365-87-PUS-CON-5)
- Serial No. 16/780,589 filed Feb. 3, 2020 (Attorney Ref. No. 8365-87-PUS-CON-6)

☐ Other: _____

Submission of the above information is not intended as an admission that any item is citable under the statutes or rules to support a rejection, that any item disclosed represents analogous art, or that those skilled in the art would refer to or recognize the pertinence of any reference without the benefit of hindsight, nor should an inference be drawn as to the pertinence of the references based on the order in which they are presented. Submission of this statement should not be taken as an indication that a search has been conducted, or that no better art exists.

It is respectfully requested that the cited information be expressly considered during the prosecution of this application and the references made of record therein.

FEES

☒	**37 CFR 1.97(b):** No fee is believed due in connection with this submission, because the information disclosure statement submitted herewith is satisfied by one of the following conditions ("X" indicates satisfaction): ☐ Within three months of the filing date of a national application other than a continued prosecution application under 37 CFR 1.53(d), or ☐ Within three months of the date of entry into the national stage of an international application as set forth in 37 CFR 1.491 or ☒ Before the mailing date of a first Office Action on the merits, or ☐ Before the mailing of a first Office action after the filing of a request for continued examination under 37 CFR 1.114. Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970.
☐	**37 CFR 1.97(c):** The information disclosure statement transmitted herewith is being filed after all the above conditions (37 CFR 1.97(b)), but before the mailing date of one of the following conditions: (1) a final action under 37 C.F.R. 1.113 or (2) a notice of allowance under 37 C.F.R. 1.311, or (3) an action that otherwise closes prosecution in the application. This Information Disclosure Statement is accompanied by:

	☐ A Certification (below) as specified by 37 C.F.R. 1.97(e). Although no fee is believed due, if any fee is deemed due in connection with this submission, please charge such fee to Deposit Account 19-1970. OR ☐ Please charge Deposit Account 19-1970 in the amount of $260.00 for the fee set forth in 37 C.F.R. 1.17(p) for submission of an information disclosure statement. Please credit any overpayment or charge any underpayment to Deposit Account 19-1970.
☐	**37 CFR 1.97(d):** This Information Disclosure Statement is being submitted after the period specified in 37 CFR 1.97(c). ☐ This information Disclosure Statement includes a Certification (below) as specified by 37 C.F.R. 1.97(e) AND ☐ Applicants hereby requests consideration of the reference(s) disclosed herein. Please charge Deposit Account 19-1970 in the amount of $260.00 under 37 C.F.R. 1.17(p). Please credit any overpayment or charge any underpayment to Deposit Account 19-1970. Election to pay the fee should not be taken as an indication that applicant(s) cannot execute a certification.

Certification (37 C.F.R. 1.97(e))

(Applicable only if checked)

☐ The undersigned certifies that:

☐ Each item of information contained in this 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 this statement. 37 C.F.R. 1.97(e)(1).

☐ A copy of the communication from the foreign patent office is enclosed.

OR

☐ No item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the undersigned after making reasonable inquiry, no item of information contained in this Information Disclosure Statement was known to any individual designated in 37 C.F.R. 1.56(c) more than three months prior to the filing of this statement. 37 C.F.R. 1.97(e)(2).

Respectfully submitted,

SHERIDAN ROSS P.C.

Date: December 29, 2020

By: /Jason H. Vick/

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jvick@sheridanross.com

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/136,801
				Filing Date	December 29, 2020
				First Named Inventor	Joon Bae KIM
				Art Unit	
				Examiner Name	
Sheet	1	of	5	Attorney Docket Number	8365-87-PUS-CON-7

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	6567383	05-20-2003	Bohnke	
	2	6580713	06-17-2003	Abe	
	3	6671284	12-30-2003	Yonge, III et al.	
	4	8266488	09-11-2012	Spencer	
	5	9584262	02-28-2017	Kim et al.	
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	11	2003/0072255	04-17-2003	Ma et al.	
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	14	2005/0135318	06-23-2005	Walton et al.	
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	16	2005/0169261	08-04-2005	Williams et al.	
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	18	2005/0195765	09-08-2005	Sharon et al.	
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	27	2010/0260137	10-14-2010	Vrzic et al.	
	28	2020/0169438	05-28-2020	Kim et al.	

Examiner Signature		Date Considered	

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

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/136,801
				Filing Date	December 29, 2020
				First Named Inventor	Joon Bae KIM
				Art Unit	
				Examiner Name	
Sheet	2	of	5	Attorney Docket Number	8365-87-PUS-CON-7

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	29	CN 1941665	04-04-2007	HUAWEI TECH CO LTD		(Believed to correspond to US Publication No. 2008/0219229 cited herein)
	30	CN 101433022	05-13-2009	INTERDIGITAL TECH CORP		(Believed to correspond to International Publication No. WO 2007/127311 cited herein)
	31	EP 1392025	02-25-2004	Kabushiki Kaisha Toyota Jidoshokki Kariya-Shi		
	32	WO 2007/127311	11-08-2007	Interdigital Technology Corporation		

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	33	"IEEE 802.3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications" December 2008; 2977 pages
	34	"IEEE 802.11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications" June 2007; 1233 pages
	35	"IEEE 802.16: Air Interface for Fixed Broadband Wireless Access Systems" October 2004; 895 pages.
	36	"ITU G.9960: Unified High-Speed Wire-Line Based Home Networking Transceivers - Foundation" October 2009; 112 pages

Examiner Signature		Date Considered	

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Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/136,801
				Filing Date	December 29, 2020
				First Named Inventor	Joon Bae KIM
				Art Unit	
				Examiner Name	
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	37	ITU-T Recommendation G.9960 "Unified High-Speed Wire-Line Based Home Networking Transceivers - Foundation" XP044232807; pages 1-107; August 2009
	38	"ITU Standard G.997.1: Physical Layer Management for Digital Subscriber Line (DSL) Transceivers" April 2009; 128 pages
	39	ITU - Telecommunication Standardization Sector - Study Group 15 "G.hn: 09CC-R12 HomePlug AV Interoperability Updates" Intellon Corporation, France Telecom, Gigle Semiconductor, Motorola, SPiDCOM; August 2009; 5 pages
	40	ITU - Telecommunication Standardization Sector "G.hn: Proposal for Detailed Text on the Media Access Plan (MAP)" Temporary Document 8AB-077; Aharona Lurie Coppergate Communications Diego Arlandis DS2: Study Period 2005-2008, International Telecommunication Union, Geneva, CH, Vol. 4/15, 16-20 June 2008, pages 1-13
	41	Aware, Inc., "G.hn: PHY-Frame Header Extension," ITU-T SG15/Q4 09CC-046, Concord, California, Aug. 2009
	42	CopperGate Communications, "G.hn: Using Two Symbols for the Header of a PHY frame on Coax," ITU-T SG15/Q4 09XC-100, Xian, China, Jul. 2009.
	43	Editor for G.9960, "ITU-T Recommendation G.9960: Next generation wire-line based home networking transceivers – Foundation," ITU-T SG15/Q4, Jan. 2009.
	44	Intellon, Corporation, "G.hn: Extended PHY frame header," ITU-T SG15/Q4 09XC-119, Xian, China, Jul. 2009
	45	OKSMAN, et al. "G.hn: The New ITU-T Home Networking Standard" IEEE Communications Magazine, IEEE Service Center, Piscataway, US, Vol 47, No. 10, October 1, 2009, pages 138-145 XP011283328
	46	International Search Report for International (PCT) Application No. PCT/US2010/046088, mailed Dec. 22, 2010 (Attorney Ref. No.: 8365-87-PCT)
	47	Written Opinion for International (PCT) Application No. PCT/US2010/046088, mailed Dec. 22, 2010 (Attorney Ref. No.: 8365-87-PCT)
	48	International Preliminary Report on Patentability for International (PCT) Application No. PCT/US2010/046088, mailed March 1, 2012 (Attorney Ref. No.: 8365-87-PCT)
	49	Official Action (including translation) for Chinese Patent Application No. 201080037081.2, mailed December 4, 2013 (Attorney Ref. No.: 8365-87-PCN)
	50	Official Action (including translation) for Chinese Patent Application No. 201080037081.2, mailed July 3, 2014 (Attorney Ref. No.: 8365-87-PCN)
	51	Official Action (including translation) for Chinese Patent Application No. 201080037081.2, mailed March 23, 2015 (Attorney Ref. No.: 8365-87-PCN)

Examiner Signature		Date Considered	

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

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/136,801
				Filing Date	December 29, 2020
				First Named Inventor	Joon Bae KIM
				Art Unit	
				Examiner Name	
Sheet	4	of	5	Attorney Docket Number	8365-87-PUS-CON-7

	52	Notification to Grant the Patent (including translation) for Chinese Patent Application No. 201080037081.2, mailed Oct. 26, 2015 (Attorney Ref. No.: 8365-87-PCN)
	53	Official Action for Chinese Patent Application No. 201610015747.3, mailed June 4, 2018 (Attorney Ref. No.: 8365-87-PCN-DIV)
	54	Official Action (Including Translation) for Chinese Patent Application No. 201610015747.3, mailed April 23, 2019 (Attorney Ref. No.: 8365-87-PCN-DIV)
	55	Communication Pursuant to Rules 161(1) and 162 EPC for European Patent Application No. 10748023.8, mailed April 18, 2012 (Attorney Ref. No.: 8365-87-PEP)
	56	Office Action for European Patent Application No. 10748023.8, mailed Feb. 17, 2015 (Attorney Ref. No.: 8365-87-PEP)
	57	Office Action for European Patent Application No. 10748023.8, mailed July 23, 2018 (Attorney Ref. No.: 8365-87-PEP)
	58	Summons to Attend Oral Proceedings for European Patent Application No. 10748023.8, mailed June 4, 2019 (Attorney Ref. No.: 8365-87-PEP)
	59	Office Action for U.S. Patent Application No. 13/376,856, mailed June 17, 2014 (Attorney Ref. No.: 8365-87-PUS)
	60	Office Action for U.S. Patent Application No. 13/376,856, mailed Feb. 24, 2015 (Attorney Ref. No.: 8365-87-PUS)
	61	Office Action for U.S. Patent Application No. 13/376,856, mailed Dec. 31, 2015 (Attorney Ref. No.: 8365-87-PUS)
	62	Office Action for U.S. Patent Application No. 13/376,856, mailed Aug. 18, 2016 (Attorney Ref. No.: 8365-87-PUS)
	63	Notice of Allowance for U.S. Patent Application No. 13/376,856, mailed Sept. 27, 2016 (Attorney Ref. No.: 8365-87-PUS)
	64	Office Action (Ex Parte Quayle Action) for U.S. Patent Application No. 15/350,418 mailed Jan. 13, 2017 (Attorney Ref. No.: 8365-87-PUS-CON)
	65	Notice of Allowance for U.S. Patent Application No. 15/350,418 mailed Feb. 10, 2017 (Attorney Ref. No.: 8365-87-PUS-CON)
	66	Office Action for U.S. Patent Application No. 15/476,284 mailed Sept. 15, 2017 (Attorney Ref. No.: 8365-87-PUS-CON-2)
	67	Notice of Allowance for U.S. Patent Application No. 15/476,284 mailed January 8, 2018 (Attorney Ref. No.: 8365-87-PUS-CON-2)

Examiner Signature		Date Considered	

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Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Complete if Known	
Application Number	17/136,801
Filing Date	December 29, 2020
First Named Inventor	Joon Bae KIM
Art Unit	
Examiner Name	
Attorney Docket Number	8365-87-PUS-CON-7

Sheet	5	of	5

	68	Notice of Allowance for U.S. Patent Application No. 15/958,519 mailed July 18, 2018 (Attorney Ref. No.: 8365-87-PUS-CON-3)
	69	Office Action for U.S. Patent Application No. 16/125,206 mailed November 13, 2018 (Attorney Ref. No.: 8365-87-PUS-CON-4)
	70	Notice of Allowance for U.S. Patent Application No. 16/125,206 mailed January 30, 2019 (Attorney Ref. No.: 8365-87-PUS-CON-4)
	71	Office Action for US App No. 16/394,490, mailed June 11, 2019 (Attorney Ref. No.: 8365-87-PUS-CON-5)
	72	Notice of Allowance for US App No. 16/394,490, mailed September 23, 2019 (Attorney Ref. No.: 8365-87-PUS-CON-5)
	73	Office Action for US Application No. 16/780,589, mailed June 23, 2020 (Attorney Ref. No. 8365-87-PUS-CON-6)
	74	Office Action for US Application No. 16/780,589, mailed October 7, 2020 (Attorney Ref. No. 8365-87-PUS-CON-6)
	75	Notice of Allowance for US Application No. 16/780,589, mailed December 23, 2020, 2020 (Attorney Ref. No. 8365-87-PUS-CON-6)

Examiner Signature		Date Considered	

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

Electronic Acknowledgement Receipt

EFS ID:	41513921
Application Number:	17136801
International Application Number:	
Confirmation Number:	2083
Title of Invention:	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS
First Named Inventor/Applicant Name:	Joon Bae KIM
Correspondence Address:	Jason H. Vick Sheridan Ross, PC Suite # 1200 1560 Broadway Denver CO 80202 US 303-863-9700 jvick@sheridanross.com
Filer:	Jason Vick/Joanne Vos
Filer Authorized By:	Jason Vick
Attorney Docket Number:	8365-87-PUS-CON-7
Receipt Date:	29-DEC-2020
Filing Date:	
Time Stamp:	16:45:58
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		Statement_Under_373c_w_POA.pdf	145985 1e54ca573859d7b5413045ee1a01dff75c7c6f22	yes	3
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Assignee showing of ownership per 37 CFR 3.73		1	2	
	Power of Attorney		3	3	
Warnings:					
Information:					
2		IDS_01.pdf	248953 519b3914b0b19ff8896b57f991ed79aeed43025e	yes	9
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Letter specifying the conditions for filing under 37CFR1.97		1	4	
	Information Disclosure Statement (IDS) Form (SB08)		5	9	
Warnings:					
Information:					
3	Foreign Reference	CN1941665A.pdf	1276919 8c3619c64d10b47fd7e22a1f2695e028dcd3e043	no	28
Warnings:					
Information:					
4	Foreign Reference	CN101433022A.pdf	1072519 286727800c9f0f26cbe144072094d8347d227e13	no	24
Warnings:					
Information:					
5	Foreign Reference	EP1392025.pdf	955419 7fdd1d0848d1f48809a14ef8289829d07e2a00ec	no	23
Warnings:					

Information:					
6	Foreign Reference	WO2007127311.pdf	1010429 8d3cbf848f60b81005690ca6f24b7fad6845e4ab	no	26
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7	Non Patent Literature	IEEE_Standard_802-3_Dec_2008.pdf	13139221 2a0c4572203d5822ecc0092264f3a8d9374325c4	no	2977
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8	Non Patent Literature	IEEE_Standard_802-11_June_2007.pdf	14782595 b9bf12e06cbd43bdea6072759a9a6ccb4daca03b	no	1233
Warnings:					
Information:					
9	Non Patent Literature	IEEE_Standard_802-16_Oct_2004_pps_1-599.pdf	23683231 17f90388f2acfc4f7ce3c57619c869c090be0193	no	599
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10	Non Patent Literature	IEEE_Standard_802-16_Oct_2004_pp_600-895.pdf	11894824 b89fccacc7c57fc2eed52a99422763c6c05dfb95	no	296
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11	Non Patent Literature	ITU-T_Recommendation_G-9960_10-2009.pdf	1380440 1b4aa99ff2ccfd7092cbce6d7fda8e686a0ceebd	no	112
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12	Non Patent Literature	ITU_G9960_08-2009.pdf	5211237 fb00d2be4541c0f872b88d07df7e1174cf5656e8	no	107
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Information:					

13	Non Patent Literature	ITU-T_Recommendation_G997-1_04-2009.pdf	6546526 581dfb6102fd4d2292eeff7ebd5230ed51e1dad5	no	128
Warnings:					
Information:					
14	Non Patent Literature	ITU_Study_15_Ghn_09CC-R12.pdf	4882105 40545c3f624599d57303e0cf4d1125c05bb56720	no	5
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15	Non Patent Literature	ITU_Ghn_Proposal_for_Detailed_Text_on_the_Media_Access_Plan.pdf	11107429 fd412db3ba2c0776528969530c2e144856db5ff7	no	13
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16	Non Patent Literature	Aware_Ghn_PHY_Frame_Header_Extension_Aug_2009.pdf	93474 2e9239cf0433f5a9fc8f19e0b871e1b95bec4683	no	7
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17	Non Patent Literature	Coppergate_Ghn_Using_2_Symbols_July_2009.pdf	59225 0aad728b741dee9a658c97ce0dbecf86e49c9e00	no	3
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Information:					
18	Non Patent Literature	Editor_G_9960_Next_Generation_Jan_2009.pdf	973399 3fd4423ac00e96b526aad0294752a32859091233	no	106
Warnings:					
Information:					
19	Non Patent Literature	Intellon_Ghn_Extended_PHY_Frame_Header_July_2009.pdf	74802 b452a9e685b7fd1a0e1347cb7c84d0cef488a3b9	no	4
Warnings:					
Information:					

20	Non Patent Literature	Oksman_Ghn_The_New_ITU-T_Home_Networking_Standard.pdf	1602866 bb850758afc49561f4fce83a1ba20644db9b1d3a	no	8
Warnings:					
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21	Non Patent Literature	8365-87-PCT_ISR_12-22-2010.pdf	657593 86c2e09412e59f92a1aeb85022fb17d99a9e9274	no	7
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Information:					
22	Non Patent Literature	8365-87-PCT_WO_12-22-2010.pdf	848629 dafc015ea04eae43d8d0efc523f3188b0c4a332b	no	9
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23	Non Patent Literature	8365-87-PCT_IPRP_03-01-2012.pdf	420547 1d7e536aed43af7c289074350cdb5ef65f70bc4b	no	9
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Information:					
24	Non Patent Literature	8365-87-PCN_OA_12-04-2013.pdf	216234 345fe001bd81e466aa1afef97dc7159c2b324908	no	8
Warnings:					
Information:					
25	Non Patent Literature	8365-87-PCN_OA_07-03-2014.pdf	808348 f26adb1429739b5ecf193e8297fb99741613db2b	no	12
Warnings:					
Information:					
26	Non Patent Literature	8365-87-PCN_OA_03-23-2015.pdf	381289 796720202f9451b200e30d4455bec36f2232e331	no	7
Warnings:					
Information:					

27	Non Patent Literature	8365-87-PCN_NOA_10-26-2015.pdf	196835 97facd3a37a9af7f7353be229878eee457f60261	no	2
Warnings:					
Information:					
28	Non Patent Literature	8365-87-PCN-DIV_OA_06-04-2018.pdf	723027 2959e3b8b991a8d7255908016f61bbe905ab5df7	no	12
Warnings:					
Information:					
29	Non Patent Literature	8365-87-PCN-DIV_OA_04-23-2019.pdf	326592 9bff8d7c8a03f6372229dcf74cd7b250015886ea	no	6
Warnings:					
Information:					
30	Non Patent Literature	8365-87-PEP_OA_04-18-2012.pdf	102910 8587a647457e0f1314f8e7bf5ad3622f01bc7330	no	2
Warnings:					
Information:					
31	Non Patent Literature	8365-87-PEP_OA_02-17-2015.pdf	2570634 5d4f3cd1e7bb98adf3dca272ad3338cd14af5749	no	4
Warnings:					
Information:					
32	Non Patent Literature	8365-87-PEP_OA_07-23-2018.pdf	5140360 039e7ec0079d009ef0e5cacf289d6c298020c2ec	no	6
Warnings:					
Information:					
33	Non Patent Literature	8365-87-PEP_Summons_06-04-2019.pdf	8544332 01e7fcb91370102c80114d7d7e6528428003651f	no	9
Warnings:					
Information:					

34	Non Patent Literature	8365-87-PUS_OA_06-17-2014.pdf	306937 7c72d505927935f721a316a64c267b6a1dccefbd	no	9
Warnings:					
Information:					
35	Non Patent Literature	8365-87-PUS_OA_02-24-2015.pdf	322464 d20f1b002ca6a1ef4c8c19154ce1df603e644701	no	10
Warnings:					
Information:					
36	Non Patent Literature	8365-87-PUS_OA_12-31-2015.pdf	622274 85ed9ec7499aec4b8ce7d160dfdb607cbdfa9798	no	17
Warnings:					
Information:					
37	Non Patent Literature	8365-87-PUS_OA_08-18-2016.pdf	255296 8067020f7bb94a6cea84c7237653e6322a0a3c06	no	8
Warnings:					
Information:					
38	Non Patent Literature	8365-87-PUS_NOA_09-27-2016.pdf	679923 511c733e16b8476714e4e0d18d007d3c0841ecec	no	16
Warnings:					
Information:					
39	Non Patent Literature	8365-87-PUS-CON_OA_01-13-2017.pdf	200670 f4dd202e54ce2f3ab18406b1fe44910e72cb0eb4	no	6
Warnings:					
Information:					
40	Non Patent Literature	8365-87-PUS-CON_NOA_02-10-2017.pdf	420797 f6a2132b734e63f09d9b22dd767ddfdf71fce4ee	no	7
Warnings:					
Information:					

41	Non Patent Literature	8365-87-PUS-CON-2_OA_09-15-2017.pdf	314063 c13beadeee5da95bd05a565c207bcbc71e6cb1be	no	9
Warnings:					
Information:					
42	Non Patent Literature	8365-87-PUS-CON-2_NOA_01-08-2018.pdf	458471 07c99451e950745528044db4296cda81d2aa71a8	no	9
Warnings:					
Information:					
43	Non Patent Literature	8365-87-PUS-CON-3_NOA_07-18-2018.pdf	461888 ab066b56e28cb9e4411d7fd39182dc6d502fa170	no	9
Warnings:					
Information:					
44	Non Patent Literature	8365-87-PUS-CON-4_OA_11-13-2018.pdf	244784 156a89d1cd6539ad315fd642b29cf06dda3a7297	no	7
Warnings:					
Information:					
45	Non Patent Literature	8365-87-PUS-CON-4_NOA_01-30-2019.pdf	419307 9a1b9bc540fbcb987eb816ffeb6a619511ffab50	no	7
Warnings:					
Information:					
46	Non Patent Literature	8365-87-PUS-CON-5_OA_06-11-2019.pdf	247705 028186d18fd42540458f7e6a4c7803b86deee14e	no	7
Warnings:					
Information:					
47	Non Patent Literature	8365-87-PUS-CON-5_NOA_09-23-2019.pdf	426537 aee75093908b07094c970cdd041aa0175644d293	no	7
Warnings:					
Information:					

48	Non Patent Literature	8365-87-PUS-CON-6_OA_06-23-2020.pdf	279086 26457822019666999b80d0a4786bab036bef0017	no	8
Warnings:					
Information:					
49	Non Patent Literature	8365-87-PUS-CON-6_OA_10-07-2020.pdf	963720 ecc8b253d98d80196070bcc240263dfc485e4f65	no	21
Warnings:					
Information:					
50	Non Patent Literature	8365-87-PUS-CON-6_NOA_12-23-2020.pdf	417683 865e26084d53b66229655b3b0c5051edfd31f30d	no	7
Warnings:					
Information:					
			Total Files Size (in bytes):	128120533	

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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.

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STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: APPLIED TRANSFORM, LLC

Application No./Patent No.: 17/136,801 Filed/Issue Date: December 29, 2020

Titled: HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS

APPLIED TRANSFORM, 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: Joon Bae Kim and Marcos Tzannes To: AWARE, INC.

   The document was recorded in the United States Patent and Trademark Office at Reel 028591, Frame 0605, or for which a copy thereof is attached.

2. From: AWARE, INC. To: APPLIED TRANSFORM, LLC

   The document was recorded in the United States Patent and Trademark Office at Reel 037491, Frame 0053, or for which a copy thereof is attached.

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.

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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

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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.

/Jason H. Vick/	December 29, 2020
Signature	Date
Jason H. Vick	45,285
Printed or Typed Name	Title or Registration Number

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 17/136,801

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	320
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	700
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	800
TOTAL CLAIMS (37 CFR 1.16(i))	1 minus 20 =	*			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*				x 480 =	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
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1820

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
AMENDMENT A	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
AMENDMENT A	Application Size Fee (37 CFR 1.16(s))									
AMENDMENT A	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)	OR	RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
AMENDMENT B	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
AMENDMENT B	Application Size Fee (37 CFR 1.16(s))									
AMENDMENT B	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
17/136,801	12/29/2020	2185	1820	8365-87-PUS-CON-7	1	1

CONFIRMATION NO. 2083

FILING RECEIPT

OC000000122857879

62574
Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202

Date Mailed: 01/14/2021

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.

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Inventor(s)

Joon Bae KIM, Lexington, MA;
Marcos C. TZANNES, Petaluma, CA;

Applicant(s)

APPLIED TRANSFORM, LLC, Bedford, MA;

Power of Attorney: The patent practitioners associated with Customer Number 62574

Domestic Priority data as claimed by applicant

This application is a CON of 16/780,589 02/03/2020
which is a CON of 16/394,490 04/25/2019 PAT 10554459
which is a CON of 16/125,206 09/07/2018 PAT 10291449
which is a CON of 15/958,519 04/20/2018 PAT 10079707
which is a CON of 15/476,284 03/31/2017 PAT 9973361
which is a CON of 15/350,418 11/14/2016 PAT 9614566
which is a CON of 13/376,856 02/08/2012 PAT 9584262
which is a 371 of PCT/US2010/046088 08/20/2010
which claims benefit of 61/235,909 08/21/2009

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: 01/13/2021

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/136,801**

Projected Publication Date: 04/22/2021

Non-Publication Request: No

Early Publication Request: No

Title

HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS

Preliminary Class

710

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

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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.

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Title 37, Code of Federal Regulations, 5.11 & 5.15

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Alexandria, Virginia 22313-1450
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
17/136,801	12/29/2020	Joon Bae KIM	8365-87-PUS-CON-7

CONFIRMATION NO. 2083

PUBLICATION NOTICE

OC000000125081982

62574
Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202

Title:HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS

Publication No.US-2021-0119841-A1
Publication Date:04/22/2021

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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In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently https://portal.uspto.gov/pair/PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

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

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/136,801	12/29/2020	Joon Bae KIM	8365-87-PUS-CON-7	2083

62574 7590 06/09/2021
Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202

EXAMINER
ALI, SHAWKAT M

ART UNIT	PAPER NUMBER
2633	

NOTIFICATION DATE	DELIVERY MODE
06/09/2021	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):

jvick@sheridanross.com

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No. 17/136,801	Applicant(s) KIM et al.	
	Examiner SHAWKAT M ALI	Art Unit 2633	AIA (FITF) Status No

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

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 12/29/2020.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ 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.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 60 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 60 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, 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.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 12/29/2020 is/are: a)☑ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ 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)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Status of Claims

2. This communication is responsive to Application No. 17/136,801 (CON of several applications) filed on December 29, 2020. Claim 60 is subject to examination.

Information Disclosure Statement (IDS)

3. The IDS submitted on 12/29/20 has been entered and considered by the Examiner.

Examiner's Comments

4. Claim 60 recites: an OFDM transmitter capable of generating a first packet type comprising a first header field. Since the claim does not include the recitation "means for" and the term "transmitter" cannot be interpreted to invoke 112(f), a single means is not applicable.

Double Patenting

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the claims at issue are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated

by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the reference application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO internet Web site contains terminal disclaimer forms which may be used. Please visit http://www.uspto.gov/forms/. The filing date of the application will determine what form should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to http://www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

6. Claim 60 is rejected on the ground of nonstatutory double patenting as being unpatentable over several patented applications.

