

Search history

Search PN=(WO2016179307) (Results 1)

1:

Search [SP]: block acknowledgement mechanism for acknowledging dl-mu data on ul-mu wireless communication systema method, an apparatus, and a computer-readable medium for wireless communication are provided. the apparatus may be a first user terminal. the first user terminal receives, on a first dl communication channel of multiple dl communication channels, a dl mu ppdu includes mpdus transmitted from an access point to multiple user terminals including the first user terminal on the multiple dl communication channels. the first user terminal obtains an ul channel indication and a ba indication. the first user terminal transmits, on a first ul communication channel of multiple ul communication channels, a first ba to the access point based on the ul channel indication and the ba indication simultaneously or concurrently with a ba transmission from the rest of the multiple user terminals to the access point on the rest of the multiple ul communication channels. the first ba acknowledges one or more of the mpdus. (Results 0)

Search fn=(65078469 or 63944653 or 68799520 or 63944653 or 65078469 or 65568057 or 68242960 or 70862407 or 72570533 or 43590048 or 43811787 or 46711996 or 46712010 or 47898887 or 48312409 or 49045316 or 49119762 or 48873167 or 43590048 or 43811787 or 46711996 or 46712010 or 47898887 or 49119762 or 49574328 or 58630683 or 63667172 or 61183531 or 61747664 or 62246668 or 62246668 or 49574328 or 54381631 or 58998878) (Results 24)

Search [SP]: 1. a method of wireless communication by a first user terminal, comprising: receiving, from an access point, a downlink (dl) multi-user (mu) physical layer convergence protocol (plcp) protocol data unit (ppdu) (dl mu ppdu), wherein the dl mu ppdu includes: a first aggregate medium access control (mac) protocol data unit (a-mpdu), a block acknowledgement (ba) trigger, and an acknowledgement policy that instructs the first user terminal when to transmit a ba to the access point, wherein the first a-mpdu includes a plurality of mpdus, wherein the ba trigger is different from the acknowledgement policy and transmitting, to the access point, a first ba based on the ba trigger and the acknowledgement policy, wherein the first ba acknowledges one or more mpdus of the plurality of mpdus.2. the method of claim 1, wherein the first a-mpdu includes the ba trigger.3. the method of claim 1, wherein each mpdu of the first a-mpdu includes the ba trigger.4. the method of claim 1, wherein the dl mu ppdu includes a preamble that includes the ba trigger.5. the method of claim 4, wherein the preamble includes an he-sig b field that includes the ba trigger.6. the method of claim 1, wherein each mpdu of the first a-mpdu includes the acknowledgement policy.7. the method of claim 1, wherein the acknowledgement policy that instructs the first user terminal when to transmit a ba to the access point includes a policy that instructs the first user terminal to transmit the first ba immediately upon receipt of the ba trigger.8. the method of claim 1, wherein the acknowledgement policy that instructs the first user terminal when to transmit a ba to the access point includes a policy that instructs the first user terminal to transmit the first ba after a period of time upon receipt of the ba trigger, wherein the period of time is measured from an end point of the dl mu ppdu.9. the method of claim 8, wherein the period of time includes a short interframe space (sifs).10. the method of claim 1, further comprising: transmitting data to the access point only after the first ba is transmitted to the access point.11. a method of wireless communication by an access point, comprising: transmitting, to a first user terminal, a downlink (dl) multi-user (mu) physical layer convergence protocol (plcp) protocol data unit (ppdu) (dl mu ppdu), wherein the dl mu ppdu includes: a first aggregate medium access control (mac) protocol data unit (a-mpdu), a block acknowledgement (ba) trigger, and an acknowledgement policy that instructs the first user terminal when to transmit a ba to the access point, wherein the first a-mpdu includes a plurality of mpdus, wherein the ba trigger is different from the acknowledgement policy and receiving, from the first user terminal, a first ba based on the ba trigger and the acknowledgement policy, wherein the first ba acknowledges one or more mpdus of the plurality of mpdus.12. the method of claim 11, wherein the first a-mpdu includes the ba trigger.13. the method of claim 11, wherein each mpdu of the first a-mpdu includes the ba trigger.14. the method of claim 11, wherein the dl mu ppdu includes a preamble that includes the ba trigger.15. the method of claim 14, wherein the preamble includes an he-sig b field that includes the ba trigger.16. the method of claim 11, wherein each mpdu of the first a-mpdu includes the acknowledgement policy.17. the method of claim 11, wherein the acknowledgement policy that instructs the first user terminal when to transmit a ba to the access point includes a policy that instructs the first user terminal to transmit the first ba immediately upon receipt of the ba trigger.18. the method of claim 11, wherein the acknowledgement policy that instructs the first user terminal when to transmit a ba to the access point includes a policy that instructs the first user terminal to transmit the first ba after a period of time upon receipt of the ba trigger, wherein the period of time is measured from an end point of the dl mu ppdu.19. the method of claim 18, wherein the period of time includes a short interframe space (sifs).20. the method of claim 11, further comprising: receiving data from the first user terminal only after the first ba is received from the first user terminal.21. a first user terminal for wireless communication, comprising: a memory and at least one processor coupled to the memory, wherein the at least one processor is configured to: receive, from an access point, a downlink (dl) multi-user (mu) physical layer convergence protocol (plcp) protocol data unit (ppdu) (dl mu ppdu), wherein the dl mu ppdu includes: a first aggregate medium access control (mac) protocol data unit (a-mpdu), a block acknowledgement (ba) trigger, and an acknowledgement policy that instructs the first user terminal when to transmit a ba to the access point, wherein the first a-mpdu includes a plurality of mpdus, wherein the ba trigger is different from the acknowledgement policy and transmit, to the access point, a first ba based on the ba trigger and the acknowledgement policy, wherein the first ba acknowledges one or more mpdus of the plurality of mpdus.22. the first user terminal of claim 21, wherein the first a-mpdu includes the ba trigger.23. the first user terminal of claim 21, wherein the dl mu ppdu includes a preamble that includes the ba trigger.24. the first user terminal of claim 21, wherein the acknowledgement policy that instructs the first user terminal when to transmit a ba to the access point includes a policy that instructs the first user terminal to transmit the first ba immediately upon receipt of the ba trigger.25. the first user terminal of claim 21, wherein the acknowledgement policy that instructs the first user terminal when to transmit a ba to the access point includes a policy that instructs the first user terminal to transmit the first ba after a period of time upon receipt of the ba trigger, wherein the period of time is measured from an end point of the dl mu ppdu.26. a non-transitory computer-readable medium having code stored thereon that, when executed, causes a first user terminal to: receive, from an access point, a downlink (dl) multi-user (mu) physical layer convergence protocol (plcp) protocol data unit (ppdu) (dl mu ppdu), wherein the dl mu ppdu includes: a first aggregate medium access control (mac) protocol data unit (a-mpdu), a block acknowledgement (ba) trigger, and an acknowledgement policy that instructs the first user terminal when to transmit a ba to the access point, wherein the first a-mpdu includes a plurality of mpdus, wherein the ba trigger is different from the acknowledgement policy and transmit, to the access point, a first ba based on the ba trigger and the acknowledgement policy, wherein the first ba acknowledges one or more mpdus of the plurality of mpdus.27. the non-transitory computer-readable medium of claim 26, wherein the first a-mpdu includes the ba trigger.28. the non-transitory computer-readable medium of claim 26, wherein the dl mu ppdu includes a preamble that includes the ba trigger.29. the non-transitory computer-readable medium of claim 26, wherein the acknowledgement policy that instructs the first user terminal when to transmit a ba to the access point includes a policy that instructs the first user terminal to transmit the first ba immediately upon receipt of the ba trigger.30. the non-transitory computer-readable medium of claim 26, wherein the acknowledgement policy that instructs the first user terminal when to transmit a ba to the access point includes a policy that instructs the first user terminal to transmit the first ba after a period of time upon receipt of the ba trigger, wherein the period of time is measured from an end point of the dl mu ppdu.31. an access point for wireless communication, comprising: a memory and at least one processor coupled to the memory, wherein the at least one processor is configured to: transmit, to a first user terminal, a downlink (dl) multi-user (mu) physical layer convergence protocol (plcp) protocol data unit (ppdu) (dl mu ppdu), wherein the dl mu ppdu includes: a first aggregate medium access control (mac) protocol data unit (a-mpdu), a block acknowledgement (ba) trigger, and an acknowledgement policy that instructs the first user terminal when to transmit a ba to the access point, wherein the first a-mpdu includes a plurality of mpdus, wherein the ba trigger is different from the acknowledgement policy and receive, from the first user terminal, a first ba based on the ba trigger and the acknowledgement policy, wherein the first ba acknowledges one or more mpdus of the plurality of mpdus.32. the access point of claim 31, wherein the first a-mpdu includes the ba trigger.33. the access point of claim 31, wherein the dl mu ppdu includes a preamble that includes the ba trigger.34. the access point of claim 31, wherein the acknowledgement policy that instructs the first user terminal when to transmit a ba to the access point includes a policy that instructs the first user terminal to transmit the first ba immediately upon receipt of the ba trigger.3 (Results 0)

Search [SP]: cross-reference to related application(s)[0001] this application claims the benefit of u.s. provisional application ser. no. 62/157,921, entitled "block acknowledgement mechanism for acknowledging dl-mu data on ul-mu wireless communication system" and filed on may 6, 2015, which is expressly incorporated by reference herein in its entirety.background[0002] field[0003] certain aspects of the present disclosure generally relate to wireless communications, and more particularly, to a block acknowledgement mechanism for acknowledging downlink multi-user data on an uplink multi-user wireless communication system.[0004] background[0005] in many telecommunication systems, communications networks are used to exchange messages among several interacting spatially-separated devices. networks may be classified according to geographic scope, which could be, for example, a metropolitan area, a local area, or a personal area. such networks may be