Claim 60 of Instant Application	**Patented Applications**

An Orthogonal Frequency Division Multiplexing (OFDM) communications transmitter capable of generating a first packet type comprising a first header field.	**Claim 1 of US 10,917,272 B2:** "…generating, by a wireless Orthogonal Frequency Division Multiplexing (OFDM) communications transmitter, a first packet type comprising a first header field…". **Claim 1 of US 10,291,449 B2:** "…a wireless OFDM communications transmitter operable to generate a first packet type for transmission in a first channel bandwidth, the first packet type comprising a first header field…". **Claim 1 of US 9,973,361 B2:** "…a wireless OFDM communications transmitter operable to generate a first packet type comprising a first header field…". **Claim 11 of US 9,614,566 B2:** "…a modulator operable to modulate a first number of OFDM symbols to transmit a first header portion of a first packet…". **Claim 1 of US 9,609,091 B2:** "…a transmitter operable to transmit a first packet using wireless OFDM communications, wherein the first packet comprises a first

	plurality of short training symbols followed by a first plurality of long training symbols followed by a first header portion…”.

Although the claims are not identical, they are not patentably distinct from each other because all the claims are directed to an OFDM transmitter/modulator. However, the instant discloses the subject matter in a broad manner and thus anticipates same.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public before the effective filing date of the claimed invention.

8. Claim 60 is rejected under 35 U.S.C. 102(b) as being anticipated by Tzannes (US 2004/0047296 A1).

Regarding claim 60, Tzannes teaches an Orthogonal Frequency Division Multiplexing (OFDM) communications transmitter capable of generating a first packet type comprising a first header field (**Figure 2: Blocks 100-200, Paragraph 3: the systems and methods of this invention relate to Orthogonal Frequency Division Multiplexing & Paragraph 44: the second transceiver 200 receives from the first transceiver 100 the packet which has the header field**).

Conclusion

9. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to SHAWKAT M. ALI whose telephone number is (571) 270-1639. The Examiner can normally be reached on Monday-Thursday 8:30AM-3:30PM ET.

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 AIR at http://www.uspto.gov/interviewpractice.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's Supervisor, SAM K. AHN can be reached on (571) 272-3044. 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.

/SHAWKAT M ALI/

Primary Examiner, Art Unit 2633

Notice of References Cited	Application/Control No. 17/136,801	Applicant(s)/Patent Under Reexamination KIM et al.	
	Examiner SHAWKAT M ALI	Art Unit 2633	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-10917272-B2	02-2021	Kim; Joon Bae	H04L27/2601	1/1
*	B	US-9609091-B2	03-2017	Kim; Joon Bae	H04L1/0042	1/1
*	C	US-20040047296-A1	03-2004	Tzannes, Marcos C.	H04W24/02	370/252
	D					
	E					
	F					
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	I					
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	K					
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FOREIGN PATENT DOCUMENTS

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

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*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.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/136,801	KIM et al.
	Examiner	**Art Unit**
	SHAWKAT M ALI	2633

CPC - Searched*		
Symbol	**Date**	**Examiner**
H04B1/38, H04B7/00, H04B7/155	06/04/2021	/SA/
H04J1/00, H04J3/00, H04J3/24, H04J11/00	06/04/2021	/SA/
H04L1/00, H04L1/08, H04L5/00, H04L12/26, H04L12/43, H04L12/54 , H04L12/56, H04L12/403, H04L27/28	06/04/2021	/SA/
H04M1/00	06/04/2021	/SA/
H04W4/00, H04W24/00, H04W52/02, H04W72/04, H04W72/12, H04W74/08	06/04/2021	/SA/

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**
370	207,229,242,252,294,328,329,330,336,338,356,389, 449,474	06/04/2021	/SA/
375	130,219,259,260,261,267,295,316	06/04/2021	/SA/

* 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: Inventors, Assignee, Class/Subclass, CPC and Keywords Searches.	06/04/2021	/SA/
Foreign and NPL Searches.	06/04/2021	/SA/

/SHAWKAT M ALI/ Primary Examiner, Art Unit 2633	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/136,801	KIM et al.
	Examiner	**Art Unit**
	SHAWKAT M ALI	2633

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**

/SHAWKAT M ALI/ Primary Examiner, Art Unit 2633	

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
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✓	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	06/04/2021								
	1	-								
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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/136,801	KIM et al.
	Examiner	**Art Unit**
	SHAWKAT M ALI	2633

CLAIM		DATE								
Final	Original	06/04/2021								
	43	-								
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	58	-								
	59	-								
	60	✓								

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	("13376856").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2014/06/06 10:59
S2	2,601	((Joon) near2 (Kim)).INV.	US-PGPUB; USPAT	OR	ON	2014/06/11 09:11
S3	237	((Marcos) near2 (Tzannes)).INV.	US-PGPUB; USPAT	OR	ON	2014/06/11 09:12
S4	2,832	S2 S3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/06/11 09:12
S5	3	S4 and "OFDM" and "TXOP" and ("MAC" "MAP")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/06/11 09:13
S6	28,058	(370/338,356,458,468).ccls.	US-PGPUB; USPAT;	OR	ON	2014/06/11 09:51

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S7	16,810	(375/219,260).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/06/11 09:51
S8	44,525	S6 S7	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/06/11 09:51
S9	158	S8 and "OFDM" and "TXOP" and ("MAC" "MAP")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/06/11 09:51
S10	80	S8 and "OFDM" and ("TXOP" same ("MAC" "MAP"))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2014/06/11 09:52

			IBM_TDB			
S11	45	S10 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/06/11 09:52
S13	467	beacon near2 header	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/02/10 11:46
S14	21	"OFDM" same "TXOP" same header	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/15 15:35
S15	325	"TXOP" with bit	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/15 16:59
S16	3,069	"OFDM" same header	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2015/12/15 16:59

			EPO; JPO; DERWENT; IBM_TDB			
S17	26	S15 and S16	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/15 16:59
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or ("20150016360") or ("7062703") or ("8467331") or ("20150023288") or ("20060193277") or ("20080273536") or ("20140369263") or ("20120189042") or ("20090041134") or ("8023593") or ("9071990") or ("8897298") or ("20140071997") or ("8488442") or ("20130107895") or ("8576882") or ("20060023802") or ("7881237") or ("8797836") or ("8498350") or ("20070286066") or ("20090141668") or ("20140341066") or ("20120250796") or ("20140233478") or ("20130016651") or ("20140269559") or ("20130265920") or ("8576938") or ("20140269659") or ("20110280329") or ("8385308") or ("20100118772") or ("9100072") or ("8781016") or ("20140079145") or ("20060212773")).PN. or (("20140198805") or ("9112753") or ("20150146607") or ("20110280261") or ("20120257606") or ("20150131530") or ("20110286404") or ("20110286322") or ("20140307625") or ("9001909") or ("20140219264") or ("20050232139") or ("8964521") or ("20130107912") or ("20150055546") or ("20120027119") or ("20120250668") or ("20120250617") or ("20140254349") or ("20140128066") or ("9191882") or ("9191092") or ("8737189") or ("20060182017") or ("20150124794") or ("9001904") or ("20140029645") or ("20090238293") or ("20140112397") or ("8218661") or ("20100046441") or ("20110268161") or ("20150030101") or ("20080198786") or ("8730878") or ("20110280332") or ("8576753") or ("20150124704") or ("20130223422") or ("20120051361") or ("20110216816") or ("20140006908") or ("20140119351") or ("8693558") or ("8457125") or ("7995672") or ("20150110163") or ("20140071956") or ("8660013") or ("8315235") or ("7995665") or ("20100086013") or ("20100202424") or ("8479076") or ("20130114757") or ("20100189167") or ("20100157907") or ("9008066") or ("8255760") or ("20110038284") or ("20120314711") or ("8774222") or ("20020012343") or ("8958464") or ("20100115372") or ("9066297") or ("8437245") or ("9143290") or ("20010055311") or ("20140146722") or ("20120207140") or ("20110051706") or ("20050169261") or ("20140192985") or ("8948284") or ("7035285") or ("6898204") or ("20150201433") or ("20090312073") or ("8498607") or ("20140146758") or ("20130279389") or ("20130128809") or ("20080031205") or ("20120314744") or ("20110267956") or ("7046746") or ("20110164707") or ("20110268200") or ("20090316815") or ("20060176968") or ("6882634") or ("8576931") or ("20140036775") or ("20020012337") or

		("20050094569") or ("20140064262") or ("20130128808") or ("8223867") or ("20030206561") or ("20140348117") or ("20140328435") or ("7426249") or ("20080187136") or ("7433298") or ("20020057713") or ("20080170556") or ("6988236") or ("8804609") or ("20060215626") or ("8966346") or ("20100329195") or ("6950444") or ("9014205") or ("20120054584") or ("20020003792") or ("8761033") or ("20020080886") or ("20130142094") or ("8867565") or ("20070060149")).PN.				
S19	250	(("20120170625") or ("20050249266") or ("20040198265") or ("8537796") or ("7421046") or ("7580444") or ("20060140251") or ("20150327284") or ("7656850") or ("20110080963") or ("20110110437") or ("20070091785") or ("8761307") or ("8989233") or ("20140247815") or ("20150195839") or ("20140341139") or ("20130182663") or ("20140254504") or ("8681767") or ("20110176532") or ("20140286183") or ("20110013534") or ("7796716") or ("20080043888") or ("9154963") or ("8824396") or ("8498239") or ("8837440") or ("20070004465") or ("20130343267") or ("20120155408") or ("7804772") or ("20110310835") or ("20130322363") or ("7936806") or ("9166718") or ("8831121") or ("20120327875") or ("20030021237") or ("8774101") or ("20130114491") or ("20080187063") or ("20140348056") or ("20120201229") or ("9191036") or ("9130699") or ("20140019828") or ("8761229") or ("20150017989") or ("20110205999") or ("20130301549") or ("20110026642") or ("9178677") or ("8879602") or ("20060114826") or ("9118401") or ("20150094078") or ("20080130486") or ("20090310619") or ("8169994") or ("8553790") or ("8891350") or ("8102929") or ("20100272192") or ("8649443") or ("20080013640") or ("20130329661") or ("20080219235") or ("8532082") or ("20110019715") or ("8276025") or ("20100002675") or ("20120188946") or ("20130294399") or ("20100202493") or ("20140355555") or ("8848581") or ("20140016579") or ("20150036629") or ("20120087396") or ("8917697") or ("20090307541") or ("8363577") or ("8619805") or ("20120128035") or ("20100272219") or ("8050203") or ("20120163334") or ("20110274016") or ("20070091983") or ("20130195145") or ("6014545") or ("20020034267") or ("6246716") or ("20020054632") or ("7089014") or ("9066334") or ("8593979") or ("8660042") or ("20060153155") or ("8958374") or ("7983356") or ("20030027577") or ("20120287877") or ("8724742") or ("8817844") or ("20120320951") or ("20130163449") or ("20060008016") or ("8472555")	US-PGPUB; USPAT	OR	OFF	2015/12/16 07:23

		or ("20150189676") or ("9078278") or ("8855073") or ("20110058626") or ("7668265") or ("20110319113") or ("20140211892") or ("7872583") or ("20110026419") or ("20130235943") or ("7460620") or ("20110110321") or ("5511090") or ("8411660") or ("20140198758") or ("20060280116") or ("9137803") or ("20120281625") or ("20150304995")).PN. or (("20120307760") or ("9112686") or ("20150289144") or ("20090004984") or ("9001935") or ("20150003379") or ("20030161411") or ("8213367") or ("20090041087") or ("8848763") or ("9088385") or ("20130315184") or ("20070263702") or ("7099413") or ("20070082633") or ("7940852") or ("20150009927") or ("8780798") or ("20020177446") or ("7706247") or ("7620112") or ("8472385") or ("7564863") or ("20130294333") or ("20070097915") or ("7483674") or ("8705655") or ("7876840") or ("7180850") or ("7280607") or ("20060029168") or ("6795485") or ("7653122") or ("20150358193") or ("7626918") or ("20130070692") or ("20110317633") or ("20140307689") or ("20090080575") or ("20140029568") or ("20140119244") or ("20090262700") or ("20150036651") or ("8284732") or ("7609712") or ("20150172949") or ("20150017923") or ("8867469") or ("20130182685") or ("20060008017") or ("20110310856") or ("20070105508") or ("6711122") or ("8660081") or ("20120269287") or ("8615046") or ("20110122846") or ("7184485") or ("9173109") or ("20140241326") or ("20060046659") or ("20070263735") or ("20110110320") or ("20150326347") or ("20110188585") or ("20070086326") or ("7853205") or ("20140126526") or ("20070081505") or ("20050237923") or ("8483086") or ("8718021") or ("9071399") or ("20070110149") or ("20070086327") or ("20050030885") or ("6477210") or ("9100152") or ("20020067755") or ("20070064587") or ("20060212773") or ("8238496") or ("8054897") or ("5278826") or ("6853675") or ("8320320") or ("20120307917") or ("20020159516") or ("8891475") or ("8547911") or ("8902869") or ("20130163530") or ("20070201350") or ("20100195614") or ("20110206147") or ("20110103338") or ("8437245") or ("8089946") or ("7039105") or ("20070121741") or ("20110051706") or ("20130016694") or ("8422465") or ("20090290552") or ("8045991") or ("7599346") or ("8693442") or ("20110211652") or ("7969311") or ("20110182332") or ("7376117") or ("20110103500") or ("8891593") or ("20130163501") or ("8089887") or ("20140269368") or ("20050190715") or ("20130028209") or ("20140119291") or ("20040081191")).PN.				

S20	6	S18 and S19	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/16 07:24
S21	9	S18 and "TXOP"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/16 07:28
S22	2	("20040179517").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/12/16 08:46
S23	2	("20070171858").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/12/16 09:53
S24	16,965	((media adj access adj plan) "MAP") near3 frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2015/12/16 10:03

			DERWENT; IBM_TDB			
S25	7,581	((transmission adj opportunity) or "TXOP")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/16 10:04
S26	252	S24 and S25	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/16 10:04
S27	170	S24 and S25 and header	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/16 10:04
S28	96	S24 and S25 and header and (ofdm$1 dmt)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/16 10:05
S29	2	("20040179517").PN.	US-PGPUB; USPAT;	OR	OFF	2015/12/22 07:40

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S31	84	((orthogonal adj frequency adj division adj multiplex$3) or "OFDM") with ((transmission adj opportunity) or "TXOP")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/26 11:24
S32	41	("20070060149" | "20070177541" | "20070206534" | "20080075058" | "20080084941" | "20080192644" | "20080292015" | "20090196163" | "20100046358" | "20100067589" | "20100091675" | "20100118829" | "20100309834" | "20110002219" | "20110038332" | "20110096796" | "20110096797" | "20110128929" | "20110128947" | "20110310827" | "20120082040" | "20130286959" | "7599332" | "7742390" | "8144647" | "8149811" | "8270909" | "8363578" | "8395997" | "8472383" | "8599803" | "8619907" | "8660497" | "8670399" | "8737405" | "8787338" | "8787385" | "8811203" | "8886755" | "8923118" | "8971350").PN. OR ("9215055").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/26 11:33
S33	16	S32 and ((transmission adj opportunity) or "TXOP")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/26 11:33
S34	31	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 dmt (multi adj2 carrier)) same ((transmission adj opportunity) or txop) same header	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWE	OR	ON	2015/12/27 11:03

			NT; IBM_TDB			
S35	10	("20050226204" | "20050254465" | "20060018268" | "20070058575" | "20080036909" | "20080181155" | "20090040965" | "7324605").PN. OR ("8817698").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 11:22
S36	73	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 dmt (multi adj2 carrier)) same ((transmission adj opportunity) or txop) same (header packet peamble)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 11:39
S37	42	S36 not S34	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 11:39
S38	8	S37 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 11:40
S39	19	("20030016686" | "20050055406" | "20050147034" | "20050175014" | "20060168313" | "6426943" | "6473425" | "6606301" | "6832261" | "6959002" | "7310337" | "7457313" | "7580355").PN. OR ("8139593").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 11:51
S40	64,423	(370/229,294,328,329,336,338,356,449).ccls.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 12:26

S41	28,065	(375/219,260,267,295,316).ccls.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 12:26
S42	2,815	(H04B1/38 H04B7/155).cpc.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 12:27
S43	1,559	(H04J1/00 H04J3/00 H04J3/24 H04J11/00).cpc.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 12:28
S44	8,852	(H04L1/00 H04L1/08 H04L5/00 H04L12/26 H04L12/43 H04L12/56 H04L12/403 H04L27/28).cpc.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 12:30
S45	440	(H04M1/00).cpc.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 12:31
S47	22,074	(H04W4/00 H04W24/00 H04W52/02 H04W72/04 H04W72/12 H04W74/08).cpc.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 12:33
S48	117,614	S40 S41 S42 S43 S44 S45 S47	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 12:33
S49	37,065	S48 and ofdm$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 12:33
S50	503	S49 and (((transmission adj opportunity) or txop) same (header packet peamble))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2015/12/27 12:34

			IBM_TDB			
S51	244	S49 and (((transmission adj opportunity) or txop) same (header peamble))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 12:34
S52	37	S51 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 12:35
S53	10	("20060239223" | "20070232358" | "20080089261" | "20080130603" | "6917598" | "7002929" | "7046649").PN. OR ("8155695").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 12:57
S54	761	S48 and ofdm$1 and ((transmission adj opportunity) or txop) and header	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 13:18
S55	186	S54 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 13:18

S56	149	S55 not (S34 S38 S52)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 13:19
S57	141	S56 and ("MAC" "MAP")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 13:20
S58	130	S56 and ("MAC" "MAP") and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 13:20
S59	16	("20020141375" | "20040166870" | "20050075104" | "20070099567" | "20070224936" | "20080177751" | "20080254810" | "20090054002" | "20090147867" | "20090176454" | "20090196173" | "20090257379" | "20100085903" | "5237587" | "5774876" | "6249680").PN. OR ("8995996").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 13:58
S60	1	("13376856").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/08/07 12:51

S61	405	ofdm with packet with header	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/08/07 15:59
S62	55	S61 and overlapp$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/08/07 16:00
S63	4,643	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 dmt (multi adj2 carrier)) same header	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/05 10:00
S64	33,411	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 dmt (multi adj2 carrier)) same de$1modulat$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/05 10:02
S65	75,803	frequency with overlap$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2016/09/05 10:03

			DERWENT; IBM_TDB			
S66	233	S63 and S64 and S65	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/05 10:03
S67	182	S66 and packet	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/05 10:04
S68	2	S66 and packet and (header adj bit)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/05 10:04
S69	27	("20010048694" | "20050152358" | "20060222005" | "20080080437" | "20090316637" | "20100014463" | "20100016023" | "20100067379" | "20100177755" | "20100183087" | "20100260114" | "20110019557" | "20110026623" | "20110128846" | "20110128900" | "20110134816" | "20110149822" | "20110188424" | "20110267959" | "20110310834" | "20120014335" | "20140036895" | "8081665" | "8503367" | "8509193" | "8599803").PN. OR ("8982914").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/05 10:09
S70	78	S66 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2016/09/05 11:16

			EPO; JPO; DERWENT; IBM_TDB			
S71	7,639	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 dmt (multi adj2 carrier)) with (header pilot preamble training) with (packet frame slot)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/05 13:02
S72	660	(frequency with overlap$4) and S71	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/05 13:03
S73	23,442	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 dmt (multi adj2 carrier)) with de$1modulat$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/05 13:03
S74	230	S72 and S73	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/05 13:04

S75	130	S74 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/05 13:04
S76	25	("20020034213" | "20030081695" | "20050135308" | "5732113" | "6954481" | "7020226").PN. OR ("7457231").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/05 13:59
S78	8	((first near2 header) same bit same (repeat$4 or repet$6)) and (ofdm$ dmt) and sub$1carrier and demodulat$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/08 13:25
S79	13	("20040066844" | "20060171283" | "20060215790" | "20060274855" | "20070195907" | "20070268977" | "20080279168" | "5966412" | "7260159" | "7274653").PN. OR ("8675754").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/08 13:49
S80	5	((first adj3 header) same bit same (second adj3 header) same symbol) and ofdm$1 and subcarrier and demodulat$4	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/08 13:58
S81	390	(second different another other next separate 2nd) near4 (header preamble) with (packet! segment! pdu!) and (segment$9 portions! sections!) with (channels! bands! ccs! (component near carriers!)) and @ad<="20090821"	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/08 14:01
S82	53	S81 and ofdm$1	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/08 14:02
S83	32	("20020053058" | "20030098804" | "20030126551" | "20040141525" | "20040148546" | "20040223473" | "20050276266" | "20060084389" | "20070016838" | "20070092013" | "20080090583" | "20080219373" | "20080279322" | "20100077275" | "4449190" | "6222889" | "6829313" | "6912249" | "7180901" |	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/08 15:15

		"7200799" | "7213194" | "7360141" | "7782973" | "7965710").PN. OR ("8345533").URPN.				
S84	38	header same (repeat$4 repet$6 duplicat$4) same ofdm$ same sub$1carrier	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/09 08:15
S85	5	("20110149929" | "20120243630" | "20130051489" | "20130064313" | "20140198877").PN. OR ("8942303").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/09 08:31
S86	3,238	(wid$3 near3 band) and (narrow$3 near3 band) and ofdm$1	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/09 08:39
S87	54,434	(second different another other next separate 2nd) near3 header	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/09 08:40
S88	46	S86 and S87	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/09 08:40
S89	265	("20010008837" | "20010055952" | "20020006799" | "20020008658" | "20020019214" | "20020077787" | "20020085503" | "20020086641" | "20020111772" | "20020142744" | "20020154614" | "20020155811" | "20020173272" | "20020177446" | "20030050012" | "20030050015" | "20030123420" | "20030198200" | "20030198304" | "20030224741" | "20050180528" | "3812291" | "4597107" | "4839582" | "5093927" | "5142691" | "5144642" | "5276908" | "5303262" | "5355522" | "5428819" | "5446370" | "5574979" | "5608727" | "5610839" | "5636140" | "5636903" | "5655217" | "5687163" | "5732077" | "5745777" | "5752164" | "5809427" | "5850596" | "5864541" | "5889772" | "5892812" | "5907812" | "5990833" | "6031833" | "6052421" | "6084919" | "6141565" | "6167237" | "6169728" | "6212566" | "6226680" | "6229799" | "6229998" | "6240282" | "6240372" | "6256478" | "6256511" | "6275695" | "6295461" | "6307839" | "6317599" | "6332076" | "6336780" | "6349198" | "6351643" | "6374079" | "6374082" | "6385434" | "6418131" | "6442371" | "6442507" |	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/09 10:19

		"6466614" | "6499006" | "6629151" | "6671495" | "6711134" | "6882851" | "7113753").PN. OR ("7424268").URPN.				
S90	8	header and ofdm$ and S89	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/09 10:20
S91	2	("8675754").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/09/10 16:37
S92	3	("20100085964").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/09/10 16:38
S93	3	("20090086646").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/09/10 16:38
S94	220,338	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 or (discrete adj multi adj tone) or dmt or (multi adj2 carrier))	US-PGPUB; USPAT; USOCR;	OR	ON	2016/09/11 10:43

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S95	86,835	(second different another other next separate 2nd multiple plural$4) near3 header	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/11 10:44
S96	2,173	header with (sub$carrier tone sub$channel)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/11 10:44
S97	8,215	header with symbol	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/11 10:44
S98	138	S94 and S95 and S96 and S97	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/11 10:45

S99	67	S98 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/11 10:46
S100	89	("4281412" | "4324001" | "4447871" | "4462108" | "4516239" | "4554656" | "4661902" | "4706246" | "4774704" | "5023869" | "5111453" | "5396519" | "5465267" | "5559561" | "5689510" | "5832233" | "6009122").PN. OR ("6130894").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/11 11:31
S101	16	S97 and S100	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/11 11:31
S102	23,783	(frame packet segment slot pdu) with (narrow$3 wid$3) with (band frequency)	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/11 11:48
S103	3,003	S94 and S102	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/11 11:48
S104	114	S94 and S102 and S97	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/11 11:48
S105	111	S104 not (S99 S101)	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/11 11:48
S106	65	S105 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/11 11:48

S107	9	("20050088318" | "20060009228" | "20060153132" | "20070291713" | "20080090575" | "5839071" | "5875183" | "6246955" | "6791475").PN. OR ("8665816").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/11 12:13
S149	0	("15350418").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/12/28 07:38
S151	3	("20030072255").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/04 07:13
S152	2	("20040179517").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/04 07:18
S153	3	("2004/0179517").URPN.	USPAT	OR	ON	2017/01/04 07:24
S154	16	("20020071407" | "20030185181" | "20040179517" | "20050123047" | "20050147112" | "20070234186" | "20070297533" | "20090238208" | "5287463" | "5802115" | "6496798" | "6580713" | "6690719" | "6925592" | "7000173" | "7616636").PN. OR ("8266488").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2017/01/04 07:31
S155	2	"20050135318"	US-PGPUB; USPAT; USOCR	OR	ON	2017/01/04 08:01

S156	2	"20050135284"	US-PGPUB; USPAT; USOCR	OR	ON	2017/01/04 08:02
S157	2	("20050169261").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/04 08:04
S158	2	("20080219229").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/04 08:04
S159	3	("20090086646").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/04 08:09
S160	2	("20090290563").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/04 08:15
S161	3	("20100085964").PN.	US-PGPUB; USPAT;	OR	OFF	2017/01/04 08:20

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S162	2	("20100158046").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/04 08:22
S163	2	("20100208594").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/04 08:23
S164	2	("20100260137").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/04 08:25
S165	2	("20120170625").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2017/01/04 08:30

			IBM_TDB			
S166	125	(("8483040") or ("20160255179") or ("20160255178") or ("20160254935") or ("20160255177") or ("7274652") or ("20120170625") or ("8194530") or ("20160066324") or ("20070297382") or ("20120294295") or ("8537796") or ("20110164623") or ("20110080963") or ("20110110437") or ("9363121") or ("6754170") or ("20140307684") or ("8705458") or ("8780813") or ("9420490") or ("20140254349") or ("20160277170") or ("20050152473") or ("20110216814") or ("20060268671") or ("7324605") or ("8472537") or ("8625690") or ("9232505") or ("20120236971") or ("20090232084") or ("9130812") or ("20090092090") or ("20150381399") or ("20130243115") or ("20130343478") or ("9264996") or ("20140016653") or ("20140078920") or ("8717957") or ("9253291") or ("9161262") or ("8582525") or ("20160112851") or ("20100098039") or ("7756002") or ("20060211377") or ("8144572") or ("20160135086") or ("20140126450") or ("7804765") or ("20140029551") or ("20160113016") or ("20120307751") or ("8989206") or ("20040151109") or ("8885661") or ("20110194475") or ("7916625") or ("7742388") or ("8737421") or ("20130010831") or ("7965798") or ("20130028155") or ("20130034075") or ("20160029244") or ("20080212652") or ("7522514") or ("20080049601") or ("20060018249") or ("8306161") or ("9379863") or ("20130202017") or ("20140153614") or ("20090028220") or ("20040047296") or ("9226270") or ("20110080873") or ("20090268832") or ("20110255433") or ("9300510") or ("20160286011") or ("9100275") or ("20120069877") or ("20090296614") or ("20110080857") or ("20090225817") or ("20140064223") or ("20130003587") or ("20110194586") or ("20090274061") or ("20140328435") or ("8284800") or ("7590071") or ("20130170411") or ("7924841") or ("9455845") or ("9191923") or ("20100220725") or ("8780824") or ("20110044273") or ("20140036711") or ("20120263107") or ("7512185") or ("20110211477") or ("20130215993") or ("9210611") or ("8159969") or ("20130235860") or ("20150023288") or ("20120263141") or ("9049155") or ("20160249332") or ("20150009855") or ("20100214992") or ("20140334323") or ("20050195765") or ("9071990") or ("20140369263") or ("20160373945") or ("20150003274") or ("8553579") or ("20160373969") or ("20050078707")).PN.	US-PGPUB; USPAT	OR	OFF	2017/01/04 08:48

S167	125	(("20120275528") or ("20140233615") or ("20160020934") or ("20150188742") or ("8718118") or ("8953657") or ("20160255177") or ("9154355") or ("20160254935") or ("20160255179") or ("20160255178") or ("8537796") or ("9363121") or ("20110110437") or ("20110080963") or ("20130336182") or ("20120189072") or ("20110216814") or ("20140119410") or ("8472537") or ("20160330738") or ("20120057483") or ("20040047296") or ("20160309457") or ("20130202017") or ("20080049601") or ("7522514") or ("7590071") or ("20140036711") or ("20130003587") or ("20090268832") or ("20090225817") or ("20110080857") or ("20130094517") or ("20100098039") or ("7916625") or ("20110211477") or ("20140334323") or ("20150003274") or ("20160373945") or ("20090296614") or ("9166860") or ("20150009855") or ("20100220725") or ("20160373969") or ("7804765") or ("20090274061") or ("20140126655") or ("8284800") or ("8755264") or ("7729281") or ("20120236879") or ("20120069877") or ("8553579") or ("20160329986") or ("7924841") or ("8958350") or ("8842570") or ("7298691") or ("20130286943") or ("20100322295") or ("8767523") or ("20110182254") or ("9450794") or ("9148806") or ("7577085") or ("8159969") or ("9461857") or ("8537703") or ("8416677") or ("9100275") or ("20130170411") or ("9313739") or ("20100303096") or ("7944851") or ("9148801") or ("8165096") or ("9191469") or ("20150304217") or ("20140112225") or ("20090285164") or ("20140050133") or ("20140140358") or ("20140301208") or ("20100050054") or ("20140161126") or ("20140233551") or ("8464138") or ("20120327987") or ("20130287045") or ("9380492") or ("20140198780") or ("9351250") or ("7577122") or ("20130272309") or ("20140211678") or ("20160174102") or ("20160242115") or ("20130138982") or ("20100265999") or ("20150319272") or ("20150016426") or ("9497764") or ("20130235860") or ("7849391") or ("20160330059") or ("9049155") or ("20100061320") or ("20150016360") or ("7415661") or ("9210611") or ("20150023288") or ("7512185") or ("7062703") or ("20050195765") or ("20140369263") or ("20060193277") or ("9386585") or ("8467331") or ("20080273536") or ("20120189042") or ("20160119047") or ("8023593") or ("20090041134") or ("9071990")).PN.	US-PGPUB; USPAT	OR	OFF	2017/01/04 08:50

S168	47	S166 and S167	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/01/04 08:50
S169	47	header and S168	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/01/04 08:51
S170	47	S169 and ofdm$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/01/04 08:52
S171	39	("20020085641" | "20030031278" | "20040141548" | "20040218683" | "20040228269" | "20050078598" | "4843352" | "6108369" | "7313190").PN. OR ("7512185").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2017/01/04 09:16
S204	1	("15476284").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/07 08:58
S206	3,727	((Joon) near2 (Kim)).INV.	US-PGPUB; USPAT	OR	ON	2017/09/07 09:38

S207	321	((Marcos) near2 (Tzannes)).INV.	US-PGPUB; USPAT	OR	ON	2017/09/07 09:38
S209	4,033	S206 S207	US-PGPUB; USPAT	OR	ON	2017/09/07 09:38
S210	20	S209 and ("OFDM" with transceiver with header with packet).clm.	US-PGPUB; USPAT	OR	ON	2017/09/07 09:39
S211	5	("9614566").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/11/29 13:08
S212	2	("9584262").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/11/29 13:10
S213	2	"15476284"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/12/11 08:07
S222	0	"15958519"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWE	OR	ON	2018/07/03 11:22

			NT; IBM_TDB			
S223	2	("9973361").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/07/03 11:26
S226	21	("20030072255" | "20040179517" | "20040228269" | "20050135284" | "20050135318" | "20050169261" | "20050195765" | "20080219229" | "20090086646" | "20090290563" | "20100085964" | "20100158046" | "20100208594" | "20100260137" | "20100265398" | "20170207940" | "6567383" | "6580713" | "8266488" | "9584262" | "9614566").PN.	US-PGPUB; USPAT	OR	ON	2018/07/07 13:21
S227	29,394	(H04L1/08 H04L27/2601).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/07/07 13:31
S228	7,738	S227 and ofdm$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/07/07 13:31
S229	1,026	S228 and demodulator and packet	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWE	OR	ON	2018/07/07 13:32

			NT; IBM_TDB			
S230	350	S229 and header	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/07/07 13:32
S231	110	S230 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/07/07 13:32
S232	32	S231 and (header near2 bit)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/07/07 13:33
S233	1,653	demodulat$4 with ofdm$1 with symbol with (second multiple plural$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/07/07 14:15
S234	47,183	head$3 with field with (second multiple plural$3)	US-PGPUB; USPAT; USOCR;	OR	ON	2018/07/07 14:16

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S235	31	S233 and S234	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/07/07 14:16
S236	82	("20010009555" | "20010022825" | "20010046877" | "20020006167" | "20020013135" | "20020031089" | "20020046379" | "20020057698" | "20020060995" | "20020068588" | "20020076043" | "20020114402" | "20020126694" | "20020136183" | "20020159533" | "20020184389" | "20030012163" | "20030018794" | "20030040280" | "20030048462" | "20030053571" | "20030063685" | "20030087659" | "20030095508" | "20030099312" | "20030112743" | "20030112821" | "20030135631" | "20030142766" | "20040151109" | "20040215709" | "20070037600" | "20130003587" | "20130286943" | "5706428" | "5797094" | "5812523" | "6075769" | "6084917" | "6108306" | "6115354" | "6141327" | "6151508" | "6181714" | "6341131" | "6418322" | "6449246" | "6535550" | "6549592" | "6587526" | "6625764" | "6671284" | "6894974" | "6904283" | "6940831" | "6987754" | "6988212" | "7088787" | "7092436" | "7106715" | "7146172" | "7158482" | "7272117" | "7274652" | "7304951" | "7362735" | "7522514" | "7590071" | "7729281" | "7804765" | "7916625" | "7924841" | "7944851" | "8159969" | "8284800" | "8416677" | "8537703" | "8553579" | "8755264" | "8842570").PN. OR ("9450794").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2018/07/07 14:22
S237	3	S236 and ofdm$1 and demodulator and packet	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2018/07/07 14:22

			IBM_TDB			
S238	1	("20080219229").PN.	US-PGPUB; USPAT	OR	OFF	2018/08/14 11:33
S239	0	"16125206"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/10/16 13:55
S240	2	"15958519"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/05 14:42
S241	26	("0000002" | "10079707" | "20030072255" | "20040179517" | "20040228269" | "20050135284" | "20050135318" | "20050169261" | "20050180315" | "20050195765" | "20080184088" | "20080219229" | "20090086646" | "20090290563" | "20100085964" | "20100158046" | "20100208594" | "20100260137" | "20100265398" | "6567383" | "6580713" | "6671284" | "8266488" | "9584262" | "9614566" | "9973361").PN.	US-PGPUB; USPAT	OR	ON	2018/11/06 08:27
S242	5	"15476284"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/06 08:52
S246	1	"16394490"	US-PGPUB; USPAT;	OR	ON	2019/06/03 09:31

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S247	1	("10291449").PN.	US-PGPUB; USPAT	OR	OFF	2019/06/03 09:36
S248	1	("10079707").PN.	US-PGPUB; USPAT	OR	OFF	2019/06/03 11:19
S249	26	("10079707" | "10291449" | "20030072255" | "20040179517" | "20040228269" | "20050135284" | "20050135318" | "20050169261" | "20050180315" | "20050195765" | "20080184088" | "20080219229" | "20090086646" | "20090290563" | "20100085964" | "20100158046" | "20100208594" | "20100260137" | "20100265398" | "6567383" | "6580713" | "6671284" | "8266488" | "9584262" | "9614566" | "9973361").PN.	US-PGPUB; USPAT	OR	ON	2019/06/06 09:11
S250	168,365	(370/207,229,242,252,294,328,329,330,336,338,356,389,449,474).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 12:34
S251	53,422	(375/130,219,259,260,261,267,295,316).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 12:34
S252	17,827	(H04B1/38 H04B7/00 H04B7/155).cpc.	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2019/06/06 12:34

			EPO; JPO; DERWENT; IBM_TDB			
S253	11,972	(H04J1/00 H04J3/00 H04J3/24 H04J11/00).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 12:34
S254	121,998	(H04L1/00 H04L1/08 H04L5/00 H04L12/26 H04L12/43 H04L12/54 H04L12/56 H04L12/403 H04L27/28 H04L27/2601 H04L27/2613 H04L69/22).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 12:34
S255	3,057	(H04M1/00).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 12:35
S256	126,461	(H04W4/00 H04W24/00 H04W52/02 H04W72/04 H04W72/12 H04W74/08).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 12:35

S257	458,129	S250 S251 S252 S253 S254 S255 S256	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 12:35
S258	36,747	(((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1) near3 symbol) and S257	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 12:36
S259	1,044	(header near3 bit) and S258	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 12:39
S260	895	S259 and bandwidth	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 12:39
S261	16	S260 and (demodulat$4 with symbol with field)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2019/06/06 12:41

			DERWENT; IBM_TDB			
S262	5,613	((("KIM") near3 ("Joon")) OR (("TZANNES") near3 ("Marcos"))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2019/06/06 13:31
S263	4	S262 and (demodulat$4 with symbol with field).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 13:33
S264	82	("20010009555" | "20010022825" | "20010046877" | "20020006167" | "20020013135" | "20020031089" | "20020046379" | "20020057698" | "20020060995" | "20020068588" | "20020076043" | "20020114402" | "20020126694" | "20020136183" | "20020159533" | "20020184389" | "20030012163" | "20030018794" | "20030040280" | "20030048462" | "20030053571" | "20030063685" | "20030087659" | "20030095508" | "20030099312" | "20030112743" | "20030112821" | "20030135631" | "20030142766" | "20040151109" | "20040215709" | "20070037600" | "20130003587" | "20130286943" | "5706428" | "5797094" | "5812523" | "6075769" | "6084917" | "6108306" | "6115354" | "6141327" | "6151508" | "6181714" | "6341131" | "6418322" | "6449246" | "6535550" | "6549592" | "6587526" | "6625764" | "6671284" | "6894974" | "6904283" | "6940831" | "6987754" | "6988212" | "7088787" | "7092436" | "7106715" | "7146172" | "7158482" | "7272117" | "7274652" | "7304951" | "7362735" | "7522514" | "7590071" | "7729281" | "7804765" | "7916625" | "7924841" | "7944851" | "8159969" | "8284800" | "8416677" | "8537703" | "8553579" | "8755264" | "8842570").PN. OR ("9450794").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2019/06/06 14:33
S265	25	(header near3 bit) and S264	US-PGPUB; USPAT; USOCR;	OR	ON	2019/06/06 14:33

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S266	6	(((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1) near3 symbol) and S265	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 14:33
S270	3	"16780589"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/06/17 18:12
S271	5,971	((("KIM") near3 ("Joon")) OR (("TZANNES") near3 ("Marcos"))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2020/06/18 10:02
S272	39	S271 and (packet with header).clm.	USPAT	OR	ON	2020/06/18 10:04
S273	1	("10554459").PN.	US-PGPUB; USPAT	OR	OFF	2020/06/18 11:08
S274	1	("10291449").PN.	US-PGPUB; USPAT	OR	OFF	2020/06/18 11:09
S275	1	("10079707").PN.	US-PGPUB; USPAT	OR	OFF	2020/06/18 11:17

S276	1	("9973361").PN.	US-PGPUB; USPAT	OR	OFF	2020/06/18 11:18
S277	1	("9614566").PN.	US-PGPUB; USPAT	OR	OFF	2020/06/18 11:20
S278	1	("9584262").PN.	US-PGPUB; USPAT	OR	OFF	2020/06/18 11:24
S289	26	("10079707" | "10291449" | "20030072255" | "20040179517" | "20040228269" | "20050135284" | "20050135318" | "20050169261" | "20050180315" | "20050195765" | "20080184088" | "20080219229" | "20090086646" | "20090290563" | "20100085964" | "20100158046" | "20100208594" | "20100260137" | "20100265398" | "6567383" | "6580713" | "6671284" | "8266488" | "9584262" | "9614566" | "9973361").PN.	US-PGPUB; USPAT	OR	ON	2021/01/08 17:36
S290	1	("10554459").PN.	US-PGPUB; USPAT	OR	OFF	2021/01/08 18:16
S291	28	("1007970" | "1029144" | "20030072255" | "20040179517" | "20040228269" | "20050135284" | "20050135318" | "20050169261" | "20050180315" | "20050195765" | "20080184088" | "20080219229" | "20090086646" | "20090290563" | "20100085964" | "20100158046" | "20100208594" | "20100260137" | "20100265398" | "6567383" | "6580713" | "6671284" | "8266488" | "9584262" | "9614566" | "9973361").PN. OR ("10554459").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2021/01/08 18:16
S292	4	S291 not S289	US-PGPUB; USPAT; USOCR	OR	ON	2021/01/08 18:16
S293	1	"17136801"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/06/04 18:09
S294	25	("0000001" | "0000002" | "0006580" | "10291449" | "10554459" | "20040179517" | "20040228269" | "20050135318" | "20050169261" | "20050180315" | "20050195765" | "20080184088" | "20080219229" |	US-PGPUB; USPAT	OR	ON	2021/06/04 20:05

		"20090290563" | "20100158046" | "20100208594" | "20100260137" | "20100265398" | "20200169438" | "6567383" | "6671284" | "8266488" | "9584262" | "9614566" | "9973361").PN.				
S295	14	S294 and (packet with header)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/06/04 20:06
S296	6,278	((("KIM") near3 ("Joon")) OR (("TZANNES") near3 ("Marcos"))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2021/06/04 20:38
S297	257	S296 and ofdm$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/06/04 20:39
S298	50	S297 and ((transceiver transmitter) with header with packet).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/06/04 20:41
S299	37	S298 and ("OFDM").clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	ON	2021/06/04 20:41

			JPO; DERWENT; IBM_TDB			
S300	19	S298 and ("OFDM").clm.	USPAT	OR	ON	2021/06/04 20:42
S301	16	(APPLIED adj TRANSFORM).as.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/06/04 21:26
S302	11	S301 and ((transceiver transmitter) with header with packet).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/06/04 21:26
S303	15	S296 and (((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1) with transmitter with packet with header).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/06/04 21:28
S304	9	S296 and (((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1) with transmitter with packet with header).clm.	USPAT	OR	ON	2021/06/04 21:35
S305	13	(APPLIED adj TRANSFORM).as.	USPAT	OR	ON	2021/06/04 21:36
S306	5	S304 and S305	USPAT	OR	ON	2021/06/04 21:36

S307	250	(("20170373903") or ("9973364") or ("10291449") or ("9236884") or ("20140006908") or ("20190007247") or ("9973361") or ("20100061320") or ("8467331") or ("10554459") or ("20190372703") or ("20040151109") or ("11012179") or ("20170317784") or ("7756002") or ("10432347") or ("20190253290") or ("20110002219") or ("9197298") or ("10079707") or ("20080137718") or ("20160226622") or ("9660760") or ("20100086076") or ("10091337") or ("20160249332") or ("20180248725") or ("8855222") or ("9614605") or ("20130301400") or ("20100309848") or ("10917272") or ("20170135006") or ("20160309477") or ("20160013925") or ("9503161") or ("20190037056") or ("10623989") or ("10237794") or ("20140036823") or ("20180270725") or ("20180124639") or ("10004074") or ("9866285") or ("20200228241") or ("9379858") or ("7577085") or ("20200252253") or ("9172571") or ("8441918") or ("10595249") or ("8767523") or ("9007983") or ("20210119841") or ("20100309834") or ("20120243626") or ("8830816") or ("20120027136") or ("20120140835") or ("20130286925") or ("20190253210") or ("8526351") or ("20030072255") or ("10868643") or ("8213292") or ("20050237923") or ("7548506") or ("8085814") or ("20120250787") or ("20090060076") or ("20170257201") or ("20200169438") or ("8619655") or ("20140307684") or ("9609092") or ("20120307938") or ("20050232139") or ("20070066362") or ("20080267157") or ("9596327") or ("20120314711") or ("20190245726") or ("10333669") or ("20170339453") or ("10742464") or ("20120311410") or ("8259695") or ("8625690") or ("7912012") or ("20120236971") or ("20150381399") or ("8479076") or ("10972222") or ("20130243115") or ("9667465") or ("20110305178") or ("10608789") or ("20200195380") or ("9609091") or ("20100189167") or ("20130107912") or ("20110193739") or ("20070064586") or ("9602637") or ("20100115372") or ("20050265221") or ("20170033949") or ("20060126492") or ("20100086013") or ("8255760") or ("7995665") or ("20130034075") or ("9130812") or ("7561511") or ("20100316140") or ("10334310") or ("8320233") or ("8441393") or ("20160255179") or ("20130028155") or ("7532565") or ("20060268671") or ("20110080873") or ("20160255178") or ("20190036751") or ("9825782") or ("7995672") or ("7548564") or ("8885661") or ("8737421") or ("6754170")).PN. or (("8054816") or ("20050180315") or ("20160301491") or ("20100310002") or ("20190199478") or ("7324605") or ("20100265999") or ("8989206") or ("10244414") or ("20170201604") or ("20160255177") or ("20160254935") or	US-PGPUB; USPAT	OR	OFF	2021/06/04 22:06

		("7929409") or ("RE44621") or ("20170207941") or ("10862723") or ("9277569") or ("20050152473") or ("20170033958") or ("20140219387") or ("20200314843") or ("20150156801") or ("8498350") or ("9967122") or ("9450794") or ("20150009855") or ("20160183257") or ("8879379") or ("9794938") or ("10033564") or ("9749680") or ("8755264") or ("20190254027") or ("20130279614") or ("20180027558") or ("9148806") or ("8958350") or ("8842570") or ("20170048033") or ("8159969") or ("9461857") or ("20110211477") or ("20200322078") or ("20140036711") or ("10637971") or ("20190288894") or ("7916625") or ("8018975") or ("9154274") or ("9848385") or ("20140219240") or ("10721733") or ("10278176") or ("8989148") or ("9949148") or ("20070147228") or ("20110164491") or ("20200244781") or ("10361826") or ("20100098039") or ("9407487") or ("9264996") or ("8284800") or ("20160373969") or ("20140334323") or ("9363121") or ("20110164492") or ("20120069877") or ("20140072080") or ("20150003274") or ("20190260446") or ("20130202017") or ("20160373945") or ("20140078920") or ("20110305194") or ("8761115") or ("20090296614") or ("20040047296") or ("20110080963") or ("20080186843") or ("20180192373") or ("20070070179") or ("9253291") or ("20110261781") or ("10979116") or ("20090225817") or ("7924841") or ("20160308702") or ("8902798") or ("20130177090") or ("20130003587") or ("20110080857") or ("20090268832") or ("8619676") or ("8416677") or ("7522514") or ("8947994") or ("20140161068") or ("20080019263") or ("20110194475") or ("20090129258") or ("20080232490") or ("20100220725") or ("8488442") or ("7804765") or ("20210067397") or ("8717957") or ("20160337973") or ("8223893") or ("9100275") or ("20100246489") or ("20160113016") or ("8773974") or ("8885535") or ("8724445") or ("9825793") or ("20170111866") or ("8537796") or ("20110032875")).PN.				
S308	47	S307 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/06/04 22:06

S309	33	S308 and (packet with header)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/06/04 22:06
S310	33	S309 and ofdm$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/06/04 22:06
S311	1	("10917272").PN.	US-PGPUB; USPAT	OR	OFF	2021/06/04 22:31
S312	1	("10291449").PN.	US-PGPUB; USPAT	OR	OFF	2021/06/04 22:34
S313	1	("9973361").PN.	US-PGPUB; USPAT	OR	OFF	2021/06/04 22:39
S314	1	("9614566").PN.	US-PGPUB; USPAT	OR	OFF	2021/06/04 22:41
S315	1	("9609091").PN.	US-PGPUB; USPAT	OR	OFF	2021/06/04 22:44

6/4/2021 11:16:48 PM
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1 - 50 — 21,919,722 results — Top 1500 results

1. **Generalized frequency division multiplexing (gfdm) frame structure for 11ay**

   In 60 GHz WiGig/IEEE 802.11ad, Orthogonal Frequency Division Multiplexing (OFDM) is used to achieve higher throughput. However, OFDM has one problem of high Peak-to-Average Power Ratio (PAPR) caused by the summing up of the large number of subcarriers. A high PAPR signal degrades the efficiency of...

   CURRENT ASSIGNEES: INTEL IP CORP
   US20170373903 | US APPLICATIONS | 28-DEC-2017

2. **Generalized frequency division multiplexing (GFDM) frame strucutre for IEEE 802.11AY**

   In 60 GHz WiGig/IEEE 802.11ad, Orthogonal Frequency Division Multiplexing (OFDM) is used to achieve higher throughput. However, OFDM has one problem of high Peak-to-Average Power Ratio (PAPR) caused by the summing up of the large number of subcarriers. A high PAPR signal degrades the efficiency of...

   CURRENT ASSIGNEES: INTEL IP CORP
   US9973364 | US PATENTS | 15-MAY-2018

3. **Transmitter method and apparatus for variable header repetition in a wireless OFDM network with different channel bandwidths**

   Method and apparatus for use within a wireless OFDM network that transmits a first packet type in a first channel bandwidth and a second packet type in a second channel bandwidth, the first channel bandwidth being at least two times wider than the second channel bandwidth. The first packet type has...

   CURRENT ASSIGNEES: APPLIED TRANSFORM LLC
   US10291449 | US PATENTS | 14-MAY-2019

4. **Interprocessor communications systems and methods**

   A method, an apparatus, and a computer program product for communication within a wireless terminal. The method can be implemented using dedicated logic and managed and controlled by state machines and/or sequencers. Data received or provided in a memory of a first integrated circuit of a terminal...

   CURRENT ASSIGNEES: QUALCOMM INC
   US9236884 | US PATENTS | 12-JAN-2016

5. **Interprocessor communications systems and methods**

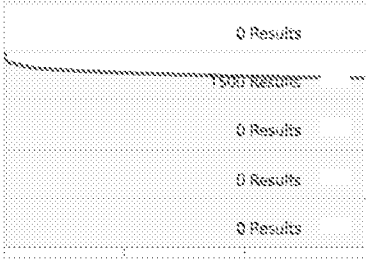
   A method, an apparatus, and a computer program product for communication within a wireless terminal. The method can be implemented using dedicated logic and managed and controlled by state machines and/or sequencers. Data received or provided in a memory of a first integrated circuit of a terminal...

   CURRENT ASSIGNEES: QUALCOMM INC
   US20140006908 | US APPLICATIONS | 02-JAN-2014

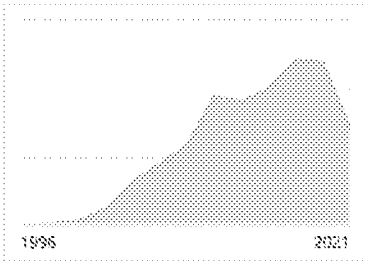
6. **Interprocessor communications systems and methods based on packet header integrity check and next packet field**

   A method, an apparatus, and a computer program product for communication within a wireless terminal. The method can be implemented using dedicated logic and managed and controlled by state machines and/or sequencers. Data received or provided in a memory of a first integrated circuit of a terminal...

Relevance — VIEW



Publication Date — VIEW



First Cur Assignees by Relevance — VIEW

- INTEL IP CORP (31)
- APPLIED TRANSFORM LLC (31)
- QUALCOMM INC (383)
- KVEHLKOMM INKORPOREJ... (7)
- APPLE INC (169)
- INTERDIGITAL TECH CORP (27)
- AVAGO TECH INTL SALES P... (77)

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An Orthogonal Frequency Division Multiplexing (OFDM) communications transmi

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https://en.wikipedia.org › wiki › Orthogonal_frequency...

Orthogonal frequency-division multiplexing - Wikipedia

In telecommunications, orthogonal frequency-division multiplexing (OFDM) is a type of digital ... The radio interface was formerly named High Speed OFDM Packet Access ... the design of both the transmitter and the receiver; unlike conventional FDM, ... The project aims at designing the first cognitive radio-based standard ...

https://patents.google.com › patent

US7929409B2 - Orthogonal frequency division multiplexing ...

The wireless OFDM communication system includes a transmitter which ... Orthogonal frequency division multiplexing (OFDM) method and apparatus for ... In the first primary technique, a new channel is defined to carry a watermark and the ... Most OFDM data packets include header fields that provide information such as ...

People also ask

What is orthogonality in OFDM?

How does orthogonality in OFDM allow for increased capacity?

How orthogonality is maintained in OFDM?

How OFDM signal is generated?

Feedback

https://patents.justia.com › patent

US Patent Application for HEADER REPETITION IN PACKET ...

An OFDM communication system is described that allows different values of D ... FIELD. An exemplary aspect of this invention relates to communications systems. ... based on Orthogonal Frequency Division Multiplexing (OFDM)—(OFDM is ... transmitter capable of generating a first packet type comprising a first header field.

https://www.electronics-notes.com › articles › radio › of...

What is OFDM: Orthogonal Frequency Division Multiplexing ...

OFDM, Orthogonal Frequency Division Multiplexing uses multiple close spaced carriers each with low rate data for resilient communications. ... read more.

https://www.google.com › patents

US20050180315A1 - Orthogonal frequency division ... - Google

The wireless OFDM communication system includes a transmitter which ... Orthogonal frequency division multiplexing (OFDM) method and apparatus for ... In the first primary technique, a new channel is defined to carry a watermark and the ... Most OFDM data packets include header fields that provide information such as ...

https://www.google.com › patents

US9461857B2 - Systems and methods for high rate OFDM ... - Google

The transmitter then stores these communication parameters and when ... to Orthogonal Frequency Division Multiplexing (OFDM) communication systems, methods ... indicated in the header field of the packet sent from the first transceiver 100 to the ... These optimized communication parameters would be generated by the ...

https://www.itu.int › rec › dologin_pub › type=items PDF

ITU-T Rec. G.9903 (02/2014) Narrowband orthogonal ...

Feb 22, 2014 --- Narrowband orthogonal frequency division multiplexing power line ... type the URL http://handle.itu.int/ in the address field of your web ... Frame control header . .. The OFDM signal is generated by performing inverse fast Fourier ... The first symbol includes raised cosine shaping on the leading points.

http://google.com › patents

EP2267961A2 - OFDM transmitter for symbols of different sizes ...

Alternatively, the transmitter may comprise a first FFT element that has a first FFT ... system employing OFDM (Orthogonal Frequency Division Multiplexing) were designed for wireless LAN (local area network) systems for fast packet access under a ... by two identical OFDM symbols having said header OFDM symbol format.

http://rfmw.em.keysight.com › wlan-ofdm › content

Concepts of Orthogonal Frequency Division Multiplexing ...

The discussion ends with an explanation of how OFDM is implemented in 802.11a WLAN and how the OFDM symbol and burst is created. Introduction to OFDM - ...

https://www.google.co.in › patents

US9609091B2 - Transceiver that indicates the packet bandwidth in ...

A wireless OFDM transceiver uses subcarrier characteristics, such as phase and ... transmissions based on Orthogonal Frequency Division Multiplexing (OFDM). ... communication link can be established between transmitter A and receiver B ... to generate a first plurality of decoded bits wherein the decoding comprises ...

Related searches

ofdm modulation	ofdm vs qam
orthogonal frequency division multiplexing (ofdm) is similar to	ofdm block diagram explanation
ofdm problems and solutions	orthogonal frequency division multiple access
ofdm modulation and demodulation	ofdm transmitter and receiver

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Visuals | Query | Results | 0 Selected | Relevance | None

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1. **Performance evaluation of a real time OFDM radio over fiber system at 2.5 GHz using software defined radio SDR**

   This paper presents the implementation of an OFDM radio over fiber (RoF) system at 2.5 GHz using software defined radio (SDR). In this work, first we present an introduction of the main concepts about radio over fiber and an orthogonal frequency-division multiplexing (OFDM) system at 2.5 GHz, then...

   IEEE Xplore | IEEE CONFERENCES | 01-AUG-2017 | 2017 SBMO/IEEE MTT-S International Microwave and Optoelectronics Conference (IMOC) (Page(s): 1-5)

2. **Digital baseband design for DC-OFDM based UWB systems**

   This paper presents a digital baseband processor in a dual-carrier orthogonal frequency division multiplexing (DC-OFDM) based ultra-wideband (UWB) systems. The fundamental architecture of the digital baseband and its frame structure is declared. After that, the major components are investigated in...