designated respectively as a wide area network (wan), metropolitan area network (man), local area network (lan), or personal area network (pan). networks also differ according to the switching/routing technique used to interconnect the various network nodes and devices (e.g., circuit switching vs. packet switching), the type of physical media employed for transmission (e.g., wired vs. wireless), and the set of communication protocols used (e.g., internet protocol suite, sonet (synchronous optical networking), ethernet, etc.).[0006] wireless networks are often preferred when the network elements are mobile and thus have dynamic connectivity needs, or if the network architecture is formed in an ad hoc, rather than fixed, topology. wireless networks employ intangible physical media in an unguided propagation mode using electromagnetic waves in the radio, microwave, infra-red, optical, etc., frequency bands. wireless networks advantageously facilitate user mobility and rapid field deployment when compared to fixed wired networks.[0007] in order to address the issue of increasing bandwidth requirements that are demanded for wireless communications systems, different schemes are being developed to allow multiple user terminals to communicate with a single access point by sharing the channel resources while achieving high data throughputs.[0008] in certain systems with the single user uplink procedure, each block acknowledgment (ba) subsequent to the immediate bas is polled using a block acknowledgment request (bars). thus, there is a need for a more efficient uplink ba mechanism for acknowledging downlink multi-user packets.summary[0009] in an aspect of the disclosure, a method, a computer-readable medium, and an apparatus are provided. the apparatus may be a first user terminal. the first user terminal receives, on a first downlink (dl) communication channel of a plurality of dl communication channels, a dl multi-user (mu) physical layer convergence procedure (plcp) protocol data unit (ppdu) transmitted from an access point to a plurality of user terminals including the first user terminal and a second user terminal on the plurality of dl communication channels. the dl mu ppdu includes a plurality of medium access control (mac) protocol data units (mpdus). the first user terminal transmits, on a first uplink (ul) communication channel of a plurality of ul communication channels, a first block acknowledgement (ba) to the access point concurrently with transmission of a second ba from the second user terminal to the access point on a second ul communication channel of the plurality of ul communication channel. the first ba acknowledges one or more of the plurality of mpdus. in certain configurations, the first user terminal obtains an ul channel indication and a ba indication. the transmission of the first ba is based on the ul channel indication and the ba indication.brief description of the drawings[0010] fig. 1 is a diagram that illustrates a multiple-access multiple-input multiple-output (mimo) system with access points and user terminals.[0011] fig. 2 illustrates a block diagram of an access point and two user terminals in mimo system.[0012] fig. 3 illustrates various components that may be utilized in a wireless device that may be employed within the mimo system.[0013] fig. 4 is a diagram illustrating operations of transmitting ba frames in a dl/ul mu-mimo system in one mechanism.[0014] fig. 5 is a diagram illustrating operations of transmitting ba frames in a dl/ul mu-mimo system in another mechanism.[0015] fig. 6 is a diagram illustrating operations of transmitting ba frames in a dl/ul mu-mimo system in yet another mechanism.[0016] fig. 7 is a diagram illustrating operations of transmitting ba frames in a dl/ul mu-mimo system in another mechanism.[0017] fig. 8 is a diagram illustrating operations of transmitting ba frames in a dl/ul mu-mimo system in yet another mechanism.[0018] fig. 9 is a flow chart of a method (process) of transmitting bas on multiple ul communication channels simultaneously or concurrently.[0019] fig. 10 is another flow chart of a method (process) of transmitting bas on multiple ul communication channels simultaneously or concurrently.[0020] fig. 11 is a functional block diagram of an example wireless communication device.detailed description[0021] various aspects of the novel systems, apparatuses, and methods are described more fully hereinafter with reference to the accompanying drawings. the teachings disclosure may, however, be embodied in many different forms and should not be construed as limited to any specific structure or function presented throughout this disclosure. rather, these aspects are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the disclosure to those skilled in the art. based on the teachings herein one skilled in the art should appreciate that the scope of the disclosure is intended to cover any aspect of the novel systems, apparatuses, and methods disclosed herein, whether implemented independently of or combined with any other aspect of the invention. for example, an apparatus may be implemented or a method may be practiced using any number of the aspects set forth herein. in addition, the scope of the invention is intended to cover such an apparatus or method which is practiced using other structure, functionality, or structure and functionality in addition to or other than the various aspects of the invention set forth herein. it should be understood that any aspect disclosed herein may be embodied by one or more elements of a claim.[0022] although particular aspects are described herein, many variations and permutations of these aspects fall within the scope of the disclosure. although some benefits and advantages of the preferred aspects are mentioned, the scope of the disclosure is not intended to be limited to particular benefits, uses, or objectives. rather, aspects of the disclosure are intended to be broadly applicable to different wireless technologies, system configurations, networks, and transmission protocols, some of which are illustrated by way of example in the figures and in the following description of the preferred aspects. the detailed description and drawings are merely illustrative of the disclosure rather than limiting, the scope of the disclosure being defined by the appended claims and equivalents thereof.[0023] wireless network technologies may include various types of wireless local area networks (wans). a wan may be used to interconnect nearby devices together, employing widely used networking protocols. the various aspects described herein may apply to any communication standard, such as wi-fi or, more generally, any member of the ieee 802.11 family of wireless protocols.[0024] in some aspects, wireless signals may be transmitted according to a high-efficiency 802.11 protocol using orthogonal frequency-division multiplexing (ofdm), direct-sequence spread spectrum (dsss) communications, a combination of ofdm and dsss communications, or other schemes. implementations of the high-efficiency 802.11 protocol may be used for internet access, sensors, metering, smart grid networks, or other wireless applications. advantageously, aspects of certain devices implementing this particular wireless protocol may consume less power than devices implementing other wireless protocols, may be used to transmit wireless signals across short distances, and/or may be able to transmit signals less likely to be blocked by objects, such as humans.[0025] in some implementations, a wan includes various devices which are the components that access the wireless network. for example, there may be two types of devices: access points (aps) and clients (also referred to as stations, or stas). in general, an ap serves as a hub or base station for the wan and an sta serves as a user of the wan. for example, a sta may be a laptop computer, a personal digital assistant (pda), a mobile phone, etc. in an example, an sta connects to an ap via a wi-fi (e.g., ieee 802.11 protocol such as 802.11 ah) compliant wireless link to obtain general connectivity to the internet or to other wide area networks. in some implementations an sta may also be used as an ap.[0026] the techniques described herein may be used for various broadband wireless communication systems, including communication systems that are based on an orthogonal multiplexing scheme. examples of such communication systems include spatial division multiple access (sdma), time division multiple access (tdma), orthogonal frequency division multiple access (ofdma) systems, single-carrier frequency division multiple access (sc-fdma (Results 25)

Search 3 or 5 (Results 25)

6:

1) Family number: 63934556 (US2016330007A)

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Title: BLOCK ACKNOWLEDGEMENT MECHANISM FOR ACKNOWLEDGING DL-MU DATA ON UL-MU WIRELESS COMMUNICATION SYSTEM

Abstract: A method, an apparatus, and a computer-readable medium for wireless communication are provided. The apparatus may be a first user terminal. The first user terminal receives, on a first DL communication channel of multiple DL communication channels, a DL MU PPDU includes MPDUs transmitted from an access point to multiple user terminals including the first user terminal on the multiple DL communication channels. The first user terminal obtains an UL channel indication and a BA indication. The first user terminal transmits, on a first UL communication channel of multiple UL communication channels, a first BA to the access point based on the UL channel indication and the BA indication simultaneously or concurrently with a BA transmission from the rest of the multiple user terminals to the access point on the rest of the multiple UL communication channels. The first BA acknowledges one or more of the MPDUs.

Classifications:

International (IPC 8-9): H04B7/04 H04B7/0413 H04B7/0452 H04J99/00

H04L H04L1/16 H04L1/18 H04L5/00 H04W H04W28/04 H04W28/12

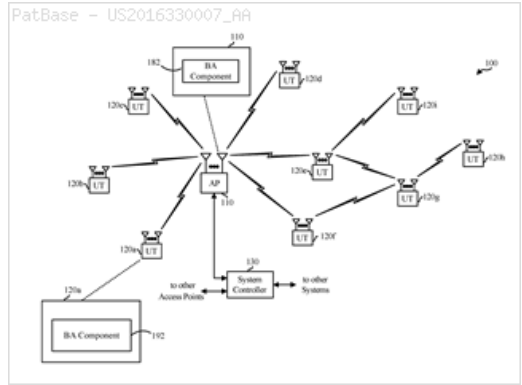
H04W72/02 H04W72/04 (Advanced/Invention);

H04L1/16 (Core/Invention)

CPC: H04L5/0055 H04W72/042 H04W72/0413 H04W72/0453 H04B7/0452

H04L1/1614 H04L1/1685 H04L1/1854 H04L1/1861

US: 370/329



Family:

Publication number	Publication date	Application number	Application date
AU2016257451 AA	20171012	AU20160257451	20160504
BR112017023679 A2	20180717	BR20171123679	20160504
CA2980467 AA	20170920	CA20162980467	20160504
CL2017002692 A1	20180406	CL20170002692	20171024
CN107534524 A	20180102	CN201680025531	20160504
CO20170011281 A2	20171110	CO20170011281	20171102
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EP3386135 A1	20181010	EP20180175526	20160504
HK1246026 A1	20180831	HK20180105074	20180419
ID201806009 A	20180608	ID2017P0008471	20160504
IN201747033750 A	20171006	IN201747033750	20170922
JP2018524841 T2	20180830	JP20170556626T	20160504
KR20180004136 A	20180110	KR20177032033	20160504
MX2017013997 A1	20180315	MX20170013997	20160504
PH2017501744 A	20180319	PH20170501744	20170922
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TH183435 A	20190207	TH20171006556	20160504
TW201640940 A	20161116	TW20160113873	20160504
US2016330007 AA	20161110	US20160145756	20160503
US10158474 BB	20181218	US20160145756	20160503
WO16179307 A1	20161110	WO2016US30820	20160504

Priority:

US20150157921P 20150506 US20160145756 20160503 EP20160724536 20160504
WO2016US30820 20160504

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Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

2) Family number: 43590048 (US2009196364A)

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Title: RADIO COMMUNICATION DEVICE, RADIO COMMUNICATION METHOD, AND PROGRAM

Abstract: A radio communication method stores a plurality MAC frames for each of a plurality of destinations. The method decides the longest transmission time of transmission times needed to transmit the plurality of MAC frames to each of the plurality of destinations within a fixed period. The method generates a plurality of physical frames for the plurality of destinations to transmit them at the same time by connecting the plurality of MAC frames and adding additional information to each connected MAC frame so as to be a frame length equivalent to a transmission time equal to the longest transmission time.

Classifications:

International (IPC 8-9): H04B7/04 H04B7/0413 H04B7/0452 H04J99/00 H04K1/10 H04L12/26 H04L29/12 H04L5/00 H04L5/08 H04W24/02 H04W28/06 H04W4/00 H04W84/12 (Advanced/Invention); H04L5/00 H04W88/06 (Advanced/Non-invention); H04B7/04 H04J99/00 H04K1/10 H04W4/00 H04W84/02 (Core/Invention)
CPC: H04B7/0452 H04W24/02 H04W88/06 H04W28/065 H04L5/0046 H04L5/0087
European: H04W28/06D
US: 1/1 370/328 370/328S 375/260 375/260P

CN102301807 A	20111228	CN201080005830	20100129
CN102301807 B	20160608	CN201080005830	20100129
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CN103178946 B	20181030	CN201310142810	20090318
EP2277277 A1	20110126	EP20090728239	20090318
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EP2654232 A1	20131023	EP20130020054	20090318
ES2641173 T3	20171108	ES20100702796T	20100129
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HU035756 T2	20180528	HU20100702796T	20100129
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Priority:

US20080041670P	20080402	US20080041670	20080402	US20080090419P	20080820
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JP20150027898	20150216				

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Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

4) Family number: 46711996 (US2010220654A)

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Title: VIDEO TRANSMISSION OVER SDMA

Abstract: Certain aspects of the present disclosure generally relate to communication, and more specifically, to techniques for transmitting data in parallel, such as spatial division multiple access (SDMA) techniques.