   IEEE Xplore | IEEE CONFERENCES | 01-OCT-2013 | 2013 International Conference on Computational Problem-Solving (ICCP) (Page(s): 127-130)

3. **Design and Simulation of Variable Guard Interval Insertion for High Throughput WLAN System**

   Orthogonal Frequency Division Multiplexing (OFDM) has been increasingly used in wireless broadband communication systems. Guard interval (GI) is used in OFDM system to reduce inter-symbol interference (ISI). As selection of the length of guard interval depends on the channel condition, the length of...

   IEEE Xplore | IEEE CONFERENCES | 01-DEC-2019 | 2019 6th NAFOSTED Conference on Information and Computer Science (NICS) (Page(s): 219-222)

4. **Measurement of real channel parameters of FPGA based OFDM system**

   Development of wireless technologies has enhanced the need for high data rate support from physical layer. The design of the LTE physical layer (PHY) is heavily influenced by the requirements for high peak transmission rate, spectral efficiency, and multiple channel bandwidths. The Orthogonal...

   IEEE Xplore | IEEE CONFERENCES | 01-JAN-2014 | International Conference on Electronics, Communication and Instrumentation (ICECI) (Page(s): 1-4)

5. **Issues in high-speed WLANs**

   This paper presents an overview of the physical layer (PHY) and medium access control layer (MAC) requirements for a new class of high-speed wireless local area networks (WLANs) operating in the 5 GHz Unlicensed National Information Infrastructure (UNII) bands at data rates of 6-54 Mbps.

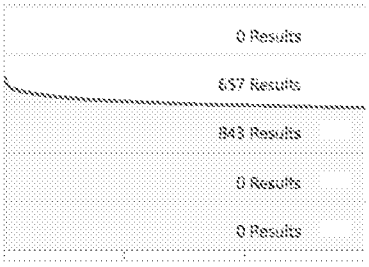
   IEEE Xplore | IEEE CONFERENCES | 01-JAN-2000 | 2000 IEEE International Conference on Acoustics, Speech, and Signal Processing. Proceedings (Cat. No.00CH37100)

6. **Simulation model of the MIMO-OFDM system compliant with IEEE 802.11n**

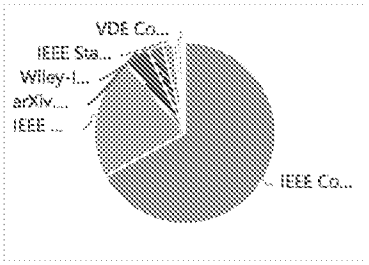
   The paper presents a simulation model of MIMO-OFDM system made in Matlab Simulink. During the work on the simulation model the transmitter, the receiver and the model of telecommunication channel were developed. Signals generated at the transmitter output are fully compatible with signals described...

   IEEE Xplore | IEEE CONFERENCES | 01-DEC-2010 | 2010 Fifth International Conference on Broadband and Biomedical Communications (Page(s): 1-5)

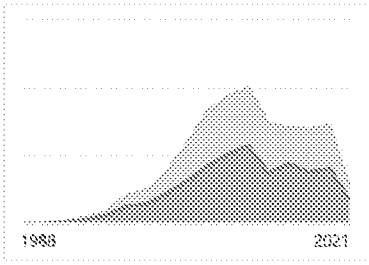
Relevance VIEW



Collections VIEW



Publication Date VIEW



More Visuals

Result #1 | PREV | NEXT

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/136,801
				Filing Date	December 29, 2020
				First Named Inventor	Joon Bae KIM
				Art Unit	
				Examiner Name	
Sheet	1	of	5	Attorney Docket Number	8365-87-PUS-CON-7

U.S. PATENT DOCUMENTS					
Examiner Initials*	Cite No.[1]	Document Number Number-kind Code [2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee of Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	6567383	05-20-2003	Bohnke	
	2	6580713	06-17-2003	Abe	
	3	6671284	12-30-2003	Yonge, III et al.	
	4	8266488	09-11-2012	Spencer	
	5	9584262	02-28-2017	Kim et al.	
	6	9614566	04-04-2017	Kim et al.	
	7	9973361	05-15-2018	Kim et al.	
	8	10079707	09-18-2018	Kim et al.	
	9	10291449	05-14-2019	Kim et al.	
	10	10554459	02-04-2020	Kim et al.	
	11	2003/0072255	04-17-2003	Ma et al.	
	12	2004/0179517	09-16-2004	Yamamoto et al.	
	13	2004/0228269	11-18-2004	Balakrishnan et al.	
	14	2005/0135318	06-23-2005	Walton et al.	
	15	2005/0135284	06-23-2005	Nanda et al.	
	16	2005/0169261	08-04-2005	Williams et al.	
	17	2005/0180315	08-18-2005	Chitrapu et al.	
	18	2005/0195765	09-08-2005	Sharon et al.	
	19	2008/0184088	07-31-2008	Yang et al.	
	20	2008/0219229	09-11-2008	Zheng	
	21	2009/0086646	04-02-2009	Kuchibhotla et al.	
	22	2009/0290563	11-26-2009	Gu et al.	
	23	2010/0085964	04-08-2010	Weir et al.	
	24	2010/0158046	06-24-2010	Pu	
	25	2010/0208594	08-19-2010	Kwon et al.	
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	27	2010/0260137	10-14-2010	Vrzic et al.	
	28	2020/0169438	05-28-2020	Kim et al.	

Examiner Signature	/SHAWKAT M ALI/	Date Considered	06/04/2021

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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /S.M.A/

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/136,801
				Filing Date	December 29, 2020
				First Named Inventor	Joon Bae KIM
				Art Unit	
				Examiner Name	
Sheet	2	of	5	Attorney Docket Number	8365-87-PUS-CON-7

FOREIGN PATENT DOCUMENTS						
Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]; Number[4]; Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
	29	CN 1941665	04-04-2007	HUAWEI TECH CO LTD		(Believed to correspond to US Publication No. 2008/0219229 cited herein)
	30	CN 101433022	05-13-2009	INTERDIGITAL TECH CORP		(Believed to correspond to International Publication No. WO 2007/127311 cited herein)
	31	EP 1392025	02-25-2004	Kabushiki Kaisha Toyota Jidoshokki Kariya-Shi		
	32	WO 2007/127311	11-08-2007	Interdigital Technology Corporation		

OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.)		
Examiner Initials*	Cite No.[1]	
	33	"IEEE 802.3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications" December 2008; 2977 pages
	34	"IEEE 802.11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications" June 2007; 1233 pages
	35	"IEEE 802.16: Air Interface for Fixed Broadband Wireless Access Systems" October 2004; 895 pages.
	36	"ITU G.9960: Unified High-Speed Wire-Line Based Home Networking Transceivers - Foundation" October 2009; 112 pages

Examiner Signature	/SHAWKAT M ALI/	Date Considered	06/04/2021

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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /S.M.A/

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/136,801
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				First Named Inventor	Joon Bae KIM
				Art Unit	
				Examiner Name	
Sheet	3	of	5	Attorney Docket Number	8365-87-PUS-CON-7

	37	ITU-T Recommendation G.9960 "Unified High-Speed Wire-Line Based Home Networking Transceivers - Foundation" XP044232807; pages 1-107; August 2009
	38	"ITU Standard G.997.1: Physical Layer Management for Digital Subscriber Line (DSL) Transceivers" April 2009; 128 pages
	39	ITU - Telecommunication Standardization Sector - Study Group 15 "G.hn: 09CC-R12 HomePlug AV Interoperability Updates" Intellon Corporation, France Telecom, Gigle Semiconductor, Motorola, SPiDCOM; August 2009; 5 pages
	40	ITU - Telecommunication Standardization Sector "G.hn: Proposal for Detailed Text on the Media Access Plan (MAP)" Temporary Document 8AB-077; Aharona Lurie Coppergate Communications Diego Arlandis DS2: Study Period 2005-2008, International Telecommunication Union, Geneva, CH, Vol. 4/15, 16-20 June 2008, pages 1-13
	41	Aware, Inc., "G.hn: PHY-Frame Header Extension," ITU-T SG15/Q4 09CC-046, Concord, California, Aug. 2009
	42	CopperGate Communications, "G.hn: Using Two Symbols for the Header of a PHY frame on Coax," ITU-T SG15/Q4 09XC-100, Xian, China, Jul. 2009.
	43	Editor for G.9960, "ITU-T Recommendation G.9960: Next generation wire-line based home networking transceivers – Foundation," ITU-T SG15/Q4, Jan. 2009.
	44	Intellon, Corporation, "G.hn: Extended PHY frame header," ITU-T SG15/Q4 09XC-119, Xian, China, Jul. 2009
	45	OKSMAN, et al. "G.hn: The New ITU-T Home Networking Standard" IEEE Communications Magazine, IEEE Service Center, Piscataway, US, Vol 47, No. 10, October 1, 2009, pages 138-145 XP011283328
	46	International Search Report for International (PCT) Application No. PCT/US2010/046088, mailed Dec. 22, 2010 (Attorney Ref. No.: 8365-87-PCT)
	47	Written Opinion for International (PCT) Application No. PCT/US2010/046088, mailed Dec. 22, 2010 (Attorney Ref. No.: 8365-87-PCT)
	48	International Preliminary Report on Patentability for International (PCT) Application No. PCT/US2010/046088, mailed March 1, 2012 (Attorney Ref. No.: 8365-87-PCT)
	49	Official Action (including translation) for Chinese Patent Application No. 201080037081.2, mailed December 4, 2013 (Attorney Ref. No.: 8365-87-PCN)
	50	Official Action (including translation) for Chinese Patent Application No. 201080037081.2, mailed July 3, 2014 (Attorney Ref. No.: 8365-87-PCN)
	51	Official Action (including translation) for Chinese Patent Application No. 201080037081.2, mailed March 23, 2015 (Attorney Ref. No.: 8365-87-PCN)

Examiner Signature	/SHAWKAT M ALI/	Date Considered	06/04/2021

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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /S.M.A/

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/136,801
				Filing Date	December 29, 2020
				First Named Inventor	Joon Bae KIM
				Art Unit	
				Examiner Name	
Sheet	4	of	5	Attorney Docket Number	8365-87-PUS-CON-7

	52	Notification to Grant the Patent (including translation) for Chinese Patent Application No. 201080037081.2, mailed Oct. 26, 2015 (Attorney Ref. No.: 8365-87-PCN)
	53	Official Action for Chinese Patent Application No. 201610015747.3, mailed June 4, 2018 (Attorney Ref. No.: 8365-87-PCN-DIV)
	54	Official Action (Including Translation) for Chinese Patent Application No. 201610015747.3, mailed April 23, 2019 (Attorney Ref. No.: 8365-87-PCN-DIV)
	55	Communication Pursuant to Rules 161(1) and 162 EPC for European Patent Application No. 10748023.8, mailed April 18, 2012 (Attorney Ref. No.: 8365-87-PEP)
	56	Office Action for European Patent Application No. 10748023.8, mailed Feb. 17, 2015 (Attorney Ref. No.: 8365-87-PEP)
	57	Office Action for European Patent Application No. 10748023.8, mailed July 23, 2018 (Attorney Ref. No.: 8365-87-PEP)
	58	Summons to Attend Oral Proceedings for European Patent Application No. 10748023.8, mailed June 4, 2019 (Attorney Ref. No.: 8365-87-PEP)
	59	Office Action for U.S. Patent Application No. 13/376,856, mailed June 17, 2014 (Attorney Ref. No.: 8365-87-PUS)
	60	Office Action for U.S. Patent Application No. 13/376,856, mailed Feb. 24, 2015 (Attorney Ref. No.: 8365-87-PUS)
	61	Office Action for U.S. Patent Application No. 13/376,856, mailed Dec. 31, 2015 (Attorney Ref. No.: 8365-87-PUS)
	62	Office Action for U.S. Patent Application No. 13/376,856, mailed Aug. 18, 2016 (Attorney Ref. No.: 8365-87-PUS)
	63	Notice of Allowance for U.S. Patent Application No. 13/376,856, mailed Sept. 27, 2016 (Attorney Ref. No.: 8365-87-PUS)
	64	Office Action (Ex Parte Quayle Action) for U.S. Patent Application No. 15/350,418 mailed Jan. 13, 2017 (Attorney Ref. No.: 8365-87-PUS-CON)
	65	Notice of Allowance for U.S. Patent Application No. 15/350,418 mailed Feb. 10, 2017 (Attorney Ref. No.: 8365-87-PUS-CON)
	66	Office Action for U.S. Patent Application No. 15/476,284 mailed Sept. 15, 2017 (Attorney Ref. No.: 8365-87-PUS-CON-2)
	67	Notice of Allowance for U.S. Patent Application No. 15/476,284 mailed January 8, 2018 (Attorney Ref. No.: 8365-87-PUS-CON-2)

Examiner Signature	/SHAWKAT M ALI/	Date Considered	06/04/2021

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Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	17/136,801
				Filing Date	December 29, 2020
				First Named Inventor	Joon Bae KIM
				Art Unit	
				Examiner Name	
Sheet	5	of	5	Attorney Docket Number	8365-87-PUS-CON-7

	68	Notice of Allowance for U.S. Patent Application No. 15/958,519 mailed July 18, 2018 (Attorney Ref. No.: 8365-87-PUS-CON-3)
	69	Office Action for U.S. Patent Application No. 16/125,206 mailed November 13, 2018 (Attorney Ref. No.: 8365-87-PUS-CON-4)
	70	Notice of Allowance for U.S. Patent Application No. 16/125,206 mailed January 30, 2019 (Attorney Ref. No.: 8365-87-PUS-CON-4)
	71	Office Action for US App No. 16/394,490, mailed June 11, 2019 (Attorney Ref. No.: 8365-87-PUS-CON-5)
	72	Notice of Allowance for US App No. 16/394,490, mailed September 23, 2019 (Attorney Ref. No.: 8365-87-PUS-CON-5)
	73	Office Action for US Application No. 16/780,589, mailed June 23, 2020 (Attorney Ref. No. 8365-87-PUS-CON-6)
	74	Office Action for US Application No. 16/780,589, mailed October 7, 2020 (Attorney Ref. No. 8365-87-PUS-CON-6)
	75	Notice of Allowance for US Application No. 16/780,589, mailed December 23, 2020, 2020 (Attorney Ref. No. 8365-87-PUS-CON-6)

Examiner Signature	/SHAWKAT M ALI/	Date Considered	06/04/2021

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

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /S.M.A/

Bibliographic Data

Application No: 17/136,801

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /SHAWKAT M ALI/ (Examiner's Signature) [ ] (Initials)

Title: HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/29/2020 **RULE**	370	2633	8365-87-PUS-CON-7

APPLICANTS

APPLIED TRANSFORM, LLC, Bedford, MA,

INVENTORS

Joon Bae KIM, Lexington, MA, UNITED STATES

Marcos C. TZANNES, Petaluma, CA, UNITED STATES

CONTINUING DATA

This application is a CON of 16780589 02/03/2020 PAT 10917272

16780589 is a CON of 16394490 04/25/2019 PAT 10554459

16394490 is a CON of 16125206 09/07/2018 PAT 10291449

16125206 is a CON of 15958519 04/20/2018 PAT 10079707

15958519 is a CON of 15476284 03/31/2017 PAT 9973361

15476284 is a CON of 15350418 11/14/2016 PAT 9614566

15350418 is a CON of 13376856 02/08/2012 PAT 9584262

13376856 is a 371 of PCT/US2010/046088 08/20/2010

PCT/US2010/046088 has PRO of 61235909 08/21/2009

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

01/13/2021

STATE OR COUNTRY

UNITED STATES

ADDRESS

Jason H. Vick
Sheridan Ross, PC
Suite # 1200

1560 Broadway
Denver, CO 80202
UNITED STATES

FILING FEE RECEIVED

$1,820

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

EPAS ID: PAT6890261

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date
APPLIED TRANSFORM, LLC	08/26/2021

RECEIVING PARTY DATA

Name:	AX WIRELESS LLC
Street Address:	3000 POLAR LANE
City:	CEDAR PARK
State/Country:	TEXAS
Postal Code:	78613

PROPERTY NUMBERS Total: 9

Property Type	Number
Application Number:	61235909
Patent Number:	9584262
Patent Number:	9614566
Patent Number:	9973361
Patent Number:	10079707
Patent Number:	10291449
Patent Number:	10554459
Patent Number:	10917272
Application Number:	17136801

CORRESPONDENCE DATA

Fax Number:

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Email: keith@axwireless.net
Correspondent Name: AX WIRELESS LLC
Address Line 1: 3000 POLAR LANE
Address Line 4: CEDAR PARK, TEXAS 78613

NAME OF SUBMITTER:	KEITH IM
SIGNATURE:	/keith k. Im/
DATE SIGNED:	08/30/2021

	This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 5
source=Patent Assignment for AX Wireless (8-26-2021)#page1.tif
source=Patent Assignment for AX Wireless (8-26-2021)#page2.tif
source=Patent Assignment for AX Wireless (8-26-2021)#page3.tif
source=Patent Assignment for AX Wireless (8-26-2021)#page4.tif
source=Patent Assignment for AX Wireless (8-26-2021)#page5.tif

EXHIBIT B

PATENT ASSIGNMENT

This Patent Assignment (this "***Assignment***"), is made and entered into as of August 26, 2021 (the "***Effective Date***"), by Applied Transform, LLC, a Delaware Limited Liability Company ("***Assignor***"), with respect to the assignment of certain patent assets to AX Wireless, LLC, a Texas Limited Liability Company ("***Assignee***").

WHEREAS, Assignee and Assignor have entered into that certain Patent Transfer Agreement, dated August 2021 (the "***Patent Transfer Agreement***"), pursuant to which Assignor has agreed to assign and transfer to Assignee, and Assignee has agreed to receive all of Assignor's right, title and interest in and to (a) those patents and patent applications listed on Appendix I attached hereto (collectively, the ***"Listed Patents"***), including any reissues, reexaminations, continuations, continuations-in-part, divisionals and foreign counter-parts thereof, but in each case only to the extent first filed on or after the Effective Date, where ***"Priority"*** means a formal claim of priority to the filing date of an earlier patent or patent application that is expressly made (i) in a U.S. patent under 35 U.S.C. § 119, 35 U.S.C. § 120, 35 U.S.C. § 121, or 35 U.S.C. § 365; or (ii) in a foreign patent under the corresponding legal requirements for claiming priority in the foreign country, including under the Paris Convention or PCT (collectively the "***Assigned Patents***");

NOW, THEREFORE, in consideration of entering into the Patent Transfer Agreement and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignor agrees as follows:

Assignor does hereby assign and transfer and convey unto Assignee its entire right, title and interest in and to the Assigned Patents listed in Appendix I hereto, including Assignor's rights under the Assigned Patents to sue for injunctive relief and damages for past, present and future infringement of the Assigned Patents.

Assignor hereby authorizes the respective patent office or governmental agency to record the Assigned Patents and any reissues or reexaminations thereof in the name of Assignee, as the assignee of the entire interest therein.

This Assignment shall be construed and interpreted in accordance with the Patent Transfer Agreement. Nothing in this Assignment shall, or shall be deemed to, modify or otherwise affect any provisions of the Patent Transfer Agreement or affect or modify or expand any of the rights or obligations of the parties under the Patent Transfer Agreement. In the event of any conflict between the provisions hereof and the provisions of the Patent Transfer Agreement, the provisions of the Patent Transfer Agreement shall govern and control. Neither Assignor nor Assignee makes any representations or warranties of any kind, whether express, implied, or otherwise, under this Assignment, all of which are governed solely by the Patent Transfer Agreement.

IN WITNESS WHEREOF, Assignor has caused this Assignment to be executed by its respective duly authorized representative as of the Effective Date.

Applied Transform, LLC

By: _____
Name:
Title:

ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of Sonoma)

On 8/26/2021 before me, Uriel Rene Medina Del Toro, Notary Public
(insert name and title of the officer)

personally appeared Marcos C. Tzannes
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (Seal)

NSP1 URIEL RENE MEDINA DEL TORO
COMM. #2340626
NOTARY PUBLIC - CALIFORNIA
SONOMA COUNTY
My Commission Expires 12/20/2024 NSP1

EXHIBIT A

LISTED PATENTS

Applied Transform, LLC - 8365-87 Family

Reference #	Title	Country ID	Status	Serial #	Filed Date	Publication #	Patent #	Issue Date
8365-87-PCN	Header Repetition Scheme in Packet-Based OFDM Systems	CN	ISSUED	201080037081.2	8/20/2010	CN102484567	ZL201080037081.2	2/10/2016
8365-87-PCN-DIV	OFDM Communication Method and OFDM Communication Transmitter	CN	ABANDONED	201610015747.3	8/20/2010	CN 105681000 A		
8365-87-PCT	Header Repetition Scheme in Packet-Based OFDM Systems	WO	NAT PHASE	PCT/US2010/046088	8/20/2010	WO 2011/022593		
8365-87-PEP	Header Repetition Scheme in Packet-Based OFDM Systems	EP	ABANDONED	10748023.8	8/20/2010	2467962		
8365-87-PROV	Header Repetition Scheme in Packet-Based OFDM Systems	US	EXPIRED	61/235,909	8/21/2009	N/A		
8365-87-PUS	METHOD AND APPARATUS FOR VARIABLE HEADER REPETITION IN A WIRELESS OFDM NETWORK WITH MULTIPLE OVERLAPPED FREQUENCY BANDS	US	ISSUED	13/376,856	2/8/2012	US 2012-0170625 A1	9,584,262	2/28/2017
8365-87-PUS-CON	METHOD AND APPARATUS FOR VARIABLE HEADER REPETITION IN A WIRELESS OFDM NETWORK WITH MULTIPLE OVERLAPPED FREQUENCY BANDS	US	ISSUED	15/350,418	11/14/2016	US 2017-0063415 A1	9,614,566	4/4/2017
8365-87-PUS-CON-2	TRANSMITTER METHOD AND APPARATUS FOR VARIABLE HEADER REPETITION IN A WIRELESS OFDM NETWORK	US	ISSUED	15/476,284	3/31/2017	US 2017-0207940 A1	9,973,361	5/15/2018
8365-87-PUS-CON-3	RECEIVER METHOD AND APPARATUS FOR VARIABLE HEADER REPETITION IN A WIRELESS OFDM NETWORK	US	ISSUED	15/958,519	4/20/2018	US 2018-0248725 A1	10,079,707	9/18/2018
8365-87-PUS-CON-4	TRANSMITTER METHOD AND APPARATUS FOR VARIABLE HEADER REPETITION IN A WIRELESS OFDM NETWORK WITH DIFFERENT CHANNEL BANDWIDTHS	US	ISSUED	16/125,206	9/7/2018	US 2019-0007247 A1	10,291,449	5/14/2019

8365-87-PUS-CON-5	RECEIVER METHOD AND APPARATUS FOR VARIABLE HEADER REPETITION IN A WIRELESS OFDM NETWORK WITH DIFFERENT CHANNEL BANDWIDTHS	US	ISSUED	16/394,490	4/25/2019	US 2019-0253290 A1	10,554,459	2/4/2020
8365-87-PUS-CON-6	Non-transitory computer-readable information storage media for variable header repetition in a wireless OFDM network	US	ISSUED	16/780,589	2/3/2020	US 2020-0169438 A1	10,917,272	2/9/2021
8365-87-PUS-CON-7	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	US	PUBLISHED	17/136,801	12/29/2020	US 2021-0119841 A1		

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Examiner: ALI, SHAWKAT M
Joon Bae KIM, et al.	Group Art Unit: 2633
Application No.: 17/136,801	Confirmation No.: 2083
Filing Date: December 29, 2020	Attorney Docket No.: PAX0001US

Title: HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS

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

REQUEST FOR CORRECTED OFFICIAL FILING RECEIPT

Sir or Madam:

Applicant respectfully request for a corrected Official Filing Receipt for the above-identified patent application. In particular, it is requested that the Applicant be changed to "AX WIRELESS LLC", as indicated in the accompanying marked-up Application Data Sheet, marked-up Official Filing Receipt, and Request to Change the Applicant Under 37 CFR 1.46(c)(2) (PTO/AIA/41). Applicant also requests that the Attorney Docket Number be updated to "PAX0001US" and Customer Number to "167455".

Respectfully submitted,

/Yeasun Yoon, Reg.# 73663/

Yeasun Yoon
Reg. No. 73,663

Date: September 6, 2021

CUSTOMER NO. 167455
Capitol IP Law Group, PLLC

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	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
17/136,801	12/29/2020	2185	1820	~~8365-87-PUS-CON-7~~ PAX0001US	1	1

CONFIRMATION NO. 2083

FILING RECEIPT

OC000000122857879

62574
Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202

Date Mailed: 01/14/2021

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)

Joon Bae KIM, Lexington, MA;
Marcos C. TZANNES, Petaluma, CA;

Applicant(s)

~~APPLIED TRANSFORM, LLC, Bodford, MA;~~ AX WIRELESS LLC, CEDAR PARK, TX

Power of Attorney: The patent practitioners associated with Customer Number ~~62574~~ 167455

Domestic Priority data as claimed by applicant

This application is a CON of 16/780,589 02/03/2020
which is a CON of 16/394,490 04/25/2019 PAT 10554459
which is a CON of 16/125,206 09/07/2018 PAT 10291449
which is a CON of 15/958,519 04/20/2018 PAT 10079707
which is a CON of 15/476,284 03/31/2017 PAT 9973361
which is a CON of 15/350,418 11/14/2016 PAT 9614566
which is a CON of 13/376,856 02/08/2012 PAT 9584262
which is a 371 of PCT/US2010/046088 08/20/2010
which claims benefit of 61/235,909 08/21/2009

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: 01/13/2021

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/136,801**

Projected Publication Date: 04/22/2021

Non-Publication Request: No

Early Publication Request: No

Title

HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS

Preliminary Class

710

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 AssetsControl, 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.

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	8365-87-PUS-CON-7
	Application Number	
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

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
	Joon	Bae	KIM	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	Lexington	State/Province	MA	Country of Residence i	US

Mailing Address of Inventor:

Address 1	14 Pine Knoll Road		
Address 2			
City	Lexington	State/Province	MA
Postal Code	02420	Country i	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Marcos	C.	TZANNES	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

City	Petaluma	State/Province	CA	Country of Residence i	US

Mailing Address of Inventor:

Address 1	1943 Castle Dr.		
Address 2			
City	Petaluma	State/Province	CA
Postal Code	94954	Country i	US

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).

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	8365-87-PUS-CON-7
	Application Number	
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	62574		
Email Address	jvick@sheridanross.com	Add Email	Remove Email

Application Information:

Title of the Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS		
Attorney Docket Number	8365-87-PUS-CON-7	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	8	**Suggested Figure for Publication (if any)**	

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	62574		

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	8365-87-PUS-CON-7
	Application Number	
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

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)
	Continuation of	16/780589	2020-02-03

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16/780589	Continuation of	16/394490	2019-04-25	10554459	2020-02-04

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16/394490	Continuation of	16/125206	2018-09-07	10291449	2019-05-14

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16/125206	Continuation of	15/958519	2018-04-20	10079707	2018-09-18

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15/958519	Continuation of	15/476284	2017-03-31	9973361	2018-05-15

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15/476284	Continuation of	15/350418	2016-11-14	9614566	2017-04-04

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15/350418	Continuation of	13/376856	2012-02-08	9584262	2017-02-28

Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
13/376856	a 371 of international	PCT/US2010/046088	2010-08-20

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	8365-87-PUS-CON-7
	Application Number	
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
PCT/US2010/046088	Claims benefit of provisional	61/235909	2009-08-21
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.			Add

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).

			Remove
Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.			Add

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	8365-87-PUS-CON-7
	Application Number	
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

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.

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	8365-87-PUS-CON-7
	Application Number	
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

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	APPLIED TRANSFORM, LLC		
Mailing Address Information For Applicant:			
Address 1	101 Great Road		
Address 2	Suite 217		
City	Bedford	**State/Province**	MA
Country	US	Postal Code	01730
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.

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	8365-87-PUS-CON-7
	Application Number	
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

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:

Remove

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	/Jason H. Vick/			Date (YYYY-MM-DD)	2020-12-29
First Name	Jason H.	Last Name	Vick	Registration Number	45285

Additional Signature may be generated within this form by selecting the Add button. Add

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	8365-87-PUS-CON-7
	Application Number	
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

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 CooperationTreaty.

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.

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.

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: AX WIRELESS LLC

Application No./Patent No.: 17/136,801 Filed/Issue Date: 2020-12-29

Titled: HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS

AX WIRELESS 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: KIM, JOON BAE, et al. To: AWARE, INC.

The document was recorded in the United States Patent and Trademark Office at Reel 028591, Frame 0605, or for which a copy thereof is attached.

2. From: AWARE, INC. To: APPLIED TRANSFORM, LL

The document was recorded in the United States Patent and Trademark Office at Reel 037491, Frame 0053, or for which a copy thereof is attached.

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.

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.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: APPLIED TRANSFORM, LLC To: AX WIRELESS LLC

The document was recorded in the United States Patent and Trademark Office at
Reel 057326, Frame 0259, 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.

/Yeasun Yoon, Reg.# 73663/	2021-09-06
Signature	Date
Yeasun Yoon	73663
Printed or Typed Name	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.

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.

PTO/AIA/80 (07-17)
Approved for use through 03/31/2021. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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: 167455

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: 167455

OR

☐

Firm or individual name		
Address		
City	State	Zip
Country		
Telephone	Email	

Assignee name and address: AX WIRELESS LLC
3000 POLAR LANE
CEDAR PARK, TX 78613

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 09/03/2021
Name Kenneth Lee	Telephone 703-953-9320
Title CFO	

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).
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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 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.

Electronic Acknowledgement Receipt

EFS ID:	43690624
Application Number:	17136801
International Application Number:	
Confirmation Number:	2083
Title of Invention:	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS
First Named Inventor/Applicant Name:	Joon Bae KIM
Customer Number:	62574
Filer:	Yeasun Yoon
Filer Authorized By:	
Attorney Docket Number:	8365-87-PUS-CON-7
Receipt Date:	06-SEP-2021
Filing Date:	29-DEC-2020
Time Stamp:	22:36:49
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	Req to correct/update/change appl name until pay issue fee	PAX0001US-Request_ChangeApplicant_.pdf	1094691 fbab083fcb346661d98ff531dbe503e934891dfa	no	2

Warnings:

Information:					
2	Application Data Sheet	PAX0001US-Markedup_ADS.pdf	782202 46bc32e4dfd7e6f07fce199e2511fbfed975d641	no	9
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
3	Request for Corrected Filing Receipt	PAX0001US-Request_CFR_.pdf	159830 4f82ba85aded96c4afa7b2eeba03f18a314e7dc5	no	1
Warnings:					
Information:					
4	Request for Corrected Filing Receipt	PAX0001US-Markedup_OFR.pdf	1143175 88fdf4d254bce162370c302fc35de618942bc7e4	no	13
Warnings:					
Information:					
5	Assignee showing of ownership per 37 CFR 3.73	PAX0001US-373.pdf	2308726 d3a8be9775406323cee1d4f73d05236457f45c3e	no	3
Warnings:					
Information:					
6	Power of Attorney	PAX0001US-POA_.pdf	962783 6a983a67195c9221e9325afc1e51a7baa7061fbb	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	6451407	

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: R46C.REQ
Document Description: Request under 37 CFR 1.46(c) to correct, update or change the applicant.

PTO/AIA/41 (04-15)
Approved for use through 11/30/2020. 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 displays a valid OMB control number.

REQUEST TO CORRECT OR UPDATE THE NAME OF THE APPLICANT UNDER 37 CFR 1.46(c)(1), OR CHANGE THE APPLICANT UNDER 37 CFR 1.46(c)(2)
(FOR USE ONLY IN APPLICATIONS FILED ON OR AFTER SEPTEMBER 16, 2012)

Application Number	17/136,801
Filing Date	2020-12-29
First Named Inventor	Joon Bae KIM
Art Unit	2633
Examiner Name	ALI, SHAWKAT M
Practitioner Docket Number	PAX0001US

To: Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Applicant hereby **requests that the name of the applicant be corrected or updated under 37 CFR 1.46(c)(1), or that the applicant be changed under 37 CFR 1.46(c)(2),** in the above-identified application. **Requests under 37 CFR 1.46(c)(1) or (c)(2) cannot be submitted after payment of the issue fee or if the application has been patented.**

Please check the applicable box(es) below.

☐ 1. This request is to **correct or update the name of the applicant (under 37 CFR 1.46(c)(1))** and includes:

☐ An application data sheet (ADS) in accordance with 37 CFR 1.76(c) with the corrected or updated information shown with markings (*e.g.*, underlining for insertions, strikethrough for deletions). A Corrected Web-based ADS may be used.

Note: Requests under 37 CFR 1.46(c)(1) may be filed to correct typographical errors in the name of the § 1.46 applicant, or for updating the name of the § 1.46 applicant (*i.e.*, where there is no change in the applicant itself but just in the applicant's name). See the Manual of Patent Examining Procedure (MPEP) section 605.01.

☒ 2. This request is to **change the applicant (under 37 CFR 1.46(c)(2))** and includes:

☒ An application data sheet (ADS) in accordance with 37 CFR 1.76(c) that identifies the changes with proper markings (underlining for insertions and strikethrough for deletions). A Corrected Web-based ADS may be used.

☒ A Statement Under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent). See MPEP 325.

I am the

☐ applicant* ☒ attorney or agent of record Registration number 73663 ☐ attorney or agent acting under 37 CFR 1.34 Registration number _____

Signature /Yeasun Yoon, Reg.# 73663/
Typed or printed name Yeasun Yoon
Date 2021-09-06

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. *Juristic entities must be represented by a patent practitioner (See 37 CFR 1.31, applicable to any paper filed on or after September 16, 2012 that is presented on behalf of a juristic entity, regardless of application filing date). Submit multiple forms if more than one signature is required, see below**.

☐ ** Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.36. 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 optian 2.

Privacy Act Statement

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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.
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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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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.

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	~~8365-87-PUS-CON-7~~ PAX0001US
	Application Number	17/136,801
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

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
	Joon	Bae	KIM	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	Lexington	State/Province	MA	Country of Residence i	US

Mailing Address of Inventor:

Address 1	14 Pine Knoll Road		
Address 2			
City	Lexington	State/Province	MA
Postal Code	02420	Country i	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Marcos	C.	TZANNES	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

City	Petaluma	State/Province	CA	Country of Residence i	US

Mailing Address of Inventor:

Address 1	1943 Castle Dr.		
Address 2			
City	Petaluma	State/Province	CA
Postal Code	94954	Country i	US

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).

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	~~8365-87-PUS-CON-7~~ PAX0001US
	Application Number	17/136,801
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	~~82574~~ 167455		
Email Address	~~jvick@sheridanross.com~~ patent@capitoliplaw.com	Add Email	Remove Email

Application Information:

Title of the Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS		
Attorney Docket Number	~~8365-87-PUS-CON-7~~ PAX0001US	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	8	**Suggested Figure for Publication (if any)**	

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	~~82574~~ 167455		

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	~~8365-87-PUS-CON-7~~ PAX0001US
	Application Number	17/136,801
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

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)**
	Continuation of	16/780589	2020-02-03

Prior Application Status	Patented				Remove
Application Number	**Continuity Type**	**Prior Application Number**	**Filing Date (YYYY-MM-DD)**	**Patent Number**	**Issue Date (YYYY-MM-DD)**
16/780589	Continuation of	16/394490	2019-04-25	10554459	2020-02-04

Prior Application Status	Patented				Remove
Application Number	**Continuity Type**	**Prior Application Number**	**Filing Date (YYYY-MM-DD)**	**Patent Number**	**Issue Date (YYYY-MM-DD)**
16/394490	Continuation of	16/125206	2018-09-07	10291449	2019-05-14

Prior Application Status	Patented				Remove
Application Number	**Continuity Type**	**Prior Application Number**	**Filing Date (YYYY-MM-DD)**	**Patent Number**	**Issue Date (YYYY-MM-DD)**
16/125206	Continuation of	15/958519	2018-04-20	10079707	2018-09-18

Prior Application Status	Patented				Remove
Application Number	**Continuity Type**	**Prior Application Number**	**Filing Date (YYYY-MM-DD)**	**Patent Number**	**Issue Date (YYYY-MM-DD)**
15/958519	Continuation of	15/476284	2017-03-31	9973361	2018-05-15

Prior Application Status	Patented				Remove
Application Number	**Continuity Type**	**Prior Application Number**	**Filing Date (YYYY-MM-DD)**	**Patent Number**	**Issue Date (YYYY-MM-DD)**
15/476284	Continuation of	15/350418	2016-11-14	9614566	2017-04-04

Prior Application Status	Patented				Remove
Application Number	**Continuity Type**	**Prior Application Number**	**Filing Date (YYYY-MM-DD)**	**Patent Number**	**Issue Date (YYYY-MM-DD)**
15/350418	Continuation of	13/376856	2012-02-08	9584262	2017-02-28

Prior Application Status	Expired		Remove
Application Number	**Continuity Type**	**Prior Application Number**	**Filing or 371(c) Date (YYYY-MM-DD)**
13/376856	a 371 of international	PCT/US2010/046088	2010-08-20

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	~~8365-87-PUS-CON-7~~ PAX0001US
	Application Number	17/136,801
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
PCT/US2010/046088	Claims benefit of provisional	61/235909	2009-08-21
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.			Add

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).

Remove

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

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

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	~~8365-87-PUS-CON-7~~ PAX0001US
	Application Number	17/136,801
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

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.

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	~~8365-87-PUS-CON-7~~ PAX0001US
	Application Number	17/136,801
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

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	~~APPLIED TRANSFORM, LLC~~ AX WIRELESS LLC		
Mailing Address Information For Applicant:			
Address 1	~~101 Great Road~~ 3000 POLAR LANE		
Address 2	~~Suite 217~~		
City	~~Bedford~~ CEDAR PARK	**State/Province**	~~MA~~ TX
Country	US	Postal Code	~~01730~~ 78613
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.

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	~~8365-87-PUS-CON-7~~ PAX0001US
	Application Number	17/136,801
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

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:

Remove

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	/Yeasun Yoon, Reg.# 73663/			Date (YYYY-MM-DD)	2021-09-06
First Name	Yeasun	Last Name	Yoon	Registration Number	73663

Additional Signature may be generated within this form by selecting the Add button. Add

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	~~8365-87-PUS-CON-7~~ PAX0001US
	Application Number	17/136,801
Title of Invention	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS	

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 CooperationTreaty.

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
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
17/136,801	12/29/2020	Joon Bae KIM	PAX0001US

CONFIRMATION NO. 2083

167455
Capitol IP Law Group, PLLC
1629 K Street NW Suite 300
Washington, DC 20006-1631

POA ACCEPTANCE LETTER

OC000000128227484

Date Mailed: 09/08/2021

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 09/06/2021.

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**.

/ggasgedom/

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
17/136,801	12/29/2020	Joon Bae KIM	8365-87-PUS-CON-7

CONFIRMATION NO. 2083

POWER OF ATTORNEY NOTICE

OC000000128227434

62574
Jason H. Vick
Sheridan Ross, PC
Suite # 1200
1560 Broadway
Denver, CO 80202

Date Mailed: 09/08/2021

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 09/06/2021.

- 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**.

/ggasgedom/

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	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
17/136,801	12/29/2020	2633	1820	PAX0001US	1	1

CONFIRMATION NO. 2083

CORRECTED FILING RECEIPT

167455
Capitol IP Law Group, PLLC
1629 K Street NW Suite 300
Washington, DC 20006-1631

OC000000128227589

Date Mailed: 09/08/2021

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)

Joon Bae KIM, Lexington, MA;
Marcos C. TZANNES, Petaluma, CA;

Applicant(s)

AX WIRELESS LLC, CEDAR PARK, TX;

Power of Attorney: The patent practitioners associated with Customer Number 167455

Domestic Priority data as claimed by applicant

This application is a CON of 16/780,589 02/03/2020 PAT 10917272
which is a CON of 16/394,490 04/25/2019 PAT 10554459
which is a CON of 16/125,206 09/07/2018 PAT 10291449
which is a CON of 15/958,519 04/20/2018 PAT 10079707
which is a CON of 15/476,284 03/31/2017 PAT 9973361
which is a CON of 15/350,418 11/14/2016 PAT 9614566
which is a CON of 13/376,856 02/08/2012 PAT 9584262
which is a 371 of PCT/US2010/046088 08/20/2010
which claims benefit of 61/235,909 08/21/2009

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: 01/13/2021

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/136,801**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No

Title

HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS

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 AssetsControl, 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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Examiner: ALI, SHAWKAT M
Joon Bae KIM, et al.	Group Art Unit: 2633
Application No.: 17/136,801	Confirmation No.: 2083
Filing Date: December 29, 2020	Attorney Docket No.: PAX0001US

Title: HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY AND AMENDMENT UNDER 37 C.F.R. § 1.111

Sir or Madam:

In response to the Non-Final Office Action dated June 9, 2021 ("Office Action"), Applicant respectfully requests reconsideration of the application in view of the following Amendments and Remarks.

Amendments to the Claims begin on page 2.

Remarks begin on page 5.

No extensions of time are required at this time. If extensions of time are necessary to prevent abandonment of this application, then they are petitioned for under 37 C.F.R. § 1.136(a). No fees for net addition of claims are required at this time. Any fees required for extensions of time or for the net addition of claims may be charged to our Deposit Account No. 603320.

AMENDMENTS TO THE CLAIMS

Please **CANCEL** claim 60 without prejudice or disclaimer.

Please **ADD** new claims 61-70 as shown below.

This claim list replaces all prior claim lists in the application.

1-60. (Cancelled)

61. (New) A wireless communication device, comprising:

a wireless receiver configured to receive a wireless packet through a communication channel, formats of the wireless packet including a first packet format and a second packet format, the first packet format comprising a first header field carried by a first orthogonal frequency division multiplexing (OFDM) symbol, the second packet format comprising both the first header field carried by the first OFDM symbol and a second header field carried by a second OFDM symbol which follows the first OFDM symbol, and the second header field being a repetition of the first header field; and

a demodulator configured to demodulate the received wireless packet,

wherein the wireless receiver distinguishes the second packet format from the first packet format by detecting, from the received wireless packet, the second header field which repeats the first header field.

62. (New) The wireless communication device of claim 61, wherein the wireless receiver determines the received wireless packet as the second packet format when the second header field is detected from the wireless packet.

63. (New) The wireless communication device of claim 61, wherein the wireless receiver determines the received wireless packet as the first packet format when the second header field is not detected from the wireless packet.

64. (New) The wireless communication device of claim 61, wherein the first and second header fields contain information for decoding the wireless packet.

65. (New) The wireless communication device of claim 61, wherein the first and second header fields contain information related to a length of the wireless packet.

66. (New) A wireless communication method, comprising:

receiving a wireless packet through a communication channel, formats of the wireless packet including a first packet format and a second packet format, the first packet format comprising a first header field carried by a first orthogonal frequency division multiplexing (OFDM) symbol, the second packet format comprising both the first header field carried by the first OFDM symbol and a second header field carried by a second OFDM symbol which follows the first OFDM symbol, and the second header field being a repetition of the first header field; and

demodulating the received wireless packet,

wherein the second packet format is distinguished from the first packet format by detecting, from the received wireless packet, the second header field which repeats the first header field.

67. (New) The wireless communication method of claim 66, wherein the received wireless packet is determined as the second packet format when the second header field is detected from the wireless packet.

68. (New) The wireless communication method of claim 66, wherein the received wireless packet is determined as the first packet format when the second header field is not detected from the wireless packet.

69. (New) The wireless communication method of claim 66, wherein the first and second header fields contain information for decoding the wireless packet.

70. (New) The wireless communication method of claim 66, wherein the first and second header fields contain information related to a length of the wireless packet.

REMARKS

Claim 60 has been canceled without prejudice or disclaimer, and new claims 61-70 have been added. Accordingly, claims 61-70 are currently pending in the application, of which claims 61 and 66 are independent.

Applicant respectfully submits that the above amendments and added claims do not add new matter to the application and are fully supported by the specification.

In view of the above amendments and the following Remarks, Applicant respectfully requests reconsideration and timely withdrawal of the pending rejections for the reasons discussed below.

Rejection of Claims under Double Patenting

Claim 60 stands rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 10,917,272, claim 1 of U.S. Patent No. 10,291,449, claim 1 of U.S. Patent No. 9,973,361, claim 1 of U.S. Patent No. 9,614,566, and claim 1 of U.S. Patent No. 9,609,091 issued to Kim, et al.

Claim 60 has been canceled without prejudice or disclaimer. Accordingly, Applicant respectfully requests withdrawal of the double patenting rejection of claim 60.

Rejections Under 35 U.S.C. § 102

Claim 60 stands rejected under 35 U.S.C. § 102(b) as being allegedly anticipated by U.S. U.S. Patent Application Publication No. 2004/0047296 applied for by Tzannes *et al.* ("Tzannes").

Without conceding to the correctness of the present rejection, claim 60 has been canceled without prejudice or disclaimer, thereby rendering the rejection moot.

Accordingly, Applicant respectfully requests withdrawal of the 35 U.S.C. § 102(b) rejection of claim 60.

Added Claims

Added claims 61-70 are directed to additional features of the invention, which are not disclosed or suggested in the art of record. Particularly, the cited reference Tzannes does not teach the present claim features.

CONCLUSION

A full and complete response has been made to the pending Office Action, and all of the stated grounds for rejection have been overcome or rendered moot. Accordingly, all pending claims are allowable, and the application is in condition for allowance.

The Examiner is invited to contact Applicant's undersigned representative at the number below if it would expedite prosecution. Prompt and favorable consideration of this Reply is respectfully requested.

Respectfully submitted,

/benjamin c rothermel/

Benjamin C. Rothermel
Reg. No. 61,893

Date: September 9, 2021

CUSTOMER NO. 167455
Capitol IP Law Group, PLLC
1629 K Street NW Suite 300
Washington DC 20006-1631
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BCR/esp

Electronic Acknowledgement Receipt

EFS ID:	43717283
Application Number:	17136801
International Application Number:	
Confirmation Number:	2083
Title of Invention:	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS
First Named Inventor/Applicant Name:	Joon Bae KIM
Customer Number:	167455
Filer:	Benjamin Caen Rothermel
Filer Authorized By:	
Attorney Docket Number:	PAX0001US
Receipt Date:	09-SEP-2021
Filing Date:	29-DEC-2020
Time Stamp:	09:11:05
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		PAX0001US_2021-09-09_Reply NFOA_FILED.pdf	41622 d1b9cbbe95464af5dd7ed711ded92b473856526b	yes	7

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	4
	Applicant Arguments/Remarks Made in an Amendment	5	7
Warnings:			
Information:			
	Total Files Size (in bytes):	41622	

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.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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 displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 17/136,801	Filing Date 12/29/2020	☐ 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), (i), 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 $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $480 =	
☐ 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

AMENDMENT	09/09/2021	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 10	Minus	** 20	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0		x $480 =	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		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) 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.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/SHEILA D CHAPMAN/
*** 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 number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. 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 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.

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UNITED STATES DEPARTMENT OF COMMERCE
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NOTICE OF ALLOWANCE AND FEE(S) DUE

167455 7590 11/10/2021
Capitol IP Law Group, PLLC
1629 K Street NW Suite 300
Washington, DC 20006-1631

EXAMINER
ALI, SHAWKAT M

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 11/10/2021

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/136,801	12/29/2020	Joon Bae KIM	PAX0001US	2083

TITLE OF INVENTION: HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	02/10/2022

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 and an extra copy of the form should be submitted. 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.

PTOL-85 (Rev. 02/11)

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)

167455 7590 11/10/2021
Capitol IP Law Group, PLLC
1629 K Street NW Suite 300
Washington, DC 20006-1631

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.
17/136,801	12/29/2020	Joon Bae KIM	PAX0001US	2083

TITLE OF INVENTION: HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1200	$0.00	$0.00	$1200	02/10/2022

EXAMINER	ART UNIT	CLASS-SUBCLASS
ALI, SHAWKAT M	2633	370-328000

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/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 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 DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/136,801	12/29/2020	Joon Bae KIM	PAX0001US	2083

167455 7590 11/10/2021
Capitol IP Law Group, PLLC
1629 K Street NW Suite 300
Washington, DC 20006-1631

EXAMINER
ALI, SHAWKAT M

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 11/10/2021

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. 17/136,801	Applicant(s) KIM et al.	
	Examiner SHAWKAT M ALI	Art Unit 2633	AIA (FITF) Status No

-- 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 09/09/2021.
   ☐ 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 61-70 (renumbered as 1-10) . 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 _____.

/SHAWKAT M ALI/
Primary Examiner, Art Unit 2633

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Response to Remarks

2. With respect to the claim rejections of the pervious Office Action, mailed on 06/09/21, have been withdrawn due to proper amendments and/or persuasive arguments.

Reason for Allowance

3. **Regarding claims 61 & 66**, prior art of record fails to disclose the second packet format comprising both the first header field carried by the first OFDM symbol and a second header field carried by a second OFDM symbol which follows the first OFDM symbol and the second header field being a repetition of the first header field.

Therefore, regarding claims 61-70 (renumbered as 1-10) having considered all limitations do not appear to be anticipated by, or obvious in view of, the prior art of record.

Any comments considered necessary by Applicant must be submitted no later than the 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

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

I. **Wang** (US 2010/0329366 A1) discloses packet data structure (**Figure 3**).

II. **Ma** (US 2003/0072255 A1) discloses header structure (**Figure 4**).

5. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to SHAWKAT M. ALI whose telephone number is (571) 270-1639. The Examiner can normally be reached on Monday-Thursday 8:30AM-3:30PM ET.

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 AIR at http://www.uspto.gov/interviewpractice.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's Supervisor, SAM K. AHN can be reached on (571) 272-3044. 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.

/SHAWKAT M ALI/

Primary Examiner, Art Unit 2633

Notice of References Cited	Application/Control No. 17/136,801	Applicant(s)/Patent Under Reexamination KIM et al.	
	Examiner SHAWKAT M ALI	Art Unit 2633	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-20100329366-A1	12-2010	Wang; Dong	H04L5/0042	375/259
*	B	US-20030072255-A1	04-2003	Ma, Jianglei	H04L7/0008	370/208
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

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

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*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.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/136,801	KIM et al.
	Examiner	**Art Unit**
	SHAWKAT M ALI	2633

CPC - Searched*		
Symbol	**Date**	**Examiner**
H04B1/38, H04B7/00, H04B7/155	06/04/2021	/SA/
H04J1/00, H04J3/00, H04J3/24, H04J11/00	06/04/2021	/SA/
H04L1/00, H04L1/08, H04L5/00, H04L12/26, H04L12/43, H04L12/54 , H04L12/56, H04L12/403, H04L27/28	06/04/2021	/SA/
H04M1/00	06/04/2021	/SA/
H04W4/00, H04W24/00, H04W52/02, H04W72/04, H04W72/12, H04W74/08	06/04/2021	/SA/

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**
370	207,229,242,252,294,328,329,330,336,338,356,389, 449,474	06/04/2021	/SA/
375	130,219,259,260,261,267,295,316	06/04/2021	/SA/

* 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: Inventors, Assignee, Class/Subclass, CPC and Keywords Searches.	06/04/2021	/SA/
Foreign and NPL Searches.	06/04/2021	/SA/
Foreign, Google and NPL Searches.	11/01/2021	/SA/

/SHAWKAT M ALI/ Primary Examiner, Art Unit 2633	

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/136,801	KIM et al.
	Examiner	**Art Unit**
	SHAWKAT M ALI	2633

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
	EAST Interference Search.	11/01/2021	/SA/

/SHAWKAT M ALI/ Primary Examiner, Art Unit 2633	

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/136,801	KIM et al.
	Examiner	**Art Unit**
	SHAWKAT M ALI	2633

CPC						
Symbol					**Type**	**Version**
H04L	/	27	/	2601	F	2013-01-01
H04L	/	27	/	2613	I	2013-01-01
H04L	/	1	/	08	I	2013-01-01
H04B	/	1	/	38	I	2013-01-01
H04L	/	69	/	22	I	2013-01-01

CPC Combination Sets								
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE (Assistant Examiner) (Date)		**Total Claims Allowed:** 10	
/SHAWKAT M ALI/ Primary Examiner, Art Unit 2633 (Primary Examiner) (Date)	01 November 2021	O.G. Print Claim(s) 61	O.G. Print Figure 1

U.S. Patent and Trademark Office Part of Paper No.: 20211101

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/136,801	KIM et al.
	Examiner	**Art Unit**
	SHAWKAT M ALI	2633

INTERNATIONAL CLASSIFICATION				
CLAIMED				
H04L	/	27	/	26

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**
370	328

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

NONE (Assistant Examiner) (Date)		**Total Claims Allowed:** 10	
/SHAWKAT M ALI/ Primary Examiner, Art Unit 2633 (Primary Examiner) (Date)	01 November 2021	O.G. Print Claim(s) 61	O.G. Print Figure 1

U.S. Patent and Trademark Office Part of Paper No.: 20211101

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/136,801	KIM et al.
	Examiner	**Art Unit**
	SHAWKAT M ALI	2633

☐ 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	-	10	-	19	-	28	-	37	-	46	-	55	4	64
-	2	-	11	-	20	-	29	-	38	-	47	-	56	5	65
-	3	-	12	-	21	-	30	-	39	-	48	-	57	6	66
-	4	-	13	-	22	-	31	-	40	-	49	-	58	7	67
-	5	-	14	-	23	-	32	-	41	-	50	-	59	8	68
-	6	-	15	-	24	-	33	-	42	-	51	-	60	9	69
-	7	-	16	-	25	-	34	-	43	-	52	1	61	10	70
-	8	-	17	-	26	-	35	-	44	-	53	2	62		
-	9	-	18	-	27	-	36	-	45	-	54	3	63		

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 10	
/SHAWKAT M ALI/ Primary Examiner, Art Unit 2633 (Primary Examiner)	01 November 2021 (Date)	O.G. Print Claim(s) 61	O.G. Print Figure 1

Bibliographic Data

Application No: 17/136,801

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /SHAWKAT M ALI/ (Examiner's Signature) [ ] (Initials)

Title: HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
12/29/2020	370	2633	PAX0001US
RULE			

APPLICANTS

AX WIRELESS LLC, CEDAR PARK, TX,

INVENTORS

Joon Bae KIM, Lexington, MA, UNITED STATES

Marcos C. TZANNES, Petaluma, CA, UNITED STATES

CONTINUING DATA

This application is a CON of 16780589 02/03/2020 PAT 10917272

16780589 is a CON of 16394490 04/25/2019 PAT 10554459

16394490 is a CON of 16125206 09/07/2018 PAT 10291449

16125206 is a CON of 15958519 04/20/2018 PAT 10079707

15958519 is a CON of 15476284 03/31/2017 PAT 9973361

15476284 is a CON of 15350418 11/14/2016 PAT 9614566

15350418 is a CON of 13376856 02/08/2012 PAT 9584262

13376856 is a 371 of PCT/US2010/046088 08/20/2010

PCT/US2010/046088 has PRO of 61235909 08/21/2009

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

01/13/2021

STATE OR COUNTRY

UNITED STATES

ADDRESS

Capitol IP Law Group, PLLC
1629 K Street NW Suite 300
Washington, DC 20006-1631

UNITED STATES

FILING FEE RECEIVED

$1,820

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	("13376856").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2014/06/06 10:59
S2	2,601	((Joon) near2 (Kim)).INV.	US-PGPUB; USPAT	OR	ON	2014/06/11 09:11
S3	237	((Marcos) near2 (Tzannes)).INV.	US-PGPUB; USPAT	OR	ON	2014/06/11 09:12
S4	2,832	S2 S3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/06/11 09:12
S5	3	S4 and "OFDM" and "TXOP" and ("MAC" "MAP")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/06/11 09:13
S6	28,058	(370/338,356,458,468).ccls.	US-PGPUB; USPAT;	OR	ON	2014/06/11 09:51