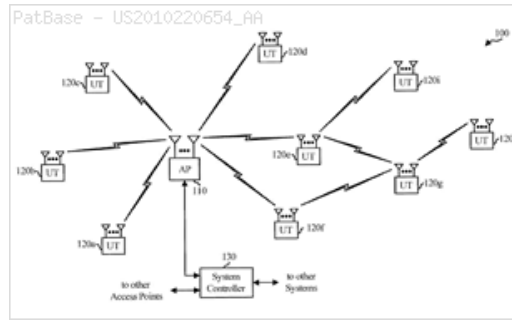
Classifications:

International (IPC 8-9): G06F15/16 H04B7/04 H04B7/0417 H04B7/10 H04J99/00 H04L1/16 H04L1/18 H04L29/06 H04W16/28 H04W28/18 H04W40/00 H04W74/04 H04W84/12 (Advanced/Invention); H04W72/12 (Advanced/Non-invention); G06F15/16 H04W40/00 (Core/Invention); H04L1/16 (Core/Non-invention)

CPC: H04B7/0417 H04L1/1685 H04L1/1854 H04W72/1289 H04B7/0697 H04W88/02 H04W88/08

European: H04B7/04M1 H04L1/16F17 H04L1/18R7 T04W72/12F4

US: 370/328 370/328P 709/231 709/231S



Family:

Publication number	Publication date	Application number	Application date
BRPI1007838 A2	20180227	BR2010PI07838	20100226
CN102326352 A	20120118	CN201080008720	20100226
CN105846964 A	20160810	CN201610289415	20100226
EP2401829 A2	20120104	EP20100740039	20100226
IN05571CN2011 A	20121109	IN2011CN05571	20110802
JP2012519423 T2	20120823	JP20110552203T	20100226
JP2014147083 A2	20140814	JP20140049090	20140312
JP5784774 B2	20150924	JP20140049090	20140312
JP5931446 B2	20160608	JP20110552203T	20100226
KR101259440 B1	20130430	KR20117022671	20100226
KR20110122210 A	20111109	KR20117022671	20100226
TW201119281 A	20110601	TW20100105881	20100226
US2010220654 AA	20100902	US20100711725	20100224
US10236950 BB	20190319	US20100711725	20100224
WO10099491 A2	20100902	WO2010US25664	20100226
WO10099491 A3	20110414	WO2010US25664	20100226

Priority:

US20090156402P 20090227 US20100711725 20100224 CN201080008720 20100226
 JP20110552203 20100226 WO2010US25664 20100226 JP20110552203T 20100226

Probable Assignee: QUALCOMM INC

Assignee(s): (std): QUALCOMM INC ; WENTINK MAARTEN MENZO

Assignee(s): QUALCOMM INCORPORATED

Inventor(s): (std): WENTINK MAARTEN MENZO ; MENZO WENTINK MAARTEN ; MAARTEN MENZO WENTINK

Agent(s): CARSTENS DIRK WILHELM; QUALCOMM INC; PATTERSON AND SHERIDAN LLP; VO DANG M

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

5) Family number: 46712010 (US2010220678A)

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Title: PIGGYBACKING INFORMATION IN TRANSMIT OPPORTUNITIES

Abstract: Aspects of the present disclosure provide techniques for aggregating certain frame types in uplink and/or downlink transmit opportunities. Such techniques may improve wireless communications system performance by reducing the overall number of transmit opportunities required.

Classifications:

International (IPC 8-9): H04B7/04 H04J99/00 H04L1/16 H04W16/28 H04W28/16 H04W72/12 (Advanced/Invention);

H04W74/08 (Advanced/Non-invention);

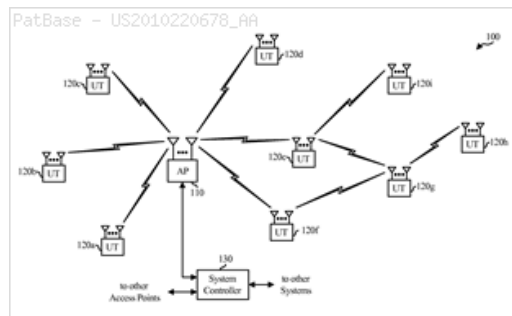
H04W72/00 (Core/Invention);

H04W72/12 (Core/Non-invention)

CPC: H04W74/006 H04W72/1289 H04W72/1284 H04W74/085 H04W74/04 H04B7/0697 H04L1/1614 H04L1/1685

European: H04W72/12F4 T04W72/12F2 T04W74/08D2B

US: 370/329 370/329P 370/330



Family:

Publication number	Publication date	Application number	Application date
CN102318428 A	20120111	CN201080008217	20100226
CN102318428 B	20150603	CN201080008217	20100226
EP2401887 A1	20120104	EP20100708042	20100226
IN05572CN2011 A	20121109	IN2011CN05572	20110802
JP2012519426 T2	20120823	JP20110552207T	20100226

JP5318974 B2	20131016	JP20110552207T	20100226
KR101357706 B1	20140206	KR20117022531	20100226
KR20110120973 A	20111104	KR20117022531	20100226
TW201127159 A	20110801	TW20100105883	20100226
US2010220678 AA	20100902	US20100711861	20100224
US8976741 BB	20150310	US20100711861	20100224
WO10099496 A1	20100902	WO2010US25672	20100226

Priority:

US20090156353P 20090227 US20100711861 20100224 WO2010US25672 20100226

Probable Assignee: QUALCOMM INC

Assignee(s): (std): QUALCOMM INC ; WENTINK MAARTEN MENZO

Inventor(s): (std): WENTINK MAARTEN MENZO ; MENZO WENTINK MAARTEN

Agent(s): SCHMIDBAUER ANDREAS KONRAD; QUALCOMM INC; KEVIN T; HO ERIC

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

6) Family number: 47898887 (US2010322166A)

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Title: MULTI-USER MULTIPLE INPUT MULTIPLE OUTPUT WIRELESS COMMUNICATIONS

Abstract: Certain aspects of the present disclosure relate to a method for enhanced multi-user multiple input multiple output (MU-MIMO) wireless communications. The proposed method may reduce and/or eliminate stringent frequency and time synchronization requirements for stations (STAs) to participate in a downlink MU-MIMO transaction by utilizing deterministic scheduling.

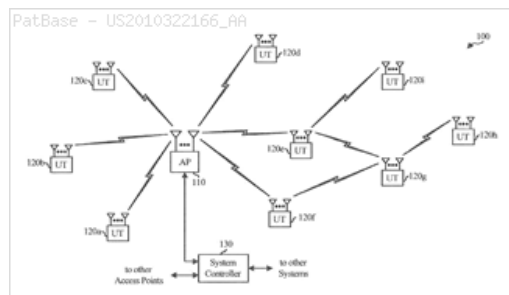
Classifications:

International (IPC 8-9): H04B7/04 H04B7/0452 H04B7/06 H04J99/00 H04W16/28 H04W28/04 H04W4/00 H04W52/14 H04W72/04 H04W72/12 H04W74/08 (Advanced/Invention); H04L27/28 (Advanced/Non-invention)

CPC: H04B7/0417 H04B7/0452 H04B7/0632 H04W72/1284 H04W52/146 H04W72/121

European: H04W72/12B2

US: 1/1 370/312 370/329 370/329P 375/260 375/260S



Family:

Publication number	Publication date	Application number	Application date
CN102461003 A	20120516	CN201080026365	20100616
CN102461003 B	20150422	CN201080026365	20100616
CN104703287 A	20150610	CN201510126272	20100616
EP2443765 A1	20120425	EP20100739732	20100616
IN09128CN2011 A	20130315	IN2011CN09128	20111207
IN295239 B	20180406	IN2011CN09128	20111207
JP2012531105 T2	20121206	JP20120516236T	20100616
JP2015029292 A2	20150212	JP20140180187	20140904
JP6141810 B2	20170607	JP20140180187	20140904
KR20120033333 A	20120406	KR20127001378	20100616
KR20130137250 A	20131216	KR20137030914	20100616
KR20160139064 A	20161206	KR20167033306	20100616
US2010322166 AA	20101223	US20100692134	20100122
US2015341955 AA	20151126	US20150819102	20150805
US9137815 BB	20150915	US20100692134	20100122
US10165591 BB	20181225	US20150819102	20150805
WO10148076 A1	20101223	WO2010US38805	20100616

Priority:

US20090188000P 20090617 US20100692134 20100122 CN201080026365 20100616
JP20120516236 20100616 JP20120516236T 20100616 WO2010US38805 20100616
US20150819102 20150805

Probable Assignee: QUALCOMM INC

Assignee(s): (std): ABRAHAM SANTOSH P ; JONES IV VINCENT KNOWLES ; QUALCOMM INC ; SAMPATH HEMANTH ; WENTINK MAARTEN MENZO

Assignee(s): QUALCOMM INCORPORATED

Inventor(s): (std): ABRAHAM SANTOSH P ; HEMANTH SAMPATH ; JONES IV VINCENT KNOWLES ; JONES VINCENT KNOWLES ; KNOWLES JONES IV VINCENT ; MAARTEN MENZO WENTINK ; MENZO WENTINK MAARTEN ; SAMPATH HEMANTH ; SANTOSH P ABRAHAM ; VINCENT KNOWLES JONES IV ; WENTINK MAARTEN MENZO

Agent(s): CARSTENS DIRK WILHELM; QUALCOMM INC; STEVEN R; THIEL STEVEN R; PATTERSON AND SHERIDAN; VO DANG M

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY

CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS
IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY
MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG
TH TJ TM TN TR TT TZ UA UG US UZ VN VC VZ ZA ZM ZW

7) Family number: 49119762 (US2012263160A)

PatBase

Title: METHOD FOR SENDING/ RECEIVING DATA IN A WIRELESS PACKET COMMUNICATION SYSTEM IN WHICH THERE IS SIMULTANEOUS COMMUNICATION WITH VARIOUS TERMINALS

Abstract: A method and apparatus for transmitting a frame to at least one receiver in a wireless communication system is provided. The apparatus determines at least one data length in accordance with each receiver based on a number of symbol for the frame to be transmitted, determines a maximum data length among the at least one data length, and determines a length of the frame in time domain based on the maximum data length. The apparatus generates the frame in accordance with the length of the frame, the frame including a first signal field and at least one second signal field. The first signal field indicates the length of the frame and each second signal field indicates each data length.

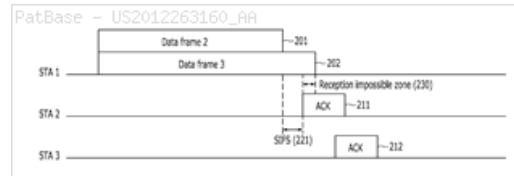
Classifications:

International (IPC 8-9): H04B5/00 H04B7/04 H04B7/26 H04L1/00
H04L1/18 H04L12/18 H04L12/28 H04L12/70 H04L29/06 H04L5/00
H04W16/28 H04W28/04 H04W28/06 H04W72/04
H04W84/12 (Advanced/Invention)

CPC: H04L1/0083 H04L2001/0093 H04L1/0028 H04L29/06 H04L12/18
H04B5/00 H04L5/0055 H04B7/0452 H04W88/08 H04W84/12 H04L1/1887

European: H04L1/00F2 H04L1/18T7 T04L1/00T1

US: 1/1 370/312 370/328 370/338



Family:

Publication number	Publication date	Application number	Application date
CN102656822 A	20120905	CN201080057551	20101216
CN102656822 B	20150114	CN201080057551	20101216
CN104506286 A	20150408	CN201410779198	20101216
CN104506286 B	20180216	CN201410779198	20101216
DE112010004877 B4	20151022	DE201011004877T	20101216
DE112010004877 T5	20130110	DE201011004877T	20101216
DE112010006113 A5	20151210	DE201011006113T	20101216
DE112010006113 B4	20160929	DE201011006113T	20101216
DE602010023873 D1	20150521	DE201060023873T	20101216
DE602010038157 D1	20161229	DE201060038157T	20101216
EP2515452 A2	20121024	EP20100837900	20101216
EP2515452 A4	20130109	EP20100837900	20101216
EP2515452 B1	20150408	EP20100837900	20101216
EP2903181 A1	20150805	EP20150156239	20101216
EP2903181 B1	20161116	EP20150156239	20101216
ES2538503 T3	20150622	ES20100837900T	20101216
JP2013514715 T2	20130425	JP20120544391T	20101216
JP2014079024 A2	20140501	JP20140021284	20140206
JP2016006960 A2	20160114	JP20150124868	20150622
JP2017103820 A2	20170608	JP20170038401	20170301
JP2018160937 A2	20181011	JP20180133278	20180713
JP5475891 B2	20140416	JP20120544391T	20101216
JP5768152 B2	20150826	JP20140021284	20140206
KR101234004 B1	20130218	KR20100129416	20101216
KR20110070806 A	20110624	KR20100129416	20101216
US2012263160 AA	20121018	US20120525220	20120615
US2012320896 AA	20121220	US20120596328	20120828
US2016197737 AA	20160707	US20160067178	20160311
US8995343 BB	20150331	US20120596328	20120828
US9288017 BB	20160315	US20120525220	20120615
WO11074904 A2	20110623	WO2010KR09039	20101216
WO11074904 A3	20111103	WO2010KR09039	20101216

Priority:

KR20090127310	20091218	KR20100010590	20100204	KR20100066465	20100709
CN201080057551	20101216	EP20100837900	20101216	JP20120544391	20101216
JP20140021284	20101216	EP20150156239	20101216	JP20120544391T	20101216
JP20150124868	20101216	JP20170038401	20101216	WO2010KR09039	20101216
US20120525220	20120615	US20120596328	20120828	US20160067178	20160311
JP20170038401	20170301	JP20180133278	20180713		

Probable Assignee: ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INST

Assignee(s): (std): CHOI JEEYON ; ELECT AND TELECOMM RESEARCH INST ; ELECTRONICS AND TELECOMMUNICATIONS RES INST ; LEE SOK KYU ; KOREA ELECTRONICS TELECOMM ; ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INST KOREA

Assignee(s): ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE ; ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INST

Inventor(s): (std): CHOI JEEYON ; LEE SOK KYU ; CHOI JEE YON ; OH JONG EE ; JEEYON CHOI ; SOK KYU LEE ; LEE SEOK KYU

Agent(s): BETTEN AND RESCH PATENT U RECHTSANWAELTE PARTGMBB; ESSLINGER ALEXANDER; BETTEN AND RESCH; SUGRANES PEDRO; NAGAI HIROSHI; SHINSUNG PATENT FIRM

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY

CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS
IT JP KE KG KM KN KP KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ
NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH
TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

8) Family number: 49574328 (US2013039205A)

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Title: WIRELESS COMMUNICATION METHOD, BASE STATION, WIRELESS COMMUNICATION SYSTEM, AND COMMUNICATION APPARATUS

Abstract: Provided are a wireless communication method, a base station, a wireless communication system and a communication apparatus whereby an interference power is calculated from an estimated propagation channel estimation result and the transmission power is controlled based on the interference power or the interference is suppressed by controlling the directivity, thereby increasing the transmission capacity. A propagation channel estimation circuit performs propagation channel estimation from a response signal transmitted from a terminal station and estimates a propagation channel estimation result. An interference power calculation circuit measures each interference power from a signal of each sub-carrier received by each of wireless units, and calculates an interference power for each sub-carrier from the propagation channel estimation result estimated by the propagation channel estimation circuit. When the calculated interference power is equal to or more than a predetermined threshold, an interference suppression signal generation circuit changes the transmission power and generates an interference suppression signal.

Classifications:

International (IPC 8-9): G01R31/08 H04B17/00 H04B17/345 H04B5/00 H04B7/04 H04B7/0452 H04J11/00 H04J99/00 H04L5/00 H04W16/28 H04W28/18 H04W52/24 H04W72/04 H04W72/08

H04W88/08 (Advanced/Invention);

H04W72/04 (Advanced/Non-invention)

CPC: H04B5/00 H04W52/243 H04W72/0453 H04L5/0055 H04W72/082

H04B7/0452 H04B17/345

European: H04B17/00B1F H04B5/00 H04B7/04M5

US: 1/1 370/252 370/310 370/328 370/329 370/338 455/403 455/422.1 455/434

PatBase - US2013039205-00

INTERFERENCE POWER [DB]	TRANSMISSION POWER [DB]
0	-20
5	-15
10	-10
20	0
30	10
40	20
50	30

Family:

Publication number	Publication date	Application number	Application date
■ CN102792743 A	20121121	CN201180012980	20110310
■ CN102792743 B	20151021	CN201180012980	20110310
■ EP2547155 A1	20130116	EP20110753437	20110310
■ EP2547155 A4	20151028	EP20110753437	20110310
■ JP2011111779 A1	20130627	JP20120504514T	20110310
■ JP5461685 B1	20140402	JP20120504514T	20110310
■ JP5461685 B2	20140402	JP20120504514T	20110310
■ US2013039205 AA	20130214	US20110583340	20110310
■ US2015036634 AA	20150205	US20140518215	20141020
■ US8897163 BB	20141125	US20110583340	20110310
■ US9370013 BB	20160614	US20140518215	20141020
■ WO11111779 A1	20110915	WO2011JP55653	20110310

Priority:

JP20100054633 20100311 JP20100176568 20100805 WO2011JP55653 20110310
JP20120504514 20110310 US20120583340 20120907 US20140518215 20141020

Probable Assignee: NIPPON TELEGRAPH AND TELEPHONE CORP

Assignee(s): (std): ASAI YUSUKE ; ICHIKAWA TAKEO ; KUDO RIICHI ; MATSUI MUNEHIRO ; MIZOGUCHI MASATO ; NIPPON TELEGRAPH AND TELEPHONE ; MURAKAMI TOMOKI ; TAKATORI YASUSHI

Assignee(s): NIPPON TELEGRAPH AND TELEPHONE CORP

Inventor(s): (std): ASAI YUSUKE ; ICHIKAWA TAKEO ; KUDO RIICHI ; MASATO MIZOGUCHI ; MATSUI MUNEHIRO ; MIZOGUCHI MASATO ; MUNEHIRO MATSUI ; MURAKAMI TOMOKI ; RIICHI KUDO ; TAKATORI YASUSHI ; TAKEO ICHIKAWA ; TOMOKI MURAKAMI ; YASUSHI TAKATORI ; YUSUKE ASAI

Agent(s): ILGART JEAN CHRISTOPHE; SHIGA INT PATENT OFFICE; HARNESS DICKEY AND PIERCE PLC; SHIGA MASATAKE ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

9) Family number: 62246668 (US2017310448A)

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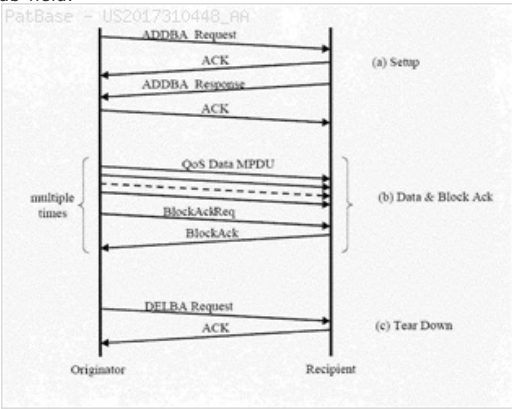
Title: METHOD FOR TRANSMITTING AND RECEIVING MULTIPLE USER BLOCK ACKNOWLEDGEMENT FRAME IN WIRELESS LAN SYSTEM, AND APPARATUS THEREFOR

Abstract: The present specification relates to a method of an access point (AP) transmitting a block acknowledgement (ACK) signal with respect to transmission data of a plurality of stations (STA) in a wireless LAN (WLAN) system, and an apparatus therefor. To this end, an AP transmits a multi-STA BA frame with respect to data received from the plurality of STA, wherein the

multi-STA BA frame includes a MAC header field, a BA control field and a BA information field. In this regard, the BA information field may include: AID information with respect to one or more STA to which ACK/NACK is transmitted from the plurality of STA; and an individual information field including BA indicator information that indicates whether the BA information field includes one or more of a block ACK bitmap sub-field and a starting sequence control sub-field.

Classifications:

International (IPC 8-9): H04B7/0452 H04L1/00 H04L1/16 H04L1/18 H04L27/26 H04L29/08 H04L5/00 H04W16/28 H04W28/04 H04W28/06 H04W72/04 H04W80/00 H04W84/12 (Advanced/Invention); H04W72/12 H04W84/12 (Advanced/Non-invention)
CPC: H04L1/1614 H04L1/1642 H04L69/322 H04W72/042 H04W84/12 H04W72/121 H04L1/00 H04L5/005 H04L1/1671 H04L1/1854 H04W72/1278 H04L1/1635 H04L1/1685 H04L2001/0093 H04B7/0452 H04L1/1896 H04L1/16 H04L5/0055



Family:

Publication number	Publication date	Application number	Application date
AU2015340292 AA	20170427	AU20150340292	20151027
AU2015340292 BB	20180614	AU20150340292	20151027
CA2965807 AA	20170425	CA20152965807	20151027
CN107078858 A	20170818	CN201580056549	20151027
EP3214788 A1	20170906	EP20150795101	20151027
EP3214788 A4	20180620	EP20150795101	20151027
JP2017537506 T2	20171214	JP20170520472T	20151027
JP6405042 B2	20181017	JP20170520472T	20151027
KR20170053663 A	20170516	KR20177008998	20151027
US2017310448 AA	20171026	US20150517911	20151027
US2017338931 AA	20171123	US20150522727	20151027
US2018034595 AA	20180201	US20160548698	20160129
WO16068571 A2	20160506	WO2015KR11366	20151027
WO16068571 A3	20160623	WO2015KR11366	20151027
WO16068572 A1	20160506	WO2015KR11367	20151027
WO16126055 A1	20160811	WO2016KR01005	20160129

Priority:

US20140068771P	20141027	US20150100915P	20150108	US20150109623P	20150130
US20150110611P	20150202	US20150111021P	20150202	US20150111117P	20150203
US20150112600P	20150205	US20150113530P	20150209	US20150185741P	20150629
WO2015KR11367	20151027	US20150517911	20151027	WO2015KR11366	20151027
US20150522727	20151027	US20160548698	20160129	WO2016KR01005	20160129

Probable Assignee: LG ELECTRONICS INC

Assignee(s): (std): LG ELECTRONICS INC

Assignee(s): RYU KISEON ; CHO HANGYU ; KIM JEONGKI

Inventor(s): (std): CHO HANGYU ; KIM JEONGKI ; RYU KISEON

Agent(s): WATERMARK INTELLECTUAL PROPERTY PTY LTD; SMART AND BIGGAR; CABINET PLASSERAUD; KIM YONG IN ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

10) Family number: 63944653 (US2016330714A)

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Title: MULTIPLEXING ACKNOWLEDGMENT MESSAGES IN RESPONSE TO DOWNLINK FRAMES

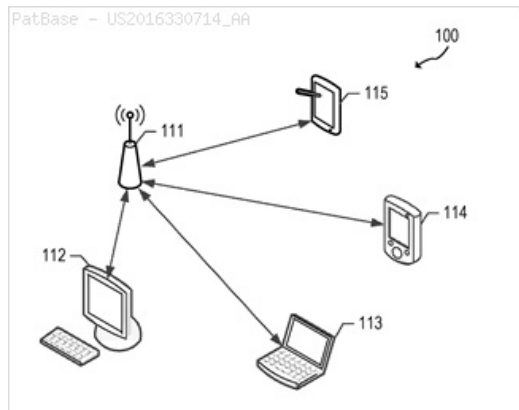
Abstract: In an example of multi-user wireless communications, an access point may send a downlink frame to multiple stations. Some or all of the stations may generate and transmit their respective uplink frames. The uplink frames from the stations may be aggregated or multiplexed to form a final uplink frame that is received by the access point. The uplink frames may be block acknowledgment or acknowledgment (BA or ACK) frames. Uplink response scheduling may be located in a payload of the downlink frame, in which the uplink response scheduling indicates one or more resource units assigned to the multiple stations for transmitting the uplink frames. In some examples, the uplink response scheduling is in a control field of the payload, in a trigger frame as part of the payload. In some aspects, the downlink frame is part of a multicast transmission. Other methods, apparatus, and computer-readable media are also disclosed.