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S7	16,810	(375/219,260).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/06/11 09:51
S8	44,525	S6 S7	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/06/11 09:51
S9	158	S8 and "OFDM" and "TXOP" and ("MAC" "MAP")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/06/11 09:51
S10	80	S8 and "OFDM" and ("TXOP" same ("MAC" "MAP"))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2014/06/11 09:52

			IBM_TDB			
S11	45	S10 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/06/11 09:52
S13	467	beacon near2 header	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/02/10 11:46
S14	21	"OFDM" same "TXOP" same header	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/15 15:35
S15	325	"TXOP" with bit	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/15 16:59
S16	3,069	"OFDM" same header	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2015/12/15 16:59

			EPO; JPO; DERWENT; IBM_TDB			
S17	26	S15 and S16	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/15 16:59
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or ("20150016360") or ("7062703") or ("8467331") or ("20150023288") or ("20060193277") or ("20080273536") or ("20140369263") or ("20120189042") or ("20090041134") or ("8023593") or ("9071990") or ("8897298") or ("20140071997") or ("8488442") or ("20130107895") or ("8576882") or ("20060023802") or ("7881237") or ("8797836") or ("8498350") or ("20070286066") or ("20090141668") or ("20140341066") or ("20120250796") or ("20140233478") or ("20130016651") or ("20140269559") or ("20130265920") or ("8576938") or ("20140269659") or ("20110280329") or ("8385308") or ("20100118772") or ("9100072") or ("8781016") or ("20140079145") or ("20060212773")).PN. or (("20140198805") or ("9112753") or ("20150146607") or ("20110280261") or ("20120257606") or ("20150131530") or ("20110286404") or ("20110286322") or ("20140307625") or ("9001909") or ("20140219264") or ("20050232139") or ("8964521") or ("20130107912") or ("20150055546") or ("20120027119") or ("20120250668") or ("20120250617") or ("20140254349") or ("20140128066") or ("9191882") or ("9191092") or ("8737189") or ("20060182017") or ("20150124794") or ("9001904") or ("20140029645") or ("20090238293") or ("20140112397") or ("8218661") or ("20100046441") or ("20110268161") or ("20150030101") or ("20080198786") or ("8730878") or ("20110280332") or ("8576753") or ("20150124704") or ("20130223422") or ("20120051361") or ("20110216816") or ("20140006908") or ("20140119351") or ("8693558") or ("8457125") or ("7995672") or ("20150110163") or ("20140071956") or ("8660013") or ("8315235") or ("7995665") or ("20100086013") or ("20100202424") or ("8479076") or ("20130114757") or ("20100189167") or ("20100157907") or ("9008066") or ("8255760") or ("20110038284") or ("20120314711") or ("8774222") or ("20020012343") or ("8958464") or ("20100115372") or ("9066297") or ("8437245") or ("9143290") or ("20010055311") or ("20140146722") or ("20120207140") or ("20110051706") or ("20050169261") or ("20140192985") or ("8948284") or ("7035285") or ("6898204") or ("20150201433") or ("20090312073") or ("8498607") or ("20140146758") or ("20130279389") or ("20130128809") or ("20080031205") or ("20120314744") or ("20110267956") or ("7046746") or ("20110164707") or ("20110268200") or ("20090316815") or ("20060176968") or ("6882634") or ("8576931") or ("20140036775") or ("20020012337") or

		("20050094569") or ("20140064262") or ("20130128808") or ("8223867") or ("20030206561") or ("20140348117") or ("20140328435") or ("7426249") or ("20080187136") or ("7433298") or ("20020057713") or ("20080170556") or ("6988236") or ("8804609") or ("20060215626") or ("8966346") or ("20100329195") or ("6950444") or ("9014205") or ("20120054584") or ("20020003792") or ("8761033") or ("20020080886") or ("20130142094") or ("8867565") or ("20070060149")).PN.				
S19	250	(("20120170625") or ("20050249266") or ("20040198265") or ("8537796") or ("7421046") or ("7580444") or ("20060140251") or ("20150327284") or ("7656850") or ("20110080963") or ("20110110437") or ("20070091785") or ("8761307") or ("8989233") or ("20140247815") or ("20150195839") or ("20140341139") or ("20130182663") or ("20140254504") or ("8681767") or ("20110176532") or ("20140286183") or ("20110013534") or ("7796716") or ("20080043888") or ("9154963") or ("8824396") or ("8498239") or ("8837440") or ("20070004465") or ("20130343267") or ("20120155408") or ("7804772") or ("20110310835") or ("20130322363") or ("7936806") or ("9166718") or ("8831121") or ("20120327875") or ("20030021237") or ("8774101") or ("20130114491") or ("20080187063") or ("20140348056") or ("20120201229") or ("9191036") or ("9130699") or ("20140019828") or ("8761229") or ("20150017989") or ("20110205999") or ("20130301549") or ("20110026642") or ("9178677") or ("8879602") or ("20060114826") or ("9118401") or ("20150094078") or ("20080130486") or ("20090310619") or ("8169994") or ("8553790") or ("8891350") or ("8102929") or ("20100272192") or ("8649443") or ("20080013640") or ("20130329661") or ("20080219235") or ("8532082") or ("20110019715") or ("8276025") or ("20100002675") or ("20120188946") or ("20130294399") or ("20100202493") or ("20140355555") or ("8848581") or ("20140016579") or ("20150036629") or ("20120087396") or ("8917697") or ("20090307541") or ("8363577") or ("8619805") or ("20120128035") or ("20100272219") or ("8050203") or ("20120163334") or ("20110274016") or ("20070091983") or ("20130195145") or ("6014545") or ("20020034267") or ("6246716") or ("20020054632") or ("7089014") or ("9066334") or ("8593979") or ("8660042") or ("20060153155") or ("8958374") or ("7983356") or ("20030027577") or ("20120287877") or ("8724742") or ("8817844") or ("20120320951") or ("20130163449") or ("20060008016") or ("8472555")	US-PGPUB; USPAT	OR	OFF	2015/12/16 07:23

or ("20150189676") or ("9078278") or ("8855073") or ("20110058626") or ("7668265") or ("20110319113") or ("20140211892") or ("7872583") or ("20110026419") or ("20130235943") or ("7460620") or ("20110110321") or ("5511090") or ("8411660") or ("20140198758") or ("20060280116") or ("9137803") or ("20120281625") or ("20150304995")).PN. or (("20120307760") or ("9112686") or ("20150289144") or ("20090004984") or ("9001935") or ("20150003379") or ("20030161411") or ("8213367") or ("20090041087") or ("8848763") or ("9088385") or ("20130315184") or ("20070263702") or ("7099413") or ("20070082633") or ("7940852") or ("20150009927") or ("8780798") or ("20020177446") or ("7706247") or ("7620112") or ("8472385") or ("7564863") or ("20130294333") or ("20070097915") or ("7483674") or ("8705655") or ("7876840") or ("7180850") or ("7280607") or ("20060029168") or ("6795485") or ("7653122") or ("20150358193") or ("7626918") or ("20130070692") or ("20110317633") or ("20140307689") or ("20090080575") or ("20140029568") or ("20140119244") or ("20090262700") or ("20150036651") or ("8284732") or ("7609712") or ("20150172949") or ("20150017923") or ("8867469") or ("20130182685") or ("20060008017") or ("20110310856") or ("20070105508") or ("6711122") or ("8660081") or ("20120269287") or ("8615046") or ("20110122846") or ("7184485") or ("9173109") or ("20140241326") or ("20060046659") or ("20070263735") or ("20110110320") or ("20150326347") or ("20110188585") or ("20070086326") or ("7853205") or ("20140126526") or ("20070081505") or ("20050237923") or ("8483086") or ("8718021") or ("9071399") or ("20070110149") or ("20070086327") or ("20050030885") or ("6477210") or ("9100152") or ("20020067755") or ("20070064587") or ("20060212773") or ("8238496") or ("8054897") or ("5278826") or ("6853675") or ("8320320") or ("20120307917") or ("20020159516") or ("8891475") or ("8547911") or ("8902869") or ("20130163530") or ("20070201350") or ("20100195614") or ("20110206147") or ("20110103338") or ("8437245") or ("8089946") or ("7039105") or ("20070121741") or ("20110051706") or ("20130016694") or ("8422465") or ("20090290552") or ("8045991") or ("7599346") or ("8693442") or ("20110211652") or ("7969311") or ("20110182332") or ("7376117") or ("20110103500") or ("8891593") or ("20130163501") or ("8089887") or ("20140269368") or ("20050190715") or ("20130028209") or ("20140119291") or ("20040081191")).PN.

S20	6	S18 and S19	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/16 07:24
S21	9	S18 and "TXOP"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/16 07:28
S22	2	("20040179517").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/12/16 08:46
S23	2	("20070171858").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2015/12/16 09:53
S24	16,965	((media adj access adj plan) "MAP") near3 frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2015/12/16 10:03

			DERWENT; IBM_TDB			
S25	7,581	((transmission adj opportunity) or "TXOP")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/16 10:04
S26	252	S24 and S25	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/16 10:04
S27	170	S24 and S25 and header	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/16 10:04
S28	96	S24 and S25 and header and (ofdm$1 dmt)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/16 10:05
S29	2	("20040179517").PN.	US-PGPUB; USPAT;	OR	OFF	2015/12/22 07:40

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S31	84	((orthogonal adj frequency adj division adj multiplex$3) or "OFDM") with ((transmission adj opportunity) or "TXOP")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/26 11:24
S32	41	("20070060149" | "20070177541" | "20070206534" | "20080075058" | "20080084941" | "20080192644" | "20080292015" | "20090196163" | "20100046358" | "20100067589" | "20100091675" | "20100118829" | "20100309834" | "20110002219" | "20110038332" | "20110096796" | "20110096797" | "20110128929" | "20110128947" | "20110310827" | "20120082040" | "20130286959" | "7599332" | "7742390" | "8144647" | "8149811" | "8270909" | "8363578" | "8395997" | "8472383" | "8599803" | "8619907" | "8660497" | "8670399" | "8737405" | "8787338" | "8787385" | "8811203" | "8886755" | "8923118" | "8971350").PN. OR ("9215055").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/26 11:33
S33	16	S32 and ((transmission adj opportunity) or "TXOP")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/26 11:33
S34	31	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 dmt (multi adj2 carrier)) same ((transmission adj opportunity) or txop) same header	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWE	OR	ON	2015/12/27 11:03

			NT; IBM_TDB			
S35	10	("20050226204" | "20050254465" | "20060018268" | "20070058575" | "20080036909" | "20080181155" | "20090040965" | "7324605").PN. OR ("8817698").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 11:22
S36	73	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 dmt (multi adj2 carrier)) same ((transmission adj opportunity) or txop) same (header packet peamble)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 11:39
S37	42	S36 not S34	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 11:39
S38	8	S37 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 11:40
S39	19	("20030016686" | "20050055406" | "20050147034" | "20050175014" | "20060168313" | "6426943" | "6473425" | "6606301" | "6832261" | "6959002" | "7310337" | "7457313" | "7580355").PN. OR ("8139593").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 11:51
S40	64,423	(370/229,294,328,329,336,338,356,449).ccls.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 12:26

S41	28,065	(375/219,260,267,295,316).ccls.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 12:26
S42	2,815	(H04B1/38 H04B7/155).cpc.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 12:27
S43	1,559	(H04J1/00 H04J3/00 H04J3/24 H04J11/00).cpc.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 12:28
S44	8,852	(H04L1/00 H04L1/08 H04L5/00 H04L12/26 H04L12/43 H04L12/56 H04L12/403 H04L27/28).cpc.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 12:30
S45	440	(H04M1/00).cpc.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 12:31
S47	22,074	(H04W4/00 H04W24/00 H04W52/02 H04W72/04 H04W72/12 H04W74/08).cpc.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 12:33
S48	117,614	S40 S41 S42 S43 S44 S45 S47	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 12:33
S49	37,065	S48 and ofdm$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 12:33
S50	503	S49 and (((transmission adj opportunity) or txop) same (header packet peamble))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2015/12/27 12:34

			IBM_TDB			
S51	244	S49 and (((transmission adj opportunity) or txop) same (header peamble))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 12:34
S52	37	S51 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 12:35
S53	10	("20060239223" | "20070232358" | "20080089261" | "20080130603" | "6917598" | "7002929" | "7046649").PN. OR ("8155695").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 12:57
S54	761	S48 and ofdm$1 and ((transmission adj opportunity) or txop) and header	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 13:18
S55	186	S54 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 13:18

S56	149	S55 not (S34 S38 S52)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 13:19
S57	141	S56 and ("MAC" "MAP")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 13:20
S58	130	S56 and ("MAC" "MAP") and frame	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2015/12/27 13:20
S59	16	("20020141375" | "20040166870" | "20050075104" | "20070099567" | "20070224936" | "20080177751" | "20080254810" | "20090054002" | "20090147867" | "20090176454" | "20090196173" | "20090257379" | "20100085903" | "5237587" | "5774876" | "6249680").PN. OR ("8995996").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2015/12/27 13:58
S60	1	("13376856").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/08/07 12:51

S61	405	ofdm with packet with header	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/08/07 15:59
S62	55	S61 and overlapp$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/08/07 16:00
S63	4,643	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 dmt (multi adj2 carrier)) same header	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/05 10:00
S64	33,411	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 dmt (multi adj2 carrier)) same de$1modulat$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/05 10:02
S65	75,803	frequency with overlap$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2016/09/05 10:03

			DERWENT; IBM_TDB			
S66	233	S63 and S64 and S65	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/05 10:03
S67	182	S66 and packet	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/05 10:04
S68	2	S66 and packet and (header adj bit)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/05 10:04
S69	27	("20010048694" | "20050152358" | "20060222005" | "20080080437" | "20090316637" | "20100014463" | "20100016023" | "20100067379" | "20100177755" | "20100183087" | "20100260114" | "20110019557" | "20110026623" | "20110128846" | "20110128900" | "20110134816" | "20110149822" | "20110188424" | "20110267959" | "20110310834" | "20120014335" | "20140036895" | "8081665" | "8503367" | "8509193" | "8599803").PN. OR ("8982914").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/05 10:09
S70	78	S66 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2016/09/05 11:16

			EPO; JPO; DERWENT; IBM_TDB			
S71	7,639	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 dmt (multi adj2 carrier)) with (header pilot preamble training) with (packet frame slot)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/05 13:02
S72	660	(frequency with overlap$4) and S71	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/05 13:03
S73	23,442	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 dmt (multi adj2 carrier)) with de$1modulat$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/05 13:03
S74	230	S72 and S73	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/05 13:04

S75	130	S74 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/05 13:04
S76	25	("20020034213" | "20030081695" | "20050135308" | "5732113" | "6954481" | "7020226").PN. OR ("7457231").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/05 13:59
S78	8	((first near2 header) same bit same (repeat$4 or repet$6)) and (ofdm$ dmt) and sub$1carrier and demodulat$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/08 13:25
S79	13	("20040066844" | "20060171283" | "20060215790" | "20060274855" | "20070195907" | "20070268977" | "20080279168" | "5966412" | "7260159" | "7274653").PN. OR ("8675754").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/08 13:49
S80	5	((first adj3 header) same bit same (second adj3 header) same symbol) and ofdm$1 and subcarrier and demodulat$4	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/08 13:58
S81	390	(second different another other next separate 2nd) near4 (header preamble) with (packet! segment! pdu!) and (segment$9 portions! sections!) with (channels! bands! ccs! (component near carriers!)) and @ad<="20090821"	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/08 14:01
S82	53	S81 and ofdm$1	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/08 14:02
S83	32	("20020053058" | "20030098804" | "20030126551" | "20040141525" | "20040148546" | "20040223473" | "20050276266" | "20060084389" | "20070016838" | "20070092013" | "20080090583" | "20080219373" | "20080279322" | "20100077275" | "4449190" | "6222889" | "6829313" | "6912249" | "7180901" |	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/08 15:15

		"7200799" | "7213194" | "7360141" | "7782973" | "7965710").PN. OR ("8345533").URPN.				
S84	38	header same (repeat$4 repet$6 duplicat$4) same ofdm$ same sub$1carrier	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/09 08:15
S85	5	("20110149929" | "20120243630" | "20130051489" | "20130064313" | "20140198877").PN. OR ("8942303").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/09 08:31
S86	3,238	(wid$3 near3 band) and (narrow$3 near3 band) and ofdm$1	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/09 08:39
S87	54,434	(second different another other next separate 2nd) near3 header	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/09 08:40
S88	46	S86 and S87	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/09 08:40
S89	265	("20010008837" | "20010055952" | "20020006799" | "20020008658" | "20020019214" | "20020077787" | "20020085503" | "20020086641" | "20020111772" | "20020142744" | "20020154614" | "20020155811" | "20020173272" | "20020177446" | "20030050012" | "20030050015" | "20030123420" | "20030198200" | "20030198304" | "20030224741" | "20050180528" | "3812291" | "4597107" | "4839582" | "5093927" | "5142691" | "5144642" | "5276908" | "5303262" | "5355522" | "5428819" | "5446370" | "5574979" | "5608727" | "5610839" | "5636140" | "5636903" | "5655217" | "5687163" | "5732077" | "5745777" | "5752164" | "5809427" | "5850596" | "5864541" | "5889772" | "5892812" | "5907812" | "5990833" | "6031833" | "6052421" | "6084919" | "6141565" | "6167237" | "6169728" | "6212566" | "6226680" | "6229799" | "6229998" | "6240282" | "6240372" | "6256478" | "6256511" | "6275695" | "6295461" | "6307839" | "6317599" | "6332076" | "6336780" | "6349198" | "6351643" | "6374079" | "6374082" | "6385434" | "6418131" | "6442371" | "6442507" |	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/09 10:19

		"6466614" | "6499006" | "6629151" | "6671495" | "6711134" | "6882851" | "7113753").PN. OR ("7424268").URPN.				
S90	8	header and ofdm$ and S89	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/09 10:20
S91	2	("8675754").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/09/10 16:37
S92	3	("20100085964").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/09/10 16:38
S93	3	("20090086646").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/09/10 16:38
S94	220,338	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 or (discrete adj multi adj tone) or dmt or (multi adj2 carrier))	US-PGPUB; USPAT; USOCR;	OR	ON	2016/09/11 10:43

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S95	86,835	(second different another other next separate 2nd multiple plural$4) near3 header	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/11 10:44
S96	2,173	header with (sub$carrier tone sub$channel)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/11 10:44
S97	8,215	header with symbol	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/11 10:44
S98	138	S94 and S95 and S96 and S97	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/11 10:45

S99	67	S98 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/11 10:46
S100	89	("4281412" | "4324001" | "4447871" | "4462108" | "4516239" | "4554656" | "4661902" | "4706246" | "4774704" | "5023869" | "5111453" | "5396519" | "5465267" | "5559561" | "5689510" | "5832233" | "6009122").PN. OR ("6130894").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/11 11:31
S101	16	S97 and S100	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/11 11:31
S102	23,783	(frame packet segment slot pdu) with (narrow$3 wid$3) with (band frequency)	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/11 11:48
S103	3,003	S94 and S102	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/11 11:48
S104	114	S94 and S102 and S97	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/11 11:48
S105	111	S104 not (S99 S101)	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/11 11:48
S106	65	S105 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2016/09/11 11:48

S107	9	("20050088318" | "20060009228" | "20060153132" | "20070291713" | "20080090575" | "5839071" | "5875183" | "6246955" | "6791475").PN. OR ("8665816").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2016/09/11 12:13
S149	0	("15350418").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2016/12/28 07:38
S151	3	("20030072255").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/04 07:13
S152	2	("20040179517").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/04 07:18
S153	3	("2004/0179517").URPN.	USPAT	OR	ON	2017/01/04 07:24
S154	16	("20020071407" | "20030185181" | "20040179517" | "20050123047" | "20050147112" | "20070234186" | "20070297533" | "20090238208" | "5287463" | "5802115" | "6496798" | "6580713" | "6690719" | "6925592" | "7000173" | "7616636").PN. OR ("8266488").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2017/01/04 07:31
S155	2	"20050135318"	US-PGPUB; USPAT; USOCR	OR	ON	2017/01/04 08:01

S156	2	"20050135284"	US-PGPUB; USPAT; USOCR	OR	ON	2017/01/04 08:02
S157	2	("20050169261").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/04 08:04
S158	2	("20080219229").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/04 08:04
S159	3	("20090086646").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/04 08:09
S160	2	("20090290563").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/04 08:15
S161	3	("20100085964").PN.	US-PGPUB; USPAT;	OR	OFF	2017/01/04 08:20

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S162	2	("20100158046").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/04 08:22
S163	2	("20100208594").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/04 08:23
S164	2	("20100260137").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/01/04 08:25
S165	2	("20120170625").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	OFF	2017/01/04 08:30

			IBM_TDB			
S166	125	(("8483040") or ("20160255179") or ("20160255178") or ("20160254935") or ("20160255177") or ("7274652") or ("20120170625") or ("8194530") or ("20160066324") or ("20070297382") or ("20120294295") or ("8537796") or ("20110164623") or ("20110080963") or ("20110110437") or ("9363121") or ("6754170") or ("20140307684") or ("8705458") or ("8780813") or ("9420490") or ("20140254349") or ("20160277170") or ("20050152473") or ("20110216814") or ("20060268671") or ("7324605") or ("8472537") or ("8625690") or ("9232505") or ("20120236971") or ("20090232084") or ("9130812") or ("20090092090") or ("20150381399") or ("20130243115") or ("20130343478") or ("9264996") or ("20140016653") or ("20140078920") or ("8717957") or ("9253291") or ("9161262") or ("8582525") or ("20160112851") or ("20100098039") or ("7756002") or ("20060211377") or ("8144572") or ("20160135086") or ("20140126450") or ("7804765") or ("20140029551") or ("20160113016") or ("20120307751") or ("8989206") or ("20040151109") or ("8885661") or ("20110194475") or ("7916625") or ("7742388") or ("8737421") or ("20130010831") or ("7965798") or ("20130028155") or ("20130034075") or ("20160029244") or ("20080212652") or ("7522514") or ("20080049601") or ("20060018249") or ("8306161") or ("9379863") or ("20130202017") or ("20140153614") or ("20090028220") or ("20040047296") or ("9226270") or ("20110080873") or ("20090268832") or ("20110255433") or ("9300510") or ("20160286011") or ("9100275") or ("20120069877") or ("20090296614") or ("20110080857") or ("20090225817") or ("20140064223") or ("20130003587") or ("20110194586") or ("20090274061") or ("20140328435") or ("8284800") or ("7590071") or ("20130170411") or ("7924841") or ("9455845") or ("9191923") or ("20100220725") or ("8780824") or ("20110044273") or ("20140036711") or ("20120263107") or ("7512185") or ("20110211477") or ("20130215993") or ("9210611") or ("8159969") or ("20130235860") or ("20150023288") or ("20120263141") or ("9049155") or ("20160249332") or ("20150009855") or ("20100214992") or ("20140334323") or ("20050195765") or ("9071990") or ("20140369263") or ("20160373945") or ("20150003274") or ("8553579") or ("20160373969") or ("20050078707")).PN.	US-PGPUB; USPAT	OR	OFF	2017/01/04 08:48

S167	125	(("20120275528") or ("20140233615") or ("20160020934") or ("20150188742") or ("8718118") or ("8953657") or ("20160255177") or ("9154355") or ("20160254935") or ("20160255179") or ("20160255178") or ("8537796") or ("9363121") or ("20110110437") or ("20110080963") or ("20130336182") or ("20120189072") or ("20110216814") or ("20140119410") or ("8472537") or ("20160330738") or ("20120057483") or ("20040047296") or ("20160309457") or ("20130202017") or ("20080049601") or ("7522514") or ("7590071") or ("20140036711") or ("20130003587") or ("20090268832") or ("20090225817") or ("20110080857") or ("20130094517") or ("20100098039") or ("7916625") or ("20110211477") or ("20140334323") or ("20150003274") or ("20160373945") or ("20090296614") or ("9166860") or ("20150009855") or ("20100220725") or ("20160373969") or ("7804765") or ("20090274061") or ("20140126655") or ("8284800") or ("8755264") or ("7729281") or ("20120236879") or ("20120069877") or ("8553579") or ("20160329986") or ("7924841") or ("8958350") or ("8842570") or ("7298691") or ("20130286943") or ("20100322295") or ("8767523") or ("20110182254") or ("9450794") or ("9148806") or ("7577085") or ("8159969") or ("9461857") or ("8537703") or ("8416677") or ("9100275") or ("20130170411") or ("9313739") or ("20100303096") or ("7944851") or ("9148801") or ("8165096") or ("9191469") or ("20150304217") or ("20140112225") or ("20090285164") or ("20140050133") or ("20140140358") or ("20140301208") or ("20100050054") or ("20140161126") or ("20140233551") or ("8464138") or ("20120327987") or ("20130287045") or ("9380492") or ("20140198780") or ("9351250") or ("7577122") or ("20130272309") or ("20140211678") or ("20160174102") or ("20160242115") or ("20130138982") or ("20100265999") or ("20150319272") or ("20150016426") or ("9497764") or ("20130235860") or ("7849391") or ("20160330059") or ("9049155") or ("20100061320") or ("20150016360") or ("7415661") or ("9210611") or ("20150023288") or ("7512185") or ("7062703") or ("20050195765") or ("20140369263") or ("20060193277") or ("9386585") or ("8467331") or ("20080273536") or ("20120189042") or ("20160119047") or ("8023593") or ("20090041134") or ("9071990")).PN.	US-PGPUB; USPAT	OR	OFF	2017/01/04 08:50

S168	47	S166 and S167	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/01/04 08:50
S169	47	header and S168	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/01/04 08:51
S170	47	S169 and ofdm$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/01/04 08:52
S171	39	("20020085641" | "20030031278" | "20040141548" | "20040218683" | "20040228269" | "20050078598" | "4843352" | "6108369" | "7313190").PN. OR ("7512185").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2017/01/04 09:16
S204	1	("15476284").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/09/07 08:58
S206	3,727	((Joon) near2 (Kim)).INV.	US-PGPUB; USPAT	OR	ON	2017/09/07 09:38

S207	321	((Marcos) near2 (Tzannes)).INV.	US-PGPUB; USPAT	OR	ON	2017/09/07 09:38
S209	4,033	S206 S207	US-PGPUB; USPAT	OR	ON	2017/09/07 09:38
S210	20	S209 and ("OFDM" with transceiver with header with packet).clm.	US-PGPUB; USPAT	OR	ON	2017/09/07 09:39
S211	5	("9614566").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/11/29 13:08
S212	2	("9584262").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2017/11/29 13:10
S213	2	"15476284"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2017/12/11 08:07
S222	0	"15958519"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWE	OR	ON	2018/07/03 11:22

			NT; IBM_TDB			
S223	2	("9973361").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2018/07/03 11:26
S226	21	("20030072255" | "20040179517" | "20040228269" | "20050135284" | "20050135318" | "20050169261" | "20050195765" | "20080219229" | "20090086646" | "20090290563" | "20100085964" | "20100158046" | "20100208594" | "20100260137" | "20100265398" | "20170207940" | "6567383" | "6580713" | "8266488" | "9584262" | "9614566").PN.	US-PGPUB; USPAT	OR	ON	2018/07/07 13:21
S227	29,394	(H04L1/08 H04L27/2601).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/07/07 13:31
S228	7,738	S227 and ofdm$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/07/07 13:31
S229	1,026	S228 and demodulator and packet	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWE	OR	ON	2018/07/07 13:32

			NT; IBM_TDB			
S230	350	S229 and header	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/07/07 13:32
S231	110	S230 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/07/07 13:32
S232	32	S231 and (header near2 bit)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/07/07 13:33
S233	1,653	demodulat$4 with ofdm$1 with symbol with (second multiple plural$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/07/07 14:15
S234	47,183	head$3 with field with (second multiple plural$3)	US-PGPUB; USPAT; USOCR;	OR	ON	2018/07/07 14:16