Classifications:

International (IPC 8-9): H04B7/04 H04B7/0452 H04L1/00 H04L1/16 H04L5/00 H04W72/00 H04W72/12 (Advanced/Invention); H04W84/12 (Advanced/Non-invention)

CPC: H04W72/1289 H04L5/0007 H04W84/12 H04L1/1621 H04B7/0452 H04L2001/0093 H04W72/1268

US: 370/312



Family:

Publication number	Publication date	Application number	Application date
US2016330714 AA	20161110	US20160151433	20160510
US10181930 BB	20190115	US20160151433	20160510

Priority:

US20150159346P 20150510 US20150160527P 20150512 US20150191623P 20150713
 US20150193305P 20150716 US20160151433 20160510

Probable Assignee:

NEWRACOM INC

Assignee(s): (std):

NEWRACOM INC

Inventor(s): (std):

HEDAYAT AHMAD REZA

Agent(s):

MORGAN LEWIS AND BOCKIUS LLP

11) Family number: 65078469 (US2017063509A)

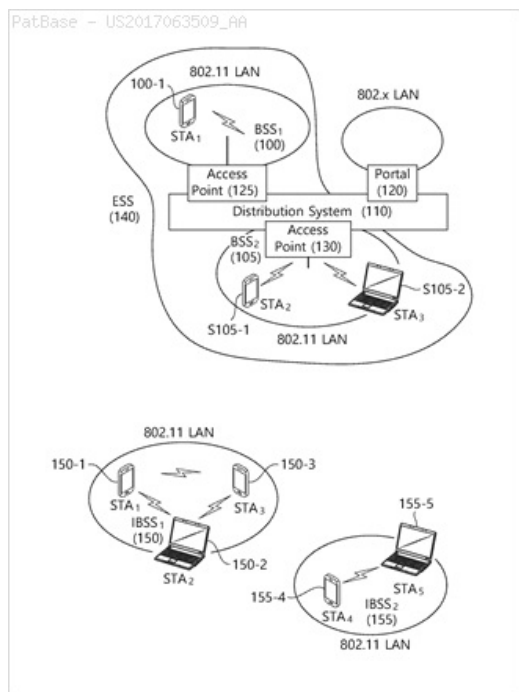
© PatBase

Title: METHOD AND APPARATUS FOR PROCESSING ACK SIGNAL IN A WIRELESS LOCAL AREA NETWORK SYSTEM

Abstract: An ACK signal processing method that can be used in a wireless LAN system is proposed. Various information that can be used for a downlink MU PPDU for multiple receiving stations may be proposed, and, for example, in order to omit the re-transmission of the related art, information requesting an ACK or Block ACK corresponding to previously transmitted data may be included. If an immediate acknowledgement (ACK) frame fails to be received after the MU-PPDU is transmitted from the AP, a Block ACK may be requested. In this case, while a Block ACK is requested, a radio resource through which a Block ACK is delivered may be allocated.

Classifications:

International (IPC 8-9): H04L1/00 H04L1/16 H04L5/00 H04W72/04
 H04W84/12 (Advanced/Invention);
 H04W84/12 (Advanced/Non-invention)
CPC: H04L5/0055 H04W84/12 H04L1/0031 H04L1/1614 H04L1/1621
 H04L1/1685
US: 370/329



Family:

Publication number	Publication date	Application number	Application date
US2017063509 AA	20170302	US20160246104	20160824
US2018351725 AA	20181206	US20180039249	20180718
US10063359 BB	20180828	US20160246104	20160824

Priority:

US20150209325P 20150824 US20150237584P 20151006 US20160246104 20160824
US20180039249 20180718

Probable Assignee: LG ELECTRONICS INC
Assignee(s): (std): LG ELECTRONICS INC
Inventor(s): (std): CHO HANGYU ; KIM JEONGKI ; KIM SUHWOOK ; RYU KISEON
Agent(s): LEE HONG DEGERMAN KANG AND WAIMEY

12) Family number: 48312409 (US2011038332A)

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Title: SDMA MULTI-DEVICE WIRELESS COMMUNICATIONS

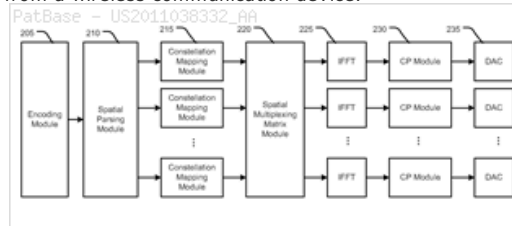
Abstract: The present disclosure includes systems and techniques relating to wireless communications. A described system, for example, includes a device configured to transmit signals, in a frequency band, to the wireless communication devices. The signals can include spatially steered first signals that concurrently provide data to the wireless communication devices. The signals can include one or more second signals to the wireless communication devices to control transmission of responses from the wireless communication devices in the frequency band. The device can monitor for the responses in the frequency band. The device can control, based on a lack of reception of an expected response, a transmission of a third signal in the frequency band to prevent a transmission from another wireless communication device different than the wireless communication devices. The third signal can include information to reschedule a transmission of a response from a wireless communication device.

Classifications:

International (IPC 8-9): H04B7/04 H04B7/212 H04B7/216 H04J99/00
H04L1/00 H04L1/16 H04L1/18 H04L12/28 H04W16/28 H04W28/26
H04W4/00 H04W72/12 H04W74/08 H04W76/30
H04W84/12 (Advanced/Invention);
H04L1/00 H04W16/28 H04W28/04 H04W28/26 H04W74/08
H04W76/06 (Advanced/Non-invention)
CPC: H04L1/1887 H04L2001/0093 H04W16/28 H04W28/04 H04W74/0816
H04W72/1263 H04L1/1685 H04W84/12 H04W28/26 H04W76/34
H04W76/38

European: H04L1/16F17 H04L1/18T7 T04L1/00T1 T04W16/28
T04W28/04 T04W74/08B2

US: 370/329 370/329P 370/330 370/331 370/332 370/333 370/334 370/335



Family:

Publication number	Publication date	Application number	Application date
■ CN102498687 A	20120613	CN201080040641	20100804
■ CN102498687 B	20150909	CN201080040641	20100804
■ DE602010043884 D1	20170907	DE201060043884T	20100804
■ EP2465227 A1	20120620	EP20100743297	20100804
■ EP2465227 B1	20170726	EP20100743297	20100804
■ JP2013502157 T2	20130117	JP20120524749T	20100804
■ JP5633048 B2	20141203	JP20120524749T	20100804
■ KR101714687 B1	20170309	KR20127006463	20100804
■ KR20120062767 A	20120614	KR20127006463	20100804
■ US2011038332 AA	20110217	US20100850529	20100804
■ US2015117383 AA	20150430	US20140585000	20141229
■ US8923217 BB	20141230	US20100850529	20100804
■ US9516667 BB	20161206	US20140585000	20141229
■ WO11019571 A1	20110217	WO2010US44457	20100804

Priority:

US20090233428P 20090812 US20090240933P 20090909 US20090241826P 20090911
US20090242928P 20090916 US20090251411P 20091014 US20090252480P 20091016
US20100324254P 20100414 EP20100743297 20100804 US20100850529 20100804
WO2010US44457 20100804 US20140585000 20141229

Probable Assignee: MARVELL INT LTD

Assignee(s): (std): BANERJEA RAJA ; LIU YONG ; MARVELL WORLD TRADE LTD ; RAMAMURTHY HARISH ; ZHANG HONGYUAN

Assignee(s): MARVELL INT LTD ; MARVELL SEMICONDUCTOR INC

Inventor(s): (std): HARISH RAMAMURTHY ; HONGYUAN ZHANG ; RAJA BANERJEA ; YONG LIU ; ZHANG HONGYUAN ;
RAMAMURTHY HARISH ; LIU YONG ; BANERJEA RAJA

Inventor(s): RAMAMURTHY HARISH SUNNYVALE ; BANERJEA RAJA SUNNYVALE

Agent(s): GRUENECKER PATENT U RECHTSANWAELTE PARTG MBB; GRUENECKER KINKELDEY STOCKMAIR AND
SCHWANHAUESSER; RYUKA IP LAW FIRM; FISH AND RICHARDSON PC; HUNTER WILLIAM E ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY
CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS
IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY
MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG
TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

13) Family number: 48873167 (US2012195301A)

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Title: METHOD AND APPARATUS FOR GENERATING, TRANSMITTING, AND RECEIVING A DATA FRAME IN A WIRELESS
COMMUNICATION SYSTEM

Abstract: The present invention relates to a technique relating to a method and apparatus for generating, transmitting, and
receiving a data frame having a newly proposed format in a wireless communication system. According to the technique, the

method for generating a data frame in a wireless communication system comprises the following steps: generating at least one first subframe; generating at least one second subframe; and generating a data frame including the first and second subframes, wherein the first and second subframes include length information of a MAC protocol data unit (MPDU) contained in the first and second subframes, and the length information of the MPDU contained in the second subframe is zero.

Classifications:

International (IPC 8-9): H04B7/04 H04B7/0413 H04B7/0452 H04B7/08 H04B7/26 H04J11/00 H04J3/16 H04J99/00 H04L1/00 H04L1/08 H04L1/24 H04L12/02 H04L12/56 H04L12/70 H04L27/18 H04L27/20 H04L27/22 H04L27/26 H04L29/06 H04L29/08 H04W16/28 H04W28/04 H04W28/06 H04W4/00 H04W72/04 H04W80/02 H04W84/12 (Advanced/Invention); H04B7/04 H04B7/26 H04L29/08 H04W84/12 (Advanced/Non-invention)

CPC: H04L1/0061 H04L1/0072 H04L1/0075 H04L1/08 H04B7/2656

H04L69/08 H04W72/044 H04L69/22 H04L69/324 H04L29/06068

H04L27/20 H04W84/12 H04B7/0452 H04B7/0413 H04L1/0028 H04L1/0083 H04L1/0008 H04L1/004 H04L69/322 H04L27/18

H04L1/0003 H04L69/323 H04Q2213/13215 H04L1/0044 H04L1/0053

European: H04B7/26T10 H04L1/00B11 H04L1/00B7E H04L1/00B8 H04L1/00F2 H04L1/08 T04B7/04M5 T04L1/00B7E

US: 1/1 370/328 370/328S 370/329 370/338 370/338P 370/472 370/473 370/474 375/267 375/338

PatBase - US2012195301 A1



Family:

Publication number	Publication date	Application number	Application date
AU2010316045 AA	20110512	AU20100316045	20101104
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AU2011224959 AA	20110915	AU20110224959	20110311
AU2011224959 BB	20140828	AU20110224959	20110311
BR112012010467 A2	20160308	BR20121110467	20101104
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CN102907011 A	20130130	CN201180023530	20110311
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KR20180050256 A	20180514	KR20180046754	20180423
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WO11055990 A2	20110512	WO2010KR07740	20101104
WO11055990 A3	20110922	WO2010KR07740	20101104
WO11112052 A2	20110915	WO2011KR01740	20110311
WO11112052 A3	20120112	WO2011KR01740	20110311

Priority:

KR20090106151	20091104	KR20100005284	20100120	KR20100021576	20100311
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KR20180046754	20180423	US20180122858	20180905		

Probable Assignee: ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INST

Assignee(s): (std): CHEONG MINHO ; CHOI JEEYON ; ELECT AND TELECOMM RESEARCH INST ; ELECTRONICS TELECOMM RES INST ; ELECTRONICS AND TELECOMMUNICATIONS RES INST ; PARK JAEWOO ; LEE SOK KYU ; KOREA ELECTRONICS TELECOMM ; LEE IL GU ; KIM YUN JOO ; LEE JAE SEUNG ; OH JONG EE ; INST ELECTRONICS AND TELECOMM RES ; INST ELECTRONICS AND TELECOMM RE ; ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INST KOREA ; ELECTRONICS AND TELECOMMUNICATION RES INST ; ELECTRONICS AND TELECOMMUNICATIONS RES INST

Assignee(s): ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INST ; ELECTRONICS AND TELECOMMUNICATION RESEARCH INST ; ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE ; ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE ; ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE ; ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INST

Inventor(s): (std): CHOI JEE YON ; PARK JAE WOO ; CHEONG MINHO ; LEE JAE SEUNG ; KIM YUN JOO ; LEE IL GU ; OH JONG EE ; CHEONG MIN HO ; JAE WOO PARK ; SOK KYU LEE ; JEE YON CHOI ; LEE SOK KY ; LEE SOK KYU ; CHOI JEEYON ; PARK JAEWOO ; LEE SEOK KYU

Inventor(s): IL GU LEE ; YUN JOO KIM ; JAE SEUNG LEE ; MINHO CHEONG ; JONG EE OH ; SOK KY LEE ; JAEWOO PARK ; JEEYON CHOI

Agent(s): PHILLIPS ORMONDE FITZPATRICK; SMART AND BIGGAR; BETTEN AND RESCH PATENT U RECHTSANWAELTE PARTGMBB; SCHOENIGER FRANZ JOSEF; Betten & Resch; BETTEN AND RESCH; SUGRANES PEDRO; NAGAI HIROSHI; SHINSUNG PATENT FIRM; YANG MOON OCK

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

14) Family number: 49045316 (US2011134816A)

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Title: WIRELESS COMMUNICATION SIGNALING FOR AGGREGATE DATA UNITS

Abstract: Systems and techniques relating to wireless communications are described. A described technique includes obtaining data for a transmission to a wireless communication device. The wireless communication device can be configured to process incoming transmissions based on an aggregate data unit format that specifies signaling for aggregating multiple medium access control (MAC) data units. The technique includes, in a physical (PHY) frame, an aggregate data unit that is based on the data and the aggregate data unit format, the aggregate data unit including a single MAC data unit. The technique includes, in the PHY frame, an indication to signal that the MAC data unit in the aggregate data unit is singular and to cause the wireless communication device to accept the aggregate data unit without a corresponding block acknowledgement agreement.

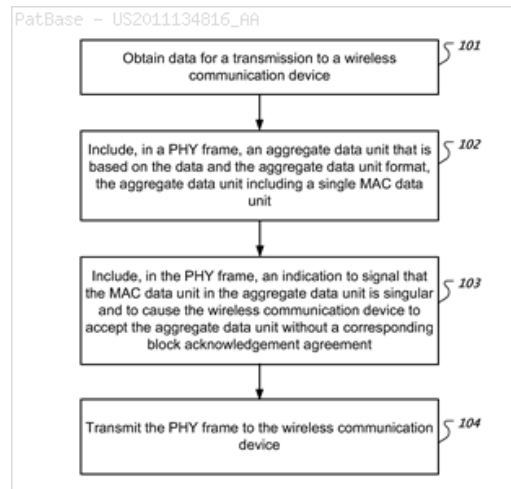
Classifications:

International (IPC 8-9): H04B7/24 H04J11/00 H04J3/00 H04J3/16 H04J3/22 H04J99/00 H04L1/06 H04L1/16 H04L12/28 H04L12/56 H04L12/66 H04L29/02 H04L29/08 H04L5/00 H04W16/28 H04W28/04 H04W28/06 H04W4/00 H04W52/02 H04W72/04 H04W84/12 (Advanced/Invention); H04W72/04 (Advanced/Non-invention)

CPC: H04L1/06 H04L1/1614 H04L1/1685 H04L5/001 H04L5/0023 H04L5/0032 H04L5/0037 H04L5/0064 H04L5/0094 H04W72/042 H04W28/06 H04L69/324 H04W84/12 H04L1/16 H04L29/02

European: H04L1/06 H04L1/16F1 H04L1/16F17 H04L5/00A2A11 H04L5/00C1 H04L5/00C2 H04L5/00C7C H04L5/00E2 T04L5/00A3C T04W72/04F4

US: 1/1 370/310 370/310P 370/328 370/329 370/338 370/338P 370/392 370/392S 370/469 370/470 370/472 370/476 375/260



Family:

Publication number	Publication date	Application number	Application date
■ CN102652418 A	20120829	CN201080056043	20101209
■ CN102652418 B	20151125	CN201080056043	20101209
■ CN102652419 A	20120829	CN201080056092	20101209
■ CN102652419 B	20150128	CN201080056092	20101209
■ DE602010047256 D1	20180111	DE201060047256T	20101209
■ EP2510660 A2	20121017	EP20100836712	20101209
■ EP2510660 A4	20170510	EP20100836712	20101209
■ EP2510661 A2	20121017	EP20100836719	20101209
■ EP2510661 A4	20161109	EP20100836719	20101209
■ EP2510661 B1	20171206	EP20100836719	20101209
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■ JP5577548 B2	20140827	JP20120543291T	20101209
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■ KR101798163 B1	20171115	KR20127014958	20101209
■ KR101837706 B1	20180313	KR20127014957	20101209
■ KR20120102692 A	20120918	KR20127014958	20101209
■ KR20120104232 A	20120920	KR20127014957	20101209
■ US2011134816 AA	20110609	US20100964534	20101209
■ US2011134900 AA	20110609	US20100964584	20101209
■ US2013272179 AA	20131017	US20130830672	20130314
■ US2014036895 AA	20140206	US20130959585	20130805
■ US2016119815 AA	20160428	US20160989754	20160106
■ US8400968 BB	20130319	US20100964584	20101209
■ US8503367 BB	20130806	US20100964534	20101209
■ US9125235 BB	20150901	US20130959585	20130805
■ US9237597 BB	20160112	US20130830672	20130314
■ US9521581 BB	20161213	US20160989754	20160106
■ WO11072164 A2	20110616	WO2010US59766	20101209
■ WO11072164 A3	20111117	WO2010US59766	20101209
■ WO11072173 A2	20110616	WO2010US59777	20101209
■ WO11072173 A3	20111020	WO2010US59777	20101209

Priority:

US20090285112P	20091209	US20100326499P	20100421	US20100347144P	20100521
EP20100836719	20101209	US20100964534	20101209	US20100964584	20101209
WO2010US59766	20101209	WO2010US59777	20101209	US20130830672	20130314
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Probable Assignee: MARVELL INT LTD

Assignee(s): (std): BANERJEA RAJA ; HO KEN KINWAH ; LIU YONG ; RAMAMURTHY HARISH ; ZHANG HONGYUAN ; MARVELL WORLD TRADE LTD

Assignee(s): MARVELL INT LTD ; MARVELL SEMICONDUCTOR INC

Inventor(s): (std): RAMAMURTHY HARISH ; HO KEN KINWAH ; LIU YONG ; BANERJEA RAJA ; ZHANG HONGYUAN ; RAJA BANERJEA ; HONGYUAN ZHANG ; HARISH RAMAMURTHY ; KINWAH HO KEN ; YONG LIU

Agent(s): GRUENECKER PATENT U RECHTSANWAELTE PARTG MBB; GRUENECKER KINKELDEY STOCKMAIR AND SCHWANHAUESSER; RYUKA IP LAW FIRM; FRYCKMAN JOHN PAUL ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PE PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: WIRELESS COMMUNICATION SYSTEM AND A METHOD OF CONTROLLING THE SAME

Abstract: In various embodiments, a method of selecting one or more nodes from a plurality of nodes for establishing wireless communication with an access point including defining a filter, filtering the one or more nodes from the plurality of nodes using the filter and sending a linking signal from each of the one or more nodes to the access point for establishing wireless communication with the access point.

Classifications:

International (IPC 8-9): H04B1/02 H04B1/38 H04B7/26 H04J3/22

H04L1/00 H04L1/08 H04L1/16 H04L12/24 H04L12/26 H04L12/28
H04L12/413 H04L12/70 H04L12/741 H04L12/801 H04L12/861 H04L29/02
H04L29/06 H04L29/08 H04L5/00 H04W24/06 H04W24/10 H04W28/00
H04W28/02 H04W28/18 H04W36/00 H04W4/00 H04W40/04 H04W40/34
H04W48/00 H04W48/02 H04W48/12 H04W48/16 H04W52/02 H04W52/34
H04W52/44 H04W52/46 H04W68/02 H04W72/02 H04W72/04 H04W72/12
H04W74/06 H04W76/04 H04W84/12 H04W88/00

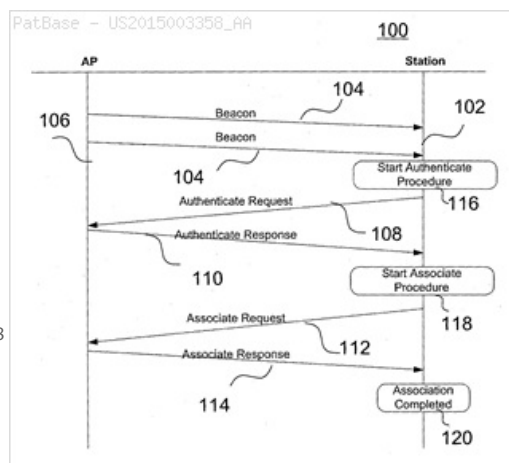
H04W88/08 (Advanced/Invention);

H03M13/09 H04L1/18 H04L12/26 H04W72/04 H04W84/12

H04W88/08 (Advanced/Non-invention)

CPC: H04W4/00 H04W40/32 H04W72/1289 H04W72/0413 H04L63/20
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H04W52/0209 H04L49/90 H04W74/04 H04W52/0229 H04W72/042
H04W92/10 H04W28/0205 H03M13/09 H04L1/1607 H04L1/1685
H04L43/10 H04L2001/0097 H04L1/1896 H04L1/00 H04J3/22 H04L1/0057
H04L1/0061 H04L1/0073 H04L1/08 H04L1/16 H04L1/1664 H04L1/1858
Y02D70/142 H04L1/1614 Y02B60/50 Y02D70/00 H04L1/1628 H04W76/27

US: 370/311 370/328 370/329 370/336 370/392 370/477 375/295 455/522

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US20160392026	20161228				

Probable Assignee: AGENCY FOR SCIENCE TECHNOLOGY AND RESEARCH

Assignee(s): (std): AGENCY FOR SCIENCE TECH AND RES ; AGENCY FOR SCIENCE TECH AND RESEARCH ; AGENCY FOR SCIENCE TECHNOLOGY AND RESEARCH ; AGENCY SCIENCE TECH AND RES

Inventor(s): (std): CHOO LI CHIA ; S O PATHMASUNTHARAM JAYA SHANKAR ; ZHOU YUAN ; ZHENG SHOUKANG ; YEOW WAI LEONG ; WANG HAIGUANG ; TEO CHEE MING JOSEPH ; PATHMASUNTHARAM JAYA SHANKAR S O ; LEI ZHONGDING ; HOANG ANH TUAN

Agent(s): VIERING JENTSCHURA AND PARTNER LLP; CROCKETT AND CROCKETT PC; K DAVID; NIKY ECONOMY

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

16) Family number: 58630683 (US2015063111A)

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Title: METHODS AND APPARATUS FOR MULTIPLE USER UPLINK

Abstract: Methods and apparatus for multiple user uplink are provided. In one aspect, a method of wireless communication is provided. The method includes transmitting a quality of service (QoS) message to a device. The QoS message includes a request for a transmission opportunity for sending uplink data to the device. The QoS message includes at least one of a sequence control field or a QoS control field. The method further includes receiving a clear to transmit (CTX) message in response to the QoS message. The method further includes transmitting data to the device in response to the CTX message.