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S235	31	S233 and S234	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/07/07 14:16
S236	82	("20010009555" | "20010022825" | "20010046877" | "20020006167" | "20020013135" | "20020031089" | "20020046379" | "20020057698" | "20020060995" | "20020068588" | "20020076043" | "20020114402" | "20020126694" | "20020136183" | "20020159533" | "20020184389" | "20030012163" | "20030018794" | "20030040280" | "20030048462" | "20030053571" | "20030063685" | "20030087659" | "20030095508" | "20030099312" | "20030112743" | "20030112821" | "20030135631" | "20030142766" | "20040151109" | "20040215709" | "20070037600" | "20130003587" | "20130286943" | "5706428" | "5797094" | "5812523" | "6075769" | "6084917" | "6108306" | "6115354" | "6141327" | "6151508" | "6181714" | "6341131" | "6418322" | "6449246" | "6535550" | "6549592" | "6587526" | "6625764" | "6671284" | "6894974" | "6904283" | "6940831" | "6987754" | "6988212" | "7088787" | "7092436" | "7106715" | "7146172" | "7158482" | "7272117" | "7274652" | "7304951" | "7362735" | "7522514" | "7590071" | "7729281" | "7804765" | "7916625" | "7924841" | "7944851" | "8159969" | "8284800" | "8416677" | "8537703" | "8553579" | "8755264" | "8842570").PN. OR ("9450794").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2018/07/07 14:22
S237	3	S236 and ofdm$1 and demodulator and packet	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2018/07/07 14:22

			IBM_TDB			
S238	1	("20080219229").PN.	US-PGPUB; USPAT	OR	OFF	2018/08/14 11:33
S239	0	"16125206"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/10/16 13:55
S240	2	"15958519"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/05 14:42
S241	26	("0000002" | "10079707" | "20030072255" | "20040179517" | "20040228269" | "20050135284" | "20050135318" | "20050169261" | "20050180315" | "20050195765" | "20080184088" | "20080219229" | "20090086646" | "20090290563" | "20100085964" | "20100158046" | "20100208594" | "20100260137" | "20100265398" | "6567383" | "6580713" | "6671284" | "8266488" | "9584262" | "9614566" | "9973361").PN.	US-PGPUB; USPAT	OR	ON	2018/11/06 08:27
S242	5	"15476284"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/11/06 08:52
S246	1	"16394490"	US-PGPUB; USPAT;	OR	ON	2019/06/03 09:31

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S247	1	("10291449").PN.	US-PGPUB; USPAT	OR	OFF	2019/06/03 09:36
S248	1	("10079707").PN.	US-PGPUB; USPAT	OR	OFF	2019/06/03 11:19
S249	26	("10079707" | "10291449" | "20030072255" | "20040179517" | "20040228269" | "20050135284" | "20050135318" | "20050169261" | "20050180315" | "20050195765" | "20080184088" | "20080219229" | "20090086646" | "20090290563" | "20100085964" | "20100158046" | "20100208594" | "20100260137" | "20100265398" | "6567383" | "6580713" | "6671284" | "8266488" | "9584262" | "9614566" | "9973361").PN.	US-PGPUB; USPAT	OR	ON	2019/06/06 09:11
S250	168,365	(370/207,229,242,252,294,328,329,330,336,338,356,389,449,474).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 12:34
S251	53,422	(375/130,219,259,260,261,267,295,316).ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 12:34
S252	17,827	(H04B1/38 H04B7/00 H04B7/155).cpc.	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2019/06/06 12:34

			EPO; JPO; DERWENT; IBM_TDB			
S253	11,972	(H04J1/00 H04J3/00 H04J3/24 H04J11/00).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 12:34
S254	121,998	(H04L1/00 H04L1/08 H04L5/00 H04L12/26 H04L12/43 H04L12/54 H04L12/56 H04L12/403 H04L27/28 H04L27/2601 H04L27/2613 H04L69/22).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 12:34
S255	3,057	(H04M1/00).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 12:35
S256	126,461	(H04W4/00 H04W24/00 H04W52/02 H04W72/04 H04W72/12 H04W74/08).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 12:35

S257	458,129	S250 S251 S252 S253 S254 S255 S256	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 12:35
S258	36,747	(((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1) near3 symbol) and S257	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 12:36
S259	1,044	(header near3 bit) and S258	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 12:39
S260	895	S259 and bandwidth	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 12:39
S261	16	S260 and (demodulat$4 with symbol with field)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2019/06/06 12:41

			DERWENT; IBM_TDB			
S262	5,613	((("KIM") near3 ("Joon")) OR (("TZANNES") near3 ("Marcos"))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2019/06/06 13:31
S263	4	S262 and (demodulat$4 with symbol with field).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 13:33
S264	82	("20010009555" | "20010022825" | "20010046877" | "20020006167" | "20020013135" | "20020031089" | "20020046379" | "20020057698" | "20020060995" | "20020068588" | "20020076043" | "20020114402" | "20020126694" | "20020136183" | "20020159533" | "20020184389" | "20030012163" | "20030018794" | "20030040280" | "20030048462" | "20030053571" | "20030063685" | "20030087659" | "20030095508" | "20030099312" | "20030112743" | "20030112821" | "20030135631" | "20030142766" | "20040151109" | "20040215709" | "20070037600" | "20130003587" | "20130286943" | "5706428" | "5797094" | "5812523" | "6075769" | "6084917" | "6108306" | "6115354" | "6141327" | "6151508" | "6181714" | "6341131" | "6418322" | "6449246" | "6535550" | "6549592" | "6587526" | "6625764" | "6671284" | "6894974" | "6904283" | "6940831" | "6987754" | "6988212" | "7088787" | "7092436" | "7106715" | "7146172" | "7158482" | "7272117" | "7274652" | "7304951" | "7362735" | "7522514" | "7590071" | "7729281" | "7804765" | "7916625" | "7924841" | "7944851" | "8159969" | "8284800" | "8416677" | "8537703" | "8553579" | "8755264" | "8842570").PN. OR ("9450794").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2019/06/06 14:33
S265	25	(header near3 bit) and S264	US-PGPUB; USPAT; USOCR;	OR	ON	2019/06/06 14:33

			FPRS; EPO; JPO; DERWENT; IBM_TDB			
S266	6	(((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1) near3 symbol) and S265	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/06/06 14:33
S270	3	"16780589"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/06/17 18:12
S271	5,971	((("KIM") near3 ("Joon")) OR (("TZANNES") near3 ("Marcos"))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2020/06/18 10:02
S272	39	S271 and (packet with header).clm.	USPAT	OR	ON	2020/06/18 10:04
S273	1	("10554459").PN.	US-PGPUB; USPAT	OR	OFF	2020/06/18 11:08
S274	1	("10291449").PN.	US-PGPUB; USPAT	OR	OFF	2020/06/18 11:09
S275	1	("10079707").PN.	US-PGPUB; USPAT	OR	OFF	2020/06/18 11:17

S276	1	("9973361").PN.	US-PGPUB; USPAT	OR	OFF	2020/06/18 11:18
S277	1	("9614566").PN.	US-PGPUB; USPAT	OR	OFF	2020/06/18 11:20
S278	1	("9584262").PN.	US-PGPUB; USPAT	OR	OFF	2020/06/18 11:24
S289	26	("10079707" | "10291449" | "20030072255" | "20040179517" | "20040228269" | "20050135284" | "20050135318" | "20050169261" | "20050180315" | "20050195765" | "20080184088" | "20080219229" | "20090086646" | "20090290563" | "20100085964" | "20100158046" | "20100208594" | "20100260137" | "20100265398" | "6567383" | "6580713" | "6671284" | "8266488" | "9584262" | "9614566" | "9973361").PN.	US-PGPUB; USPAT	OR	ON	2021/01/08 17:36
S290	1	("10554459").PN.	US-PGPUB; USPAT	OR	OFF	2021/01/08 18:16
S291	28	("1007970" | "1029144" | "20030072255" | "20040179517" | "20040228269" | "20050135284" | "20050135318" | "20050169261" | "20050180315" | "20050195765" | "20080184088" | "20080219229" | "20090086646" | "20090290563" | "20100085964" | "20100158046" | "20100208594" | "20100260137" | "20100265398" | "6567383" | "6580713" | "6671284" | "8266488" | "9584262" | "9614566" | "9973361").PN. OR ("10554459").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2021/01/08 18:16
S292	4	S291 not S289	US-PGPUB; USPAT; USOCR	OR	ON	2021/01/08 18:16
S293	1	"17136801"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/06/04 18:09
S294	25	("0000001" | "0000002" | "0006580" | "10291449" | "10554459" | "20040179517" | "20040228269" | "20050135318" | "20050169261" | "20050180315" | "20050195765" | "20080184088" | "20080219229" |	US-PGPUB; USPAT	OR	ON	2021/06/04 20:05

		"20090290563" | "20100158046" | "20100208594" | "20100260137" | "20100265398" | "20200169438" | "6567383" | "6671284" | "8266488" | "9584262" | "9614566" | "9973361").PN.				
S295	14	S294 and (packet with header)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/06/04 20:06
S296	6,278	((("KIM") near3 ("Joon")) OR (("TZANNES") near3 ("Marcos"))).INV.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	ON	2021/06/04 20:38
S297	257	S296 and ofdm$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/06/04 20:39
S298	50	S297 and ((transceiver transmitter) with header with packet).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/06/04 20:41
S299	37	S298 and ("OFDM").clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	ON	2021/06/04 20:41

			JPO; DERWENT; IBM_TDB			
S300	19	S298 and ("OFDM").clm.	USPAT	OR	ON	2021/06/04 20:42
S301	16	(APPLIED adj TRANSFORM).as.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/06/04 21:26
S302	11	S301 and ((transceiver transmitter) with header with packet).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/06/04 21:26
S303	15	S296 and (((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1) with transmitter with packet with header).clm.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/06/04 21:28
S304	9	S296 and (((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1) with transmitter with packet with header).clm.	USPAT	OR	ON	2021/06/04 21:35
S305	13	(APPLIED adj TRANSFORM).as.	USPAT	OR	ON	2021/06/04 21:36
S306	5	S304 and S305	USPAT	OR	ON	2021/06/04 21:36

S307	250	(("20170373903") or ("9973364") or ("10291449") or ("9236884") or ("20140006908") or ("20190007247") or ("9973361") or ("20100061320") or ("8467331") or ("10554459") or ("20190372703") or ("20040151109") or ("11012179") or ("20170317784") or ("7756002") or ("10432347") or ("20190253290") or ("20110002219") or ("9197298") or ("10079707") or ("20080137718") or ("20160226622") or ("9660760") or ("20100086076") or ("10091337") or ("20160249332") or ("20180248725") or ("8855222") or ("9614605") or ("20130301400") or ("20100309848") or ("10917272") or ("20170135006") or ("20160309477") or ("20160013925") or ("9503161") or ("20190037056") or ("10623989") or ("10237794") or ("20140036823") or ("20180270725") or ("20180124639") or ("10004074") or ("9866285") or ("20200228241") or ("9379858") or ("7577085") or ("20200252253") or ("9172571") or ("8441918") or ("10595249") or ("8767523") or ("9007983") or ("20210119841") or ("20100309834") or ("20120243626") or ("8830816") or ("20120027136") or ("20120140835") or ("20130286925") or ("20190253210") or ("8526351") or ("20030072255") or ("10868643") or ("8213292") or ("20050237923") or ("7548506") or ("8085814") or ("20120250787") or ("20090060076") or ("20170257201") or ("20200169438") or ("8619655") or ("20140307684") or ("9609092") or ("20120307938") or ("20050232139") or ("20070066362") or ("20080267157") or ("9596327") or ("20120314711") or ("20190245726") or ("10333669") or ("20170339453") or ("10742464") or ("20120311410") or ("8259695") or ("8625690") or ("7912012") or ("20120236971") or ("20150381399") or ("8479076") or ("10972222") or ("20130243115") or ("9667465") or ("20110305178") or ("10608789") or ("20200195380") or ("9609091") or ("20100189167") or ("20130107912") or ("20110193739") or ("20070064586") or ("9602637") or ("20100115372") or ("20050265221") or ("20170033949") or ("20060126492") or ("20100086013") or ("8255760") or ("7995665") or ("20130034075") or ("9130812") or ("7561511") or ("20100316140") or ("10334310") or ("8320233") or ("8441393") or ("20160255179") or ("20130028155") or ("7532565") or ("20060268671") or ("20110080873") or ("20160255178") or ("20190036751") or ("9825782") or ("7995672") or ("7548564") or ("8885661") or ("8737421") or ("6754170")).PN. or (("8054816") or ("20050180315") or ("20160301491") or ("20100310002") or ("20190199478") or ("7324605") or ("20100265999") or ("8989206") or ("10244414") or ("20170201604") or ("20160255177") or ("20160254935") or	US-PGPUB; USPAT	OR	OFF	2021/06/04 22:06

		("7929409") or ("RE44621") or ("20170207941") or ("10862723") or ("9277569") or ("20050152473") or ("20170033958") or ("20140219387") or ("20200314843") or ("20150156801") or ("8498350") or ("9967122") or ("9450794") or ("20150009855") or ("20160183257") or ("8879379") or ("9794938") or ("10033564") or ("9749680") or ("8755264") or ("20190254027") or ("20130279614") or ("20180027558") or ("9148806") or ("8958350") or ("8842570") or ("20170048033") or ("8159969") or ("9461857") or ("20110211477") or ("20200322078") or ("20140036711") or ("10637971") or ("20190288894") or ("7916625") or ("8018975") or ("9154274") or ("9848385") or ("20140219240") or ("10721733") or ("10278176") or ("8989148") or ("9949148") or ("20070147228") or ("20110164491") or ("20200244781") or ("10361826") or ("20100098039") or ("9407487") or ("9264996") or ("8284800") or ("20160373969") or ("20140334323") or ("9363121") or ("20110164492") or ("20120069877") or ("20140072080") or ("20150003274") or ("20190260446") or ("20130202017") or ("20160373945") or ("20140078920") or ("20110305194") or ("8761115") or ("20090296614") or ("20040047296") or ("20110080963") or ("20080186843") or ("20180192373") or ("20070070179") or ("9253291") or ("20110261781") or ("10979116") or ("20090225817") or ("7924841") or ("20160308702") or ("8902798") or ("20130177090") or ("20130003587") or ("20110080857") or ("20090268832") or ("8619676") or ("8416677") or ("7522514") or ("8947994") or ("20140161068") or ("20080019263") or ("20110194475") or ("20090129258") or ("20080232490") or ("20100220725") or ("8488442") or ("7804765") or ("20210067397") or ("8717957") or ("20160337973") or ("8223893") or ("9100275") or ("20100246489") or ("20160113016") or ("8773974") or ("8885535") or ("8724445") or ("9825793") or ("20170111866") or ("8537796") or ("20110032875")).PN.				
S308	47	S307 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/06/04 22:06

S309	33	S308 and (packet with header)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/06/04 22:06
S310	33	S309 and ofdm$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/06/04 22:06
S311	1	("10917272").PN.	US-PGPUB; USPAT	OR	OFF	2021/06/04 22:31
S312	1	("10291449").PN.	US-PGPUB; USPAT	OR	OFF	2021/06/04 22:34
S313	1	("9973361").PN.	US-PGPUB; USPAT	OR	OFF	2021/06/04 22:39
S314	1	("9614566").PN.	US-PGPUB; USPAT	OR	OFF	2021/06/04 22:41
S315	1	("9609091").PN.	US-PGPUB; USPAT	OR	OFF	2021/06/04 22:44
S318	100	(("20170207940") or ("20200169438") or ("20120170625") or ("9584262") or ("9614566") or ("10079707") or ("20180248725") or ("10291449") or ("10554459") or ("20170063415") or ("20190253290") or ("9973361") or ("20190007247") or ("10917272") or ("9609091") or ("9602637") or ("9609092") or ("9596327") or ("20160255177") or ("20160254935") or ("20160255179") or ("20160255178") or ("10091337") or ("20210289061") or ("20190037056") or ("20170201604") or ("20200244781") or ("20110080963") or ("11032401") or ("9363121") or ("10637971") or ("8537796") or ("20130336182") or ("20150188742") or ("9154355") or ("8718118") or	US-PGPUB; USPAT	OR	OFF	2021/11/01 15:40

		("8953657") or ("20110110437") or ("20160309457") or ("20120275528") or ("20160020934") or ("10021695") or ("20180288759") or ("20140233615") or ("10785777") or ("20140161126") or ("20140119410") or ("20160329986") or ("20140126655") or ("9949259") or ("9876604") or ("7298691") or ("9787355") or ("20180270018") or ("20170033949") or ("20150304217") or ("9906444") or ("11075716") or ("20160330738") or ("20200153550") or ("10135492") or ("9998370") or ("9825782") or ("10587365") or ("20120236879") or ("20210099329") or ("20160174102") or ("20180049061") or ("20130287045") or ("9191469") or ("20140233551") or ("20170373903") or ("20170257201") or ("10333669") or ("10044470") or ("20160374081") or ("7590071") or ("8284800") or ("8553579") or ("20140006908") or ("20040047296") or ("20140233478") or ("20100098039") or ("20190109685") or ("20080049601") or ("7916625") or ("20130202017") or ("20100322295") or ("9973364") or ("20140003415") or ("9236884") or ("20120057483") or ("7924841") or ("20110211477") or ("20090225817") or ("9853794") or ("20150009855") or ("20090268832") or ("20130003587") or ("20140334323")).PN.				
S319	99	(("20130107912") or ("20160249332") or ("11115964") or ("20130128806") or ("20160277543") or ("20130121244") or ("9154363") or ("9843654") or ("8934413") or ("20130121243") or ("20130121245") or ("8824371") or ("9385911") or ("10554459") or ("20190253290") or ("20180248725") or ("10079707") or ("20080240166") or ("10917272") or ("7693191") or ("20140086362") or ("20170006139") or ("9596327") or ("9191042") or ("10291449") or ("10111133") or ("20190007247") or ("9432308") or ("9584262") or ("10523789") or ("20160227532") or ("20160072732") or ("20160337901") or ("9973361") or ("20140072080") or ("20140321479") or ("9602637") or ("8902798") or ("9525759") or ("9609092") or ("20100008436") or ("20130230126") or ("20120201276") or ("8599900") or ("8605635") or ("9609091") or ("8441968") or ("20160255178") or ("20130028155") or ("20100080266") or ("20110080873") or ("9100275") or ("8165185") or ("20160255179") or ("20130242968") or ("8885661") or ("8737421") or ("20130243115") or ("20130114764") or ("8867569") or ("20160255177") or ("20160254935") or ("20140281835") or ("9130812") or ("20100054223") or ("20150381399") or ("8625690") or ("20120236971") or ("8670794") or ("8774251") or ("9219573") or ("20100316024") or ("20090252104") or ("9667465") or ("8477813") or	US-PGPUB; USPAT	OR	OFF	2021/11/01 15:43

		("20090225734") or ("20100091673") or ("8358668") or ("20050068895") or ("20130266083") or ("8811507") or ("9008195") or ("8339978") or ("7577122") or ("10123234") or ("20170063415") or ("9521652") or ("9100151") or ("9143271") or ("9100932") or ("20120207192") or ("7551581") or ("20200136877") or ("20150365917") or ("20170171009") or ("20160191679") or ("9756610") or ("9614642") or ("9614566")).PN.				
S320	19	S318 and S319	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/01 15:43
S321	19	S320 and ((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1) and head$3 and (packet payload)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/01 15:45
S322	22	header same field same (repeat$3 repetition) same (second two "2" multiple plural$3) same ((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1) same (packet payload) same (de$1modulat$4 de$1cod$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/01 16:09
S323	7	S322 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2021/11/01 16:11

			IBM_TDB			
S324	1,214	header same (repeat$4 repet$6 duplicat$4) same ofdm$	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/01 19:51
S325	197	S324 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/01 19:52
S326	409	header with (repeat$4 repet$6 duplicat$4 identical "same") with ofdm$1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/01 20:35
S327	84	S326 and @ad<="20090821"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/11/01 20:35
S328	39	S327 not S325	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2021/11/01 20:36

			EPO; JPO; DERWENT; IBM_TDB			

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S77	1	("13376856").PN.	US-PGPUB; USPAT	OR	OFF	2016/09/08 12:07
S108	3,400	((Joon) near2 (Kim)).INV.	US-PGPUB; USPAT	OR	ON	2016/09/11 12:37
S109	299	((Marcos) near2 (Tzannes)).INV.	US-PGPUB; USPAT	OR	ON	2016/09/11 12:37
S110	3,688	S108 S109	US-PGPUB; USPAT	OR	ON	2016/09/11 12:37
S111	344	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 or (discrete adj multi adj tone) or dmt or (multi adj2 carrier)) and S110	US-PGPUB; USPAT	OR	ON	2016/09/11 12:37
S112	99	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 or (discrete adj multi adj tone) or dmt or (multi adj2 carrier)).clm. and S110	US-PGPUB; USPAT	OR	ON	2016/09/11 12:38
S113	28	(header with symbol) and S112	US-PGPUB; USPAT	OR	ON	2016/09/11 12:38

S114	80	("20010009555" | "20010022825" | "20010046877" | "20020006167" | "20020013135" | "20020031089" | "20020046379" | "20020057698" | "20020060995" | "20020068588" | "20020076043" | "20020114402" | "20020126694" | "20020136183" | "20020159533" | "20020184389" | "20030012163" | "20030018794" | "20030040280" | "20030048462" | "20030053571" | "20030063685" | "20030087659" | "20030095508" | "20030099312" | "20030112743" | "20030112821" | "20030135631" | "20030142766" | "20040151109" | "20040215709" | "20070037600" | "20130003587" | "20130286943" | "5706428" | "5797094" | "5812523" | "6075769" | "6084917" | "6108306" | "6115354" | "6141327" | "6151508" | "6181714" | "6341131" | "6418322" | "6449246" | "6535550" | "6549592" | "6587526" | "6625764" | "6671284" | "6894974" | "6904283" | "6940831" | "6987754" | "6988212" | "7088787" | "7092436" | "7106715" | "7146172" | "7158482" | "7272117" | "7274652" | "7304951" | "7362735" | "7522514" | "7590071" | "7729281" | "7804765" | "7916625" | "7924841" | "7944851" | "8159969" | "8284800" | "8416677" | "8537703" | "8553579" | "8755264" | "8842570").PN. OR ("9148806").URPN.	US-PGPUB; USPAT	OR	ON	2016/09/11 12:45
S115	22	(header with symbol) and S114	US-PGPUB; USPAT	OR	ON	2016/09/11 12:46
S116	16	(header with symbol).clm. and S112	US-PGPUB; USPAT	OR	ON	2016/09/11 12:55
S117	7	(header with (sub$carrier tone sub$channel)).clm. and S116	US-PGPUB; USPAT	OR	ON	2016/09/11 12:56
S118	4	((frame packet segment slot pdu) with (narrow$3 wid$3) with (band frequency)).clm. and S112	US-PGPUB; USPAT	OR	ON	2016/09/11 12:59
S119	4	((frame packet segment slot pdu) with (narrow$3 wid$3) with (band frequency)).clm. and S117	US-PGPUB; USPAT	OR	ON	2016/09/11 13:00

S120	0	(repeat$4 repet$6 duplicat$4 cop$4).clm. and S119	US-PGPUB; USPAT	OR	ON	2016/09/11 13:01
S121	352	(AWARE adj INC).as.	US-PGPUB; USPAT	OR	ON	2016/09/11 13:01
S122	70	((narrow$3 wid$3) with (band frequency)) and S121	US-PGPUB; USPAT	OR	ON	2016/09/11 13:02
S123	19	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 or (discrete adj multi adj tone) or dmt or (multi adj2 carrier)).clm. and S122	US-PGPUB; USPAT	OR	ON	2016/09/11 13:02
S124	2	(header with symbol) and S123	US-PGPUB; USPAT	OR	ON	2016/09/11 13:03
S125	12	("20030215021" | "20080056390" | "6115354" | "20080137718" | "20100208854" | "20090041151" | "20070218843" | "20050265433" | "20100158091" | "20140105328" | "20050243791" | "8498350").PN.	US-PGPUB; USPAT	OR	ON	2016/09/11 13:05
S126	101,669	(370/207,229,242,252,294,328,329,330,336,338,356,389,449,474).ccls.	US-PGPUB; USPAT	OR	ON	2016/09/11 13:12
S127	33,757	(375/130,219,259,260,261,267,295,316).ccls.	US-PGPUB; USPAT	OR	ON	2016/09/11 13:12
S128	3,268	(H04B1/38 H04B7/00 H04B7/155).cpc.	US-PGPUB; USPAT	OR	ON	2016/09/11 13:12
S129	1,685	(H04J1/00 H04J3/00 H04J3/24 H04J11/00).cpc.	US-PGPUB;	OR	ON	2016/09/11 13:12

			USPAT			
S130	9,724	(H04L1/00 H04L1/08 H04L5/00 H04L12/26 H04L12/43 H04L12/54 H04L12/56 H04L12/403 H04L27/28).cpc.	US-PGPUB; USPAT	OR	ON	2016/09/11 13:12
S131	432	(H04M1/00).cpc.	US-PGPUB; USPAT	OR	ON	2016/09/11 13:12
S132	24,253	(H04W4/00 H04W24/00 H04W52/02 H04W72/04 H04W72/12 H04W74/08).cpc.	US-PGPUB; USPAT	OR	ON	2016/09/11 13:12
S133	160,246	S126 S127 S128 S129 S130 S131 S132	US-PGPUB; USPAT	OR	ON	2016/09/11 13:13
S134	12,830	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 or (discrete adj multi adj tone) or dmt or (multi adj2 carrier)).clm. and S133	US-PGPUB; USPAT	OR	ON	2016/09/11 13:13
S135	566	(header with symbol) and S134	US-PGPUB; USPAT	OR	ON	2016/09/11 13:14
S136	192	((repeat$4 repet$6 duplicat$4 cop$4) with header) and S135	US-PGPUB; USPAT	OR	ON	2016/09/11 13:14
S137	33	(header with (sub$carrier tone sub$channel)) and S136	US-PGPUB; USPAT	OR	ON	2016/09/11 13:15
S138	25	S137 not S113	US-PGPUB; USPAT	OR	ON	2016/09/11 13:15

S139	95	("5241545" | "5420851" | "5504775" | "5606560" | "5920547").PN. OR ("6567383").URPN.	US-PGPUB; USPAT	OR	ON	2016/09/11 13:20
S140	3	(header with symbol) and S139	US-PGPUB; USPAT	OR	ON	2016/09/11 13:21
S141	49	("20030081538" | "20040085946" | "6515960" | "6567383" | "6643281" | "6741578" | "7039001").PN. OR ("7738437").URPN.	US-PGPUB; USPAT	OR	ON	2016/09/11 13:32
S142	2	(header with symbol) and S141	US-PGPUB; USPAT	OR	ON	2016/09/11 13:33
S143	4,687	(((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 or (discrete adj multi adj tone) or dmt or (multi adj2 carrier)) with (frame packet segment slot pdu)).clm.	US-PGPUB; USPAT	OR	ON	2016/09/11 13:35
S144	118	(header with symbol).clm. and S143	US-PGPUB; USPAT	OR	ON	2016/09/11 13:35
S145	17	((repeat$4 repet$6 duplicat$4 cop$4) with header) and S144 and (header with (sub$carrier tone sub$channel))	US-PGPUB; USPAT	OR	ON	2016/09/11 13:37
S147	0	(((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 or (discrete adj multi adj tone) or dmt or (multi adj2 carrier)) with (frame packet segment slot pdu) with header with symbol with (repeat$4 repet$6 duplicat$4 cop$4) with (sub$carrier tone sub$channel) with (narrow$3 wid$3) with (band frequency)).clm.	US-PGPUB; USPAT	OR	ON	2016/09/11 13:48
S148	0	(((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 or (discrete adj multi adj tone) or dmt or (multi adj2 carrier)) same (frame packet segment slot pdu) same header same symbol same (repeat$4 repet$6 duplicat$4 cop$4) same (sub$carrier tone sub$channel) same (narrow$3 wid$3) same (band frequency))	US-PGPUB; USPAT	OR	ON	2016/09/11 13:49