Classifications:

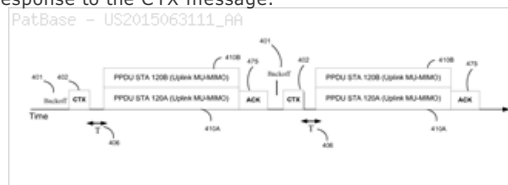
International (IPC 8-9): H04B H04B7/022 H04B7/04 H04B7/0413 H04B7/0452 H04B7/12 H04B7/26 H04H20/71 H04J1/00 H04J3/16 H04J99/00 H04L H04L1/00 H04L1/16 H04L1/18 H04L12/801 H04L12/851 H04L12/911 H04L12/927 H04L27/26 H04L29/08 H04L5/00 H04N7/173 H04W H04W16/28 H04W28/02 H04W28/04 H04W28/06 H04W28/08 H04W28/12 H04W28/24 H04W4/00 H04W4/12 H04W52/14 H04W72/04 H04W72/12 H04W72/14 H04W72/00 H04W74/04 H04W74/06 H04W74/08 H04W76/02 H04W76/10 H04W80/02 H04W84/12 (Advanced/Invention); H04B7/04 H04L1/00 H04L1/16 H04W28/06 H04W28/24 H04W72/02 H04W72/12 H04W74/04 H04W74/08 (Advanced/Non-invention); H04L1/18 H04W74/08 (Core/Invention); H04B H04L H04W (Subclass/Invention)

CPC: H04L47/14 H04L5/0037 H04W72/0446 H04W72/0413 H04B7/2621 H04L5/003 H04W72/0453 H04W72/1268 H04B7/0413 H04W72/1226 H04W28/0278 H04L5/005 H04L1/1607 H04L1/1854 H04L2001/0093 H04W28/06 H04W28/24 H04W72/12 H04W72/121 H04W72/1289 H04W74/006 H04W74/008 H04W74/04 H04W74/08 H04W74/085 H04L1/1858 H04L1/1861 H04L47/12 H04B7/0452 H04L5/0055 H04W72/0406 H04L1/1887 H04W72/042 H04W72/1284 H04L69/323 H04L1/0061 H04L1/1614 H04L1/0008 H04N7/17309 H04L5/0044 H04L47/72 H04L47/805 H04W52/50 H04L5/0005 H04L5/0007 H04L47/24 H04W52/146

US: 1/1 370/235 370/312 370/329 370/330 370/336

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WO2014US52840	20140827	WO2014US52844	20140827	WO2014US52845	20140827
WO2014US52825	20140827	WO2014US52839	20140827	WO2014US52884	20140827
WO2014US52889	20140827	WO2014US52958	20140827	US20150799527	20150714
EP20150745652	20150715	WO2015US40645	20150715	US20160183703	20160615
US20170483943	20170410	US20170791300	20171023	US20170791327	20171023
JP20180018219	20180205	US20180891253	20180207		

Probable Assignee: QUALCOMM INC

Assignee(s): (std): KVELKOMM INKORPOREJTED ; QUALCOMM INC

Assignee(s): VERMANI SAMEER ; SAMPATH HEMANTH ; QUALCOMM INC SAN DIEGO ; QUALCOMM INCORPORATED ; MERLIN SIMONE ; BARRIAC GWENDOLYN DENISE ; COVIDIEN AG

Inventor(s): (std): SAMEER VERMANI ; SAMPATH HEMANTH H ; SIMONE MERLIN ; VERMANI SAMEER S ; VERMANI SAMIR ; SAMPATH KHEMANTKH ; BARRIAK GVENDOLIN DENIS ; WENTINK MAARTEN MENZO ; VERMANI SAMEER ; SAMPATH HEMANTH ; MERLIN SIMONE ; BARRIAC GWENDOLYN DENISE ; GWENDOLYN DENISE BARRIAC ; DING GANG ; BARRIAC GWENDOLYN D ; BARRIAC GWENDOLYN DENISE GD ; DENISE BARRIAC GWENDOLYN ; HEMANTH SAMPATH ; MAARTEN MENZO WENTINK ; MERLIN SIMONE S

Inventor(s): MERLIN SIMONE SAN DIEGO ; VERMANI SAMEER SAN DIEGO ; WENTINK MAARTEN MENZO SAN DIEGO ; SAMPATH HEMANTH SAN DIEGO ; BARRIAC GWENDOLYN DENISE SAN DIEGO

Agent(s): MADDERNS PATENT AND TRADE MARK ATTORNEYS; MADDERNS PTY LTD; SMART AND BIGGAR; ESTUDIO CLARKE MODET AND CO CHILE LTDA; BARDEHLE PAGENBERG PARTNERSCHAFT MBB PATENTANWAELTE RECHTSANWAELTE; WEGNER HANS; SHANGHAI INTELLECTUAL PROPERTY OFFICE; DORA AM BADAR SPST; ANNISA AM BADAR SH LLM; NADIA AM BADAR SH; NABILA AM BADAR SH LLM; DORA AM BADAR S PSI; SANFORD TCOLB AND CO; OOO YURIDICHESKAYA GORODISSKIJ I PARTNERY FA; YURIDICHESKAYA GORODISSKIJ I PARTNERY OOO FA; KNOBBE MARTENS OLSON AND BEAR LLP; ARNO THOMAS R; ABUMER MARK M; ARNO THOMAS R ET AL; NELSON ERIC M; FULLER MICHAEL L; GELFOUND CRAIG A ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

17) Family number: 58998878 (US2016270079A)

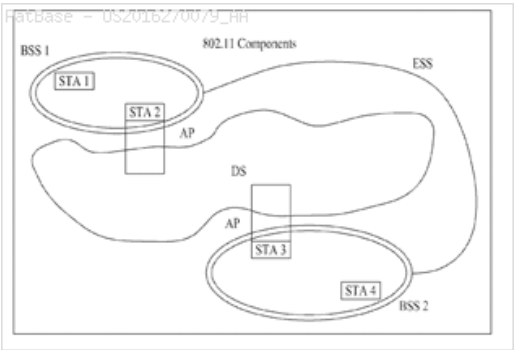
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Title: METHOD FOR CHANNEL ACCESS IN WIRELESS LAN SYSTEM AND APPARATUS THEREOF

Abstract: A method and an apparatus for channel access in a WLAN system are disclosed. A method by a station (STA) for channel access in a wireless local area network system, the method may comprise: receiving a frame; and determining if a wireless medium is idle using a time interval specified by an Extended Inter-Frame Space (EIFS) before performing a transmission in the wireless medium, wherein the EIFS is set to a dynamic value based on Cyclic Redundancy Code (CRC) status of a SIGNAL-A (SIG-A) field of the received frame.

Classifications:

International (IPC 8-9): H04B7/04 H04B7/0413 H04L5/00 H04W28/04 H04W72/04 H04W74/00 H04W74/04 H04W74/08 H04W84/12 (Advanced/Invention); H04W84/12 H04W88/02 (Advanced/Non-invention) CPC: H04W74/008 H04W74/0808 H04W84/12 H04W72/0453 H04B7/0413 H04L5/0055 H04W72/0446 H04W72/0433 H04W88/02 H04W74/04 US: 370/329



Family:

Publication number	Publication date	Application number	Application date
AU2014332765 AA	20160324	AU20140332765	20140926
AU2014332765 BB	20170608	AU20140332765	20140926
CA2924334 AA	20160314	CA20142924334	20140926
CA2924334 C	20190312	CA20142924334	20140926
CN105612803 A	20160525	CN201480055575	20140926
DE602014036305 D1	20181213	DE201460036305T	20140926
EP2861030 A1	20150415	EP20140003336	20140926
EP2861030 B1	20181121	EP20140003336	20140926
IN201627007543 A	20160722	IN201627007543	20160303
JP2016534681 T2	20161104	JP20160544300T	20140926
JP6250177 B2	20171220	JP20160544300T	20140926
KR101832777 B1	20180413	KR20167006291	20140926
KR20160042992 A	20160420	KR20167006291	20140926
RU2628490 C1	20170817	RU20160112123	20140926

US2016270079 AA	20160915	US20140028698	20140926
US10051627 BB	20180814	US20140028698	20140926
WO15053499 A1	20150416	WO2014KR09024	20140926

Priority:

US20130889488P 20131010 US20130900313P 20131105 EP20140003336 20140926
WO2014KR09024 20140926 US20140028698 20140926

Probable Assignee: LG ELECTRONICS INC

Assignee(s): (std): LG ELECTRONICS INC

Assignee(s): SEOK YONGHO ; ELDZHI ELEKTRONIKS INK

Inventor(s): (std): SEOK JONGKHO ; SEOK YONG HO ; SEOK YONGHO

Agent(s): WATERMARK PATENT AND TRADE MARKS ATTORNEYS; WATERMARK INTELLECTUAL PROPERTY PTY LTD;
SMART AND BIGGAR; WUESTHOFF AND WUESTHOFF PATENTANWALTE PARTG MBB; FRENKEL MATTHIAS
ALEXANDER; LEE HONG DEGERMAN KANG WAIMEY; KIM YONG IN ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU
CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN
IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW
MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM
SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

18) Family number: 61183531 (US2017104570A)

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Title: METHOD AND APPARATUS FOR TRANSMITTING FRAME

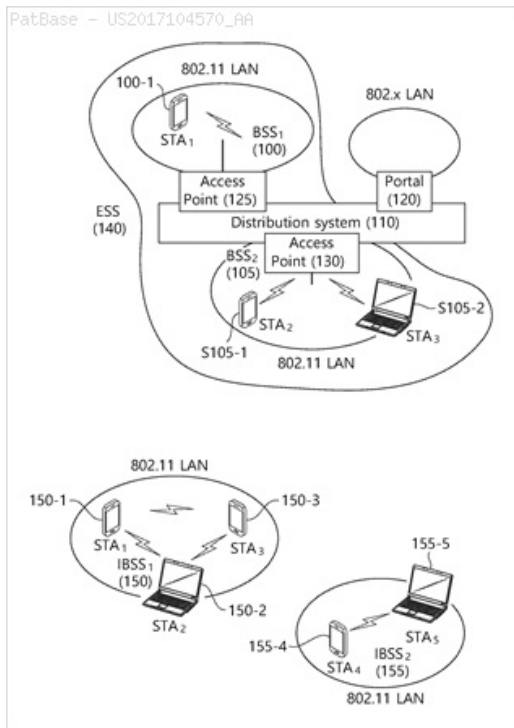
Abstract: Disclosed are a method and apparatus for transmitting a frame. A method for transmitting a frame in a wireless LAN comprises the steps of: an AP transmitting a first RTS frame, through a primary channel, to a plurality of first target STAs; the AP receiving, from one target STA from among the plurality of first target STAs, a first CTS frame as a response to the first RTS frame, through the primary channel; and the AP transmitting, to the plurality of first target STAs, a plurality of pieces of first downlink data for each of the respective plurality of first target STAs, through a plurality of first subbands included in the primary channel on one first data frame, wherein a first RTS frame may include identification information for each of the plurality of first target STAs.