S150	1	("13376856").PN.	US-PGPUB; USPAT	OR	OFF	2016/12/28 08:03
S172	101,840	(370/207,229,242,252,294,328,329,330,336,338,356,389,449,474).ccls.	US-PGPUB; USPAT	OR	ON	2017/01/04 09:42
S173	33,773	(375/130,219,259,260,261,267,295,316).ccls.	US-PGPUB; USPAT	OR	ON	2017/01/04 09:42
S174	3,421	(H04B1/38 H04B7/00 H04B7/155).cpc.	US-PGPUB; USPAT	OR	ON	2017/01/04 09:42
S175	1,882	(H04J1/00 H04J3/00 H04J3/24 H04J11/00).cpc.	US-PGPUB; USPAT	OR	ON	2017/01/04 09:42
S176	10,158	(H04L1/00 H04L1/08 H04L5/00 H04L12/26 H04L12/43 H04L12/54 H04L12/56 H04L12/403 H04L27/28).cpc.	US-PGPUB; USPAT	OR	ON	2017/01/04 09:42
S177	454	(H04M1/00).cpc.	US-PGPUB; USPAT	OR	ON	2017/01/04 09:42
S178	25,210	(H04W4/00 H04W24/00 H04W52/02 H04W72/04 H04W72/12 H04W74/08).cpc.	US-PGPUB; USPAT	OR	ON	2017/01/04 09:42
S179	162,030	S172 S173 S174 S175 S176 S177 S178	US-PGPUB; USPAT	OR	ON	2017/01/04 09:42
S180	11,315	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1).clm. and S179	US-PGPUB;	OR	ON	2017/01/04 09:42

			USPAT			
S181	146	(header with (sub$carrier tone sub$channel)) and S180	US-PGPUB; USPAT	OR	ON	2017/01/04 09:42
S182	68	modulat$4.clm. and S181	US-PGPUB; USPAT	OR	ON	2017/01/04 09:43
S183	34	S182 and @ad<="20090821"	US-PGPUB; USPAT	OR	ON	2017/01/04 09:44
S184	314	(header with (sub$carrier tone sub$channel)).clm.	US-PGPUB; USPAT	OR	ON	2017/01/04 10:17
S185	47	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1).clm. and S184	US-PGPUB; USPAT	OR	ON	2017/01/04 10:18
S186	24	S185 and @ad<="20090821"	US-PGPUB; USPAT	OR	ON	2017/01/04 10:18
S187	95	("5241545" | "5420851" | "5504775" | "5606560" | "5920547").PN. OR ("6567383").URPN.	US-PGPUB; USPAT	OR	ON	2017/01/04 10:25
S188	82	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1) and S187	US-PGPUB; USPAT	OR	ON	2017/01/04 10:26
S189	6	header and S188	US-PGPUB; USPAT	OR	ON	2017/01/04 10:26

S190	7	("5867478" | "6473467" | "6567383" | "7548506" | "8213292").PN. OR ("9172571").URPN.	US-PGPUB; USPAT	OR	ON	2017/01/04 10:30
S191	4	(((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1 or (discrete adj multi adj tone) or dmt or (multi adj2 carrier)) same (frame packet segment slot pdu) same header same modulat$4 same (repeat$4 repet$6 duplicat$4 cop$4) same (sub$carrier tone sub$channel) same (narrow$3 wid$3))	US-PGPUB; USPAT	OR	ON	2017/01/04 10:38
S193	314	(header with (sub$carrier tone sub$channel)).clm.	US-PGPUB; USPAT	OR	ON	2017/02/04 12:20
S194	47	((orthogonal adj frequency adj division adj multiplex$3) or ofdm$1).clm. and S193	US-PGPUB; USPAT	OR	ON	2017/02/04 12:21
S196	12	overlap$5.clm. and S194	US-PGPUB; USPAT	OR	ON	2017/02/04 12:23
S197	5	(narrow$3 wide$3).clm. and S194	US-PGPUB; USPAT	OR	ON	2017/02/04 12:30
S198	1	("9363121").PN.	US-PGPUB; USPAT	OR	OFF	2017/02/04 12:33
S199	1	("8537796").PN.	US-PGPUB; USPAT	OR	OFF	2017/02/04 12:34
S201	18	S194 and modulat$4.clm.	US-PGPUB; USPAT	OR	ON	2017/02/04 12:38
S202	11	S201 not (S196 S197)	US-PGPUB;	OR	ON	2017/02/04 12:38

			USPAT			
S203	1	S196 and S197 and S201	US-PGPUB; USPAT	OR	ON	2017/02/04 12:43
S214	50	header with bit with field with (two "2") with ofdm$1	US-PGPUB; USPAT	OR	ON	2017/12/11 11:42
S215	28	header with bit with field with (four "4") with ofdm$1	US-PGPUB; USPAT	OR	ON	2017/12/11 11:42
S216	16	S214 same S215	US-PGPUB; USPAT	OR	ON	2017/12/11 11:42
S217	67	header adj ext	US-PGPUB; USPAT	OR	ON	2017/12/11 11:46
S218	24	S217 and ofdm$1	US-PGPUB; USPAT	OR	ON	2017/12/11 11:46
S219	24	S218 not S216	US-PGPUB; USPAT	OR	ON	2017/12/11 11:47
S220	16	header with bit with field with (two "2") with ofdm$1 with (four "4")	US-PGPUB; USPAT	OR	ON	2017/12/11 12:05
S221	0	(header with bit with field with (two "2") with ofdm$1 with (four "4")).clm.	US-PGPUB; USPAT	OR	ON	2017/12/11 12:07

S224	0	"15958519"	US-PGPUB; USPAT	OR	ON	2018/07/07 08:32
S225	0	(demodulat$4 with ofdm$1 with head$3 with different with fourth).clm.	US-PGPUB; USPAT	OR	ON	2018/07/07 12:00
S243	1	"16125206"	US-PGPUB; USPAT	OR	ON	2019/01/16 10:41
S244	1	(modulat$4 with ofdm$1 with head$3 with different with bandwidth with bit with (four "4" fourth))	US-PGPUB; USPAT	OR	ON	2019/01/16 11:36
S245	0	S244 not S243	US-PGPUB; USPAT	OR	ON	2019/01/16 11:36
S267	0	(demodulat$4 with ofdm$1 with head$3 with different with bandwidth with bit with (four "4" fourth))	US-PGPUB; USPAT	OR	ON	2019/06/06 13:30
S268	1	"16394490"	US-PGPUB; USPAT	OR	ON	2019/09/14 19:51
S269	1	(demodulat$4 with ofdm$1 with head$3 with band$1width with bit with field with packet)	US-PGPUB; USPAT	OR	ON	2019/09/14 21:04
S279	1	"16780589"	US-PGPUB; USPAT	OR	ON	2020/09/30 21:18
S280	4	(modulat$4 with ofdm$1 with head$3 with bit with (four "4" fourth)).clm.	US-PGPUB;	OR	ON	2020/10/01 13:07

			USPAT			
S281	4	(demodulat$4 with ofdm$1 with head$3 with bit with (four "4" fourth)).clm.	US-PGPUB; USPAT	OR	ON	2020/10/01 13:08
S282	1	"16780589"	US-PGPUB; USPAT	OR	ON	2020/12/09 17:36
S283	1	("10554459").PN.	US-PGPUB; USPAT	OR	OFF	2020/12/09 17:38
S284	1	("10079707").PN.	US-PGPUB; USPAT	OR	OFF	2020/12/09 17:39
S285	1	("9973361").PN.	US-PGPUB; USPAT	OR	OFF	2020/12/09 17:39
S286	1	("10291449").PN.	US-PGPUB; USPAT	OR	OFF	2020/12/09 17:39
S287	4	(modulat$4 with ofdm$1 with head$3 with bit with (three "3" third)).clm.	US-PGPUB; USPAT	OR	ON	2020/12/09 17:47
S288	4	(demodulat$4 with ofdm$1 with head$3 with bit with (three "3" third)).clm.	US-PGPUB; USPAT	OR	ON	2020/12/09 17:47
S316	1	"17136801"	US-PGPUB; USPAT	OR	ON	2021/10/31 15:27

S317	0	(packet with demodulat$4 with ofdm$1 with head$3 with field with (second "2" two) with repet$5 with detect$4).clm.	US-PGPUB; USPAT	OR	ON	2021/10/31 16:02

11/1/2021 8:51:08 PM
C:\Users\sali\Documents\EAST\Workspaces\Case_446_JK_17136801.wsp

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Visuals | Query | Results | 0 Selected | Relevance | None | None

1 - 50 — 10,222,477 results — Top 1500 results

1. **WLAN Device and Method Thereof**

   A Wireless Local Area Network (WLAN) device and a method thereof. The Wireless Local Area Network (WLAN) device generates a Physical Layer (PHY) protocol data unit (PPDU) comprising a preamble field, a header field and a payload field for transmission, and comprises a MAC module, a modulator, and an...

   CURRENT ASSIGNEES: MEDIATEK SINGAPORE PTE LTD
   US20130107912 | US APPLICATIONS | 02-MAY-2013

2. **Wlan device and method thereof**

   A Wireless Local Area Network (WLAN) device and a method thereof. The Wireless Local Area Network (WLAN) device generates a Physical Layer (PHY) protocol data unit (PPDU) comprising a preamble field, a header field and a payload field for transmission, and comprises a MAC module, a modulator, and an...

   CURRENT ASSIGNEES: MEDIATEK SINGAPORE PTE LTD
   WO2012006513A1 | WIPO APPLICATIONS | 12-JAN-2012

3. **System and method for auto-detection of wlan packets using header**

   A system and method of auto-detection of WLAN packets includes transmitting in a 60GHz frequency band a wireless packet comprising a first header, a second header, a payload, and a training field, the first header carrying a plurality of bits, a logical value of a subset of the plurality of bits in...

   CURRENT ASSIGNEES: HUAWEI TECH CO LTD [+1]
   WO2016130987A1 | WIPO APPLICATIONS | 18-AUG-2016

4. **System and method for auto-detection of wlan packets using header**

   A system and method of auto-detection of WLAN packets includes transmitting in a 60GHz frequency band a wireless packet comprising a first header, a second header, a payload, and a training field, the first header carrying a plurality of bits, a logical value of a subset of the plurality of bits in...

   CURRENT ASSIGNEES: HUAWEI TECH CO LTD
   EP3257162A1 | EPO APPLICATIONS | 20-DEC-2017

5. **System and method for automatic detection of WLAN packets using headers**

   A system and method for automatically detecting WLAN packets, comprising: transmitting a wireless packet in a 60GHz frequency band, the wireless packet comprising a first header, a second header, a payload, and a training field, the first header carrying a plurality of bits, a logical value of a...

   CURRENT ASSIGNEES: HUAWEI TECH CO LTD
   CN107210765B | CHINA PATENTS | 02-JUN-2020

6. **System and method for automatic detection of WLAN packets using headers**

   A system and method for automatically detecting a WLAN packet includes transmitting a wireless packet in a 60 GHz frequency band that includes a first header, a second header, a payload, and a training field. Here, the first header carries a plurality of bits, and the logical value of the subset of...

   CURRENT ASSIGNEES: HUAWEI TECH CO LTD
   KR102083187B1 | KOREA PATENTS | 03-MAR-2020

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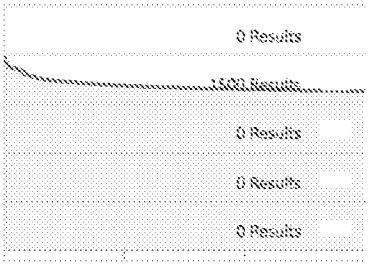
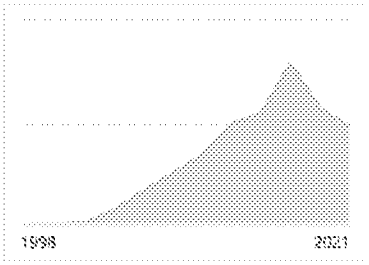


Publication Date — VIEW



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A wireless communication device, comprising: a wirel

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"orthogonal" (and any subsequent words) was ignored because we limit queries to 32 words.

https://link.springer.com › bbm:978-1-4020-5397-9 › 1.pdf

Structure of IEEE 802.11 Packets at Various Physical Layers

This appendix gives a detailed description of the structure of packets in IEEE 802.11 for the different physical layers. 1. Packet Format of Frequency Hopping.

34 pages

https://patents.justia.com › patent

Apparatus and methods for wireless communication using a packet ...

Further, when two wireless devices are attempting to communicate with each other, ... a packet header comprising a packet format field comprising a first ...

https://patents.justia.com › patents-by-us-classification

Byte Assembly And Formatting Patents and Patent Applications ...

The method comprises the steps of: parsing an original MMS data packet, ... the first wireless protocol interfering with communications using the second ...

https://www.google.com › patents

Methods and apparatus for communicating short paging ...

In some aspects, a wireless device includes a first receiver and a second receiver ... the second signal comprises a wake-up signal configured in NDP format ...

https://www.google.com › patents

Frame format and frame assembling/disassembling method ...

Finally, the data payload, the block code and the format header are ... a first variable size, including at least one of a partial data cell/packet and a ...

https://patents.google.com › patent

US20090103485A1 - System and method for wireless data ...

The method comprises receiving a data packet having a MAC frame over a wireless channel. The MAC frame comprises a header, a payload, a first checksum, ...

https://patents.google.com › patent

US8358613B1 - Transmitter-directed security for wireless ...

Wireless communications is becoming increasingly important, with wireless systems ... The first receiver can be configured to receive format information at ...

https://www.google.co.in › patents

US20130022032A1 - Systems and methods for communicating in a ...

The devices in a wireless network may transmit/receive data packets ... The header comprises a first field indicating the header is a compressed header.

https://www.google.co.in › patents

System and method for packet information indication in ...

The wireless devices may each utilize this received resource allocation information to ... A first signaling field (e.g., HE-SIG-A) may indicate whether the ...

https://www.patentguru.com › ...

Superposition coding in a wireless communication system ...

a preamble comprising at least one superposition coded packet parameter and ... a second packet, wherein the first packet is formatted in accordance with a ...

Related searches

wifi protocol	wifi protocol specification
ppdu	wifi 6 physical layer
wifi modulation and coding scheme pdf	wifi physical layer
which one of the following portions of information is...	802.11 protocol explained

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1. **Next generation wireless LAN system design and implementation based on MIMO-OFDM**

   Multiple input multiple output-orthogonal frequency division multiplexing (MIMO-OFDM) is regarded as a promising technology enabling higher data rate wireless communications in frequency selective fading channels. This paper proposes the next generation wireless local area network (WLAN) physical...

   IEEE Xplore | IEEE CONFERENCES | 01-JAN-2006 | IEEE Wireless Communications and Networking Conference, 2006. WCNC 2006.

2. **IEEE Standard for Local and Metropolitan Area Networks - Part 20: Air Interface for Mobile Broadband Wireless Access Systems Supporting Vehicular Mobility -- Physical and Media Access Control Layer Specification**

   The technical requirements of this standard form a compatibility standard for mobile broadband wireless access systems. The standard ensures that a compliant access terminal (AT) or user terminal (UT) can obtain service through any access node (AN) or base station (BS) conforming to properly...

   IEEE Xplore | IEEE STANDARDS | 29-AUG-2008 | IEEE Std 802.20-2008 (Page(s): 1-1039)

3. **IEEE Standard for Local and metropolitan area networks Part 16: Air Interface for Broadband Wireless Access Systems**

   This standard specifies the air interface, including the medium access control layer (MAC) and physical layer (PHY), of combined fixed and mobile point-to-multipoint broadband wireless access (BWA) systems providing multiple services. The MAC is structured to support multiple physical layer (PHY)...

   IEEE Xplore | IEEE STANDARDS | 29-MAY-2009 | IEEE Std 802.16-2009 (Revision of IEEE Std 802.16-2004) (Page(s): 1-2080)

4. **Exploiting Frame Preamble Waveforms to Support New Physical-Layer Functions in OFDM-Based 802.11 Systems**

   The frame preamble in current WiFi systems is designed to facilitate various PHY-layer functions, including frequency offset estimation and frame detection. However, this preamble is typically fixed and is never used to convey any user-specific bits. Embedding information into the preamble opens the...

   IEEE Xplore | IEEE PERIODICALS | 28-MAR-2017 | IEEE Transactions on Wireless Communications

5. **Standard for Amendment to IEEE Standard for Local and Metropolitan Area Networks - Part 16: Air Interface for Fixed Broadband Wireless Access Systems - Medium Access Control Modifications and Additional Physical Layer Specifications for 2-11 GHz**

   Supeseded by IEEE Std 802.16-2004 (Amendment to IEEE Std 802.16-2001) Abstract: This document amends IEEE Std 802.16-2001 by enhancing the medium access control layer and providing additional physical layer specifications in support of broadband wireless access at frequencies from 2-11 GHz. The...

   IEEE Xplore | IEEE STANDARDS | 01-APR-2003 | IEEE Std 802.16a-2003 (Amendment to IEEE Std 802.16-2001) (Page(s): 1-316)

6. **StealTE: Private 5G Cellular Connectivity as a Service with Full-stack Wireless Steganography**

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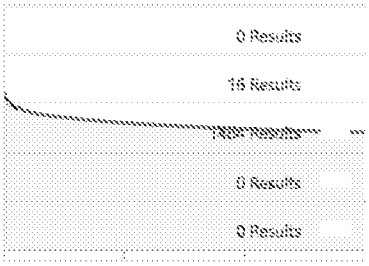

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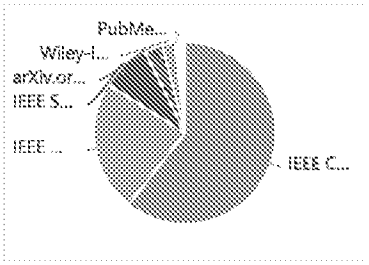

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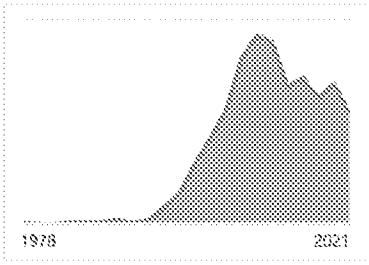

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1. **Header repetition in packet-based ofdm systems**

An OFDM communication system is described that allows different values of D in a single domain where nodes are operating in different portions of frequency bands. For the power-line medium, G.9960 has defined two overlapped baseband bandplans, 50 MHz-PB and 100 MHz-PB. In this exemplary scenario,...

CURRENT ASSIGNEES: AX WIRELESS LLC
US20170207940 | US APPLICATIONS | 20-JUL-2017

2. **Header repetition in packet-based ofdm systems**

An OFDM communication system is described that allows different values of D in a single domain where nodes are operating in different portions of frequency bands. For the power-line medium, G.9960 has defined two overlapped baseband bandplans, 50 MHz-PB and 100 MHz-PB. In this exemplary scenario,...

CURRENT ASSIGNEES: AX WIRELESS LLC
US20200169438 | US APPLICATIONS | 28-MAY-2020

3. **Header repetition in packet-based ofdm systems**

An OFDM communication system is described that allows different values of D in a single domain where nodes are operating in different portions of frequency bands. For the power-line medium, G.9960 has defined two over-lapped baseband bandplans, 50 MHz-PB and 100 MHz-PB. In this exemplary scenario,...

CURRENT ASSIGNEES: AX WIRELESS LLC
US20120170625 | US APPLICATIONS | 05-JUL-2012

4. **Header repetition in packet-based ofdm systems**

An OFDM communication system is described that allows different values of D in a single domain where nodes are operating in different portions of frequency bands. For the power-line medium, G.9960 has defined two overlapped baseband bandplans, 50MHz-PB and 100MHz-PB. In this exemplary scenario, the...

CURRENT ASSIGNEES: APPLIED TRANSFORM LLC
EP2467962A1 | EPO APPLICATIONS | 27-JUN-2012

5. **Header repetition in packet-based ofdm systems**

An OFDM communication system is described that allows different values of D in a single domain where nodes are operating in different portions of frequency bands. For the power-line medium, G.9960 has defined two overlapped baseband bandplans, 50MHz-PB and 100MHz-PB. In this exemplary scenario, the...

CURRENT ASSIGNEES: AWARE INC
WO2011022593A1 | WIPO APPLICATIONS | 24-FEB-2011

6. **Method and apparatus for variable header repetition in a wireless OFDM network with multiple overlapped frequency bands**

Method and apparatus for use within a wireless OFDM network that transmits and receives first and second packets each having header bits and utilizing variable header repetition. The header bits in the first packet are communicated on multiple OFDM symbols and repeated on a plurality of OFDM...

CURRENT ASSIGNEES: AX WIRELESS LLC
US9584262 | US PATENTS | 28-FEB-2017

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Document Description: Issue Fee Payment (PTO-85B)

Issue Fee Transmittal Form

Application Number	Filing Date	First Named Inventor	Atty. Docket No.	Confirmation No.
17136801	29-Dec-2020	Joon Bae KIM	PAX0001US	2083

TITLE OF INVENTION :

HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS

Entity Status	Application Type	Art Unit	Class - Subclass	EXAMINER
Regular Undiscounted	Utility under 35 USC 111(a)	2633	328000	

Issue Fee Due	Publication Due	Total Fee(s) Due	Date Due	Prev. Paid Fee
$1200	$0	$1200	10-Feb-2022	$0

1.Change of Correspondence Address and/or Indication Of Fee Address (37 CFR 1.33 & 1.363)

Current Correspondence Address:	Current Indicated Fee Address :
167455 Capitol IP Law Group, PLLC 1629 K Street NW Suite 300 Washington DC 20006-1631 UNITED STATES 434-906-2975 patent@capitoliplaw.com	
☐ Change of correspondence address requested, system generated AIA/122-EFS form attached	☐ Fee Address indication requested, system generated SB/47-EFS form attached

2.Entity Status

Change in Entity Status

○ Applicant certifying micro entity status; system generated Micro Entity certification form attached. See 37 CFR 1.29.
Note: Absent a valid certification of micro entity status, issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment. If this box is checked, you will be prompted to choose a micro entity status on the gross income basis (37 CFR 1.29(a)) or the institution of higher education basis (37 CFR 1.29(d)), and make the applicable certification online.

○ 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.

◉ Applicant changing to regular undiscounted fee status.
Note: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

Document Description: Issue Fee Payment (PTO-85B)

3.The Following Fee(s) Are Submitted:

☒ Issue Fee

☐ I authorize USPTO to apply my previously paid issue fee to the current fees due

☐ Publication Fee

☐ The Director is hereby authorized to apply my previously paid issue fee to the current fee due and to charge deficient fees to Deposit Account Number _____

☐ Advance Order - # of copies _____

☒ If **in addition to** the payment of the issue fee amount submitted with this form, there are any discrepancies in any amount(s) due, the Director is authorized to charge any deficiency, or credit any overpayment, to Deposit Account Number 603320 . The **issue fee must be submitted** with this form. **If payment of the issue fee does not accompany this form, checking this box and providing a deposit account number will NOT be effective to satisfy full payment of the fee(s) due.**

4.Firm and/or Attorney Names To Be Printed

NOTE: If no name is listed, no name will be printed
For printing on the patent front page, list to be displayed as entered

1. Capitol IP Law Group, PLLC
2.
3.

5.Assignee Name(s) and Residence Data To Be Printed

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

Name	City	State	Country	Category
AX WIRELESS, LLC	Cedar Park	TEXAS	UNITED STATES	corporation

6.Signature

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 filed and has been granted power of attorney in this application. I also certify that this Fee(s) Transmittal form is being transmitted to the USPTO via EFS-WEB on the date indicated below.

Signature	/benjamin c rothermel/	**Date**	11-21-2021
Name	Benjamin Caen Rothermel	**Registration Number**	61893

Electronic Patent Application Fee Transmittal

Application Number:	17136801
Filing Date:	29-Dec-2020
Title of Invention:	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS
First Named Inventor/Applicant Name:	Joon Bae KIM
Filer:	Benjamin Caen Rothermel
Attorney Docket Number:	PAX0001US

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 APPL ISSUE FEE	1501	1	1200	1200
PUBL. FEE- EARLY, VOLUNTARY, OR NORMAL	1504	1	0	0
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1200**

Electronic Acknowledgement Receipt

EFS ID:	44335009
Application Number:	17136801
International Application Number:	
Confirmation Number:	2083
Title of Invention:	HEADER REPETITION IN PACKET-BASED OFDM SYSTEMS
First Named Inventor/Applicant Name:	Joon Bae KIM
Customer Number:	167455
Filer:	Benjamin Caen Rothermel
Filer Authorized By:	
Attorney Docket Number:	PAX0001US
Receipt Date:	21-NOV-2021
Filing Date:	29-DEC-2020
Time Stamp:	15:56:31
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1200
RAM confirmation Number	E2021AKF56281240
Deposit Account	603320
Authorized User	Benjamin Rothermel

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

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)	Web85b.pdf	62882 85496522d97806e0faa4a7345527658c9c4f21fb	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	40296 da424d01744255efb08fe29b3a1680dc1ce50509	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	103178		

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.

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.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/136,801	12/28/2021	11212146	PAX0001US	2083

167455 7590 12/08/2021

Capitol IP Law Group, PLLC
1629 K Street NW Suite 300
Washington, DC 20006-1631

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 0 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 Data Management (ODM) at (571)-272-4200.

INVENTOR(s) (Please see PAIR WEB site http://pair.uspto.gov for additional inventors):

Joon Bae KIM, Lexington, MA;
Marcos C. TZANNES, Petaluma, CA;

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

AX WIRELESS LLC, CEDAR PARK, TX;

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 USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court for the Eastern District of Texas, Marshall Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
2:22-cv-277	7/22/2022	for the Eastern District of Texas, Marshall Division

PLAINTIFF	DEFENDANT
AX Wireless LLC	Dell Inc. et al. (see attachment)

PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 (see attachment)		
2		
3		
4		
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

AX WIRELESS LLC, Plaintiff, v. DELL INC., and DELL TECHNOLOGIES INC., Defendants.	Case No. 2:22-cv-277 JURY TRIAL DEMANDED

ATTACHMENT TO FORM AO 120

Defendants:

Dell Inc.; Dell Technologies Inc.

PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 9,973,361	05/15/2018	AX Wireless LLC
2 10,079,707	09/18/2018	AX Wireless LLC
3 10,917,272	02/09/2021	AX Wireless LLC
4 11,212,146	12/28/2021	AX Wireless LLC

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court for the Eastern District of Texas, Marshall Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
2:22-cv-279	7/22/2022	for the Eastern District of Texas, Marshall Division

PLAINTIFF	DEFENDANT
AX Wireless LLC	HP Inc.

PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 (see attachment)		
2		
3		
4		
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

AX WIRELESS LLC,

Plaintiff,

v.

HP INC.,

Defendant.

Case No. 2:22-cv-279

JURY TRIAL DEMANDED

ATTACHMENT TO FORM AO 120

Defendant:

HP Inc.

PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 9,973,361	05/15/2018	AX Wireless LLC
2 10,079,707	09/18/2018	AX Wireless LLC
3 10,917,272	02/09/2021	AX Wireless LLC
4 11,212,146	12/28/2021	AX Wireless LLC

AO 120 (Rev. 08/10)

TO: Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court for the Eastern District of Texas, Marshall Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
2:22-cv-280	7/22/2022	for the Eastern District of Texas, Marshall Division

PLAINTIFF	DEFENDANT
AX Wireless LLC	Lenovo Group Limited

PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 (see attachment)		
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In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

AX WIRELESS LLC,

Plaintiff,

v.

LENOVO GROUP LIMITED,

Defendant.

Case No. 2:22-cv-280

JURY TRIAL DEMANDED

ATTACHMENT TO FORM AO 120

PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 9,973,361	05/15/2018	AX Wireless LLC
2 10,079,707	09/18/2018	AX Wireless LLC
3 10,917,272	02/09/2021	AX Wireless LLC
4 11,212,146	12/28/2021	AX Wireless LLC