Classifications:

International (IPC 8-9): H04B7/26 H04J1/00 H04L1/16 H04L1/18
H04L27/26 H04L5/00 H04W72/04 H04W74/00 H04W74/04 H04W74/08
H04W84/12 H04W88/08 (Advanced/Invention)

CPC: H04W74/085 H04W74/002 H04W84/12 H04W88/08 H04L5/0055
H04W72/0446 H04W74/0816 H04W72/0493 H04W74/006 H04L1/1635
H04L1/1685 H04L1/1864 H04B7/26 H04B7/2678 H04L1/18 H04L27/26

US: 370/336



Family:

Publication number	Publication date	Application number	Application date
CN106464354 A	20170222	CN201580032100	20150128
EP3160058 A1	20170426	EP20150809294	20150128
EP3160058 A4	20180207	EP20150809294	20150128
JP2017523647 T2	20170817	JP20160570880T	20150128
JP6374533 B2	20180815	JP20160570880T	20150128
KR20170007765 A	20170120	KR20167033536	20150128
US2017104570 AA	20170413	US20150316823	20150128
US2017149547 AA	20170525	US20150319477	20150128
US10225061 BB	20190305	US20150319477	20150128
WO15194731 A1	20151223	WO2015KR00898	20150128
WO15194732 A1	20151223	WO2015KR00899	20150128

Priority:

US20140014655P 20140619 US20140016607P 20140624 US20140036602P 20140812
WO2015KR00898 20150128 US20150316823 20150128 US20150319477 20150128
WO2015KR00899 20150128

Probable Assignee: LG ELECTRONICS INC

Assignee(s): (std): LG ELECTRONICS INC

Inventor(s): (std): CHO HANGYU ; CHOI JINSOO ; CHUN JINYOUNG ; KIM JEONGKI ; KIM SUHWOOK ; LEE WOOKBONG ; RYU KISEON

Agent(s): CABINET PLASSERAUD; BIRCH STEWART KOLASCH AND BIRCH LLP; S AND IP PATENT AND LAW FIRM

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

19) Family number: 61747664 (US2017272138A)

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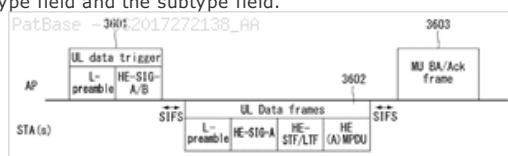
Title: METHOD FOR UPLINK MULTI-USER TRANSMISSION IN WIRELESS COMMUNICATION SYSTEM AND APPARATUS THEREFOR

Abstract: In the present invention, disclosed is a method for uplink multi-user transmission in a wireless communication system and an apparatus therefor. Specifically, a method for performing, by a station (STA), uplink (UL) multi-user (MU) transmission in a wireless communication system comprises the steps of: receiving, from an access point (AP), a trigger frame including information for UL MU transmission; and transmitting an UL MU PPDU on the basis of the information for UL MU transmission, wherein the trigger frame is a medium access control (MAC) frame, a MAC header of the trigger frame includes a type field and a subtype field, and the type of the trigger frame may be indicated by the type field and the subtype field.

Classifications:

International (IPC 8-9): H04B7/02 H04B7/0452 H04B7/06 H04L1/00 H04L1/06 H04L29/08 H04W74/00 (Advanced/Invention)

CPC: H04L29/08 H04B7/0613 H04B7/0452 H04W74/006 H04L1/0643 H04L69/323 H04W72/042 H04B7/063 H04B7/0669 H04B7/0695 H04L1/0031 H04L1/0083 H04L1/1614 H04L1/1685



Family:

Publication number	Publication date	Application number	Application date
US2017272138 AA	20170921	US20150505561	20150824
US10128925 BB	20181113	US20150505561	20150824
WO16028131 A1	20160225	WO2015KR08845	20150824

Priority:

US20140040431P 20140822 US20140049368P 20140912 US20150120883P 20150226
WO2015KR08845 20150824 US20150505561 20150824

Probable Assignee: LG ELECTRONICS INC

Assignee(s): (std): LG ELECTRONICS INC

Inventor(s): (std): CHO HANGYU ; CHO JINSOO ; CHUN JINYOUNG ; KIM SUHWOOK ; LEE WOOKBONG ; RYU KISEON ; CHOI JINSOO

Agent(s): LEE HONG DEGERMAN KANG WAIMEY; ROYAL PATENT AND LAW OFFICE

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

20) Family number: 63667172 (US2016285608A)

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Title: APPARATUS AND METHOD FOR DOWNLINK AND UPLINK MULTI-USER TRANSMISSIONS

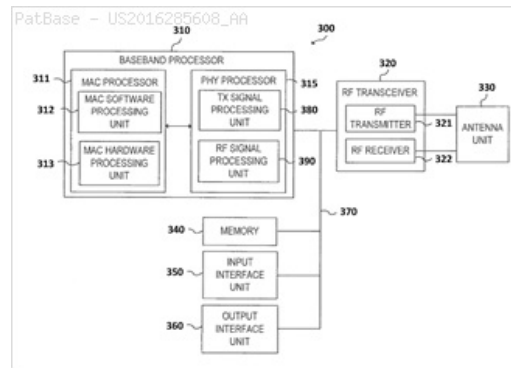
Abstract: Methods and devices are described that facilitate uplink multi-user acknowledgment transmissions. In particular, acknowledgment information may be located in a media access control (MAC) header of a payload section of a MAC Protocol Data Unit within a downlink multi-user frame. The acknowledgment information may be present in each resource unit of the downlink multi-user frame to indicate to each corresponding station properties/characteristics of a subsequent acknowledgment transmission. The properties may include one or more of (1) whether the acknowledgement transmission is multi-user or single user, (2) whether the acknowledgement transmission is transmitted immediately following receipt of the downlink multi-user frame or upon receipt of a multi-user block acknowledgement request frame, and (3) resource scheduling information for an uplink multi-user acknowledgement transmission.

Classifications:

International (IPC 8-9): H04L1/00 H04L1/16 H04L1/18 H04L29/10 H04L5/00 H04W72/04 H04W72/12 (Advanced/Invention); H04L1/00 (Advanced/Non-invention)

CPC: H04L5/0055 H04W72/042 H04W72/0446 H04W72/1268 H04L1/1685 H04L1/1854 H04L1/1861 H04L1/1893 H04L1/18 H04L1/1887 H04L1/1896 H04L2001/0093

US: 370/329



Family:

Publication number	Publication date	Application number	Application date
EP3275113 A1	20180131	EP20160769635	20160323
EP3275113 A4	20181114	EP20160769635	20160323
US2016285608 AA	20160929	US20160078920	20160323
US2017063511 AA	20170302	US20160352435	20161115
US9531520 BB	20161227	US20160078920	20160323
US10153886 BB	20181211	US20160352435	20161115
WO16154350 A1	20160929	WO2016US23829	20160323

Priority:

US20150137138P 20150323 US20150140349P 20150330 US20160078920 20160323
WO2016US23829 20160323 US20160352435 20161115

Probable Assignee: NEWRACOM INC

Assignee(s): (std): NEWRACOM INC

Inventor(s): (std): HEDAYAT AHMAD REZA ; KWON YOUNG HOON

Agent(s): KOBIAKO VON GAMM IOURI; CHO STEVE Y

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

21) Family number: 65568057 (US2017126450A)

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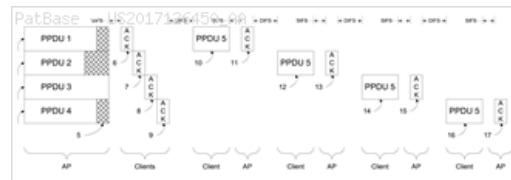
Title: TRIGGER INFORMATION EXCHANGE BETWEEN WIRELESS SYSTEMS

Abstract: Systems and methods are disclosed herein to provide efficient support for the exchange of trigger information between wireless data communication devices and systems, including Multi-User Multiple Input Multiple Output (MU-MIMO) devices and systems that may utilize Orthogonal Frequency Division Multiple Access (OFDMA). In accordance with one or more embodiments, a trigger information exchange mechanism is disclosed that transfers trigger data as part of a pre-existing data frame handshake. Such a system may offer improved capabilities such as a reduced channel overhead incurred due to the trigger information exchange.

Classifications:

International (IPC 8-9): H04B7/04 H04L27/26 H04L5/00
H04W74/00 (Advanced/Invention)

CPC: H04L27/2613 H04W84/12 H04B7/26



Family:

Publication number	Publication date	Application number	Application date
US2017126450 AA	20170504	US20150927365	20151029

Priority:

US20150927365 20151029

Probable Assignee: KEYSIGHT TECHNOLOGIES SINGAPORE HOLDINGS PTE LTD

Assignee(s): (std): IXIA

Assignee(s): KEYSIGHT TECHNOLOGIES SINGAPORE HOLDINGS PTE LTD ; KEYSIGHT TECHNOLOGIES SINGAPORE SALES PTE LTD

Inventor(s): (std): STOTT LESTER NOEL

22) Family number: 68242960 (US2018019792A)

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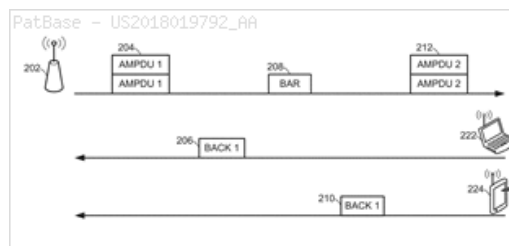
Title: REVERSE DIRECTION FOR MULTI-USER MULTIPLE INPUT MULTIPLE OUTPUT COMMUNICATIONS

Abstract: This disclosure describes systems, methods, and devices related to reverse direction multi-user multiple input multiple output (MU-MIMO). A device may determine a reverse direction indication to be included in a frame for transmission to one or more first devices in a MU-MIMO communication. The device may cause to wirelessly transmit the frame to a first device of the one or more first devices. The device may identify an acknowledgment frame from the at least one of the first devices based at least in part on the reverse direction indication

Classifications:

International (IPC 8-9): H04W72/04 H04W74/08 (Advanced/Invention)

CPC: H04B7/0452 H04W72/042 H04W72/0446 H04W74/0816 H04W84/12 H04L1/1628 H04L1/1664 H04L1/1685



Family:

Publication number	Publication date	Application number	Application date
US2018019792 AA	20180118	US20160394029	20161229
US2018020480 AA	20180118	US20160393408	20161229

Priority:

US20160363596P 20160718 US20160380672P 20160829 US20160394029 20161229
US20160393408 20161229

Probable Assignee: INTEL CORP

Assignee(s): (std): INTEL CORP ; INTEL IP CORP

Inventor(s): (std): CARIOU LAURENT ; CORDEIRO CARLOS ; GHOSH CHITABRATA ; KEDEM OREN ; TRAININ SOLOMON ; YANG OU

23) Family number: 68799520 (US2018069678A)

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Title: ACKNOWLEDGEMENT PROCEDURE IN WLAN

Abstract: A method and apparatus for a first station (STA) to transmit an acknowledgement (ACK) signal to a second STA in a wireless local area network (WLAN) are disclosed. For this end, the first STA receive a first type frame aggregated with a second type frame from the second STA, wherein the first type frame does not include a quality of service (QoS) control field while the second type frame includes the QoS control field. Then, the first STA transmits an ACK signal for the first type frame to the second STA based on an ACK policy of the QoS control field of the second type frame.

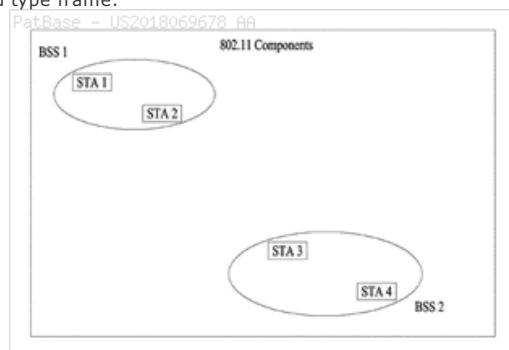
Classifications:

International (IPC 8-9): H04L1/18 H04L5/00

H04W72/12 (Advanced/Invention);

H04L1/16 H04L29/08 H04W84/12 H04W92/18 (Advanced/Non-invention)

CPC: H04L5/0055 H04W84/12 H04W72/1284 H04L69/324 H04W92/18 H04L5/0053 H04L5/0094 H04L1/1657 H04L1/1854 H04L1/1864



Family:

Publication number	Publication date	Application number	Application date
US2018069678 AA	20180308	US20170695498	20170905
US10205578 BB	20190212	US20170695498	20170905

Priority:

US20160383496P 20160905 US20160383500P 20160905 US20170695498 20170905

Probable Assignee: LG ELECTRONICS INC

Assignee(s): (std): LG ELECTRONICS INC

Inventor(s): (std): CHO HANGYU ; KIM JEONGKI ; RYU KISEON

Agent(s): DENTONS US LLP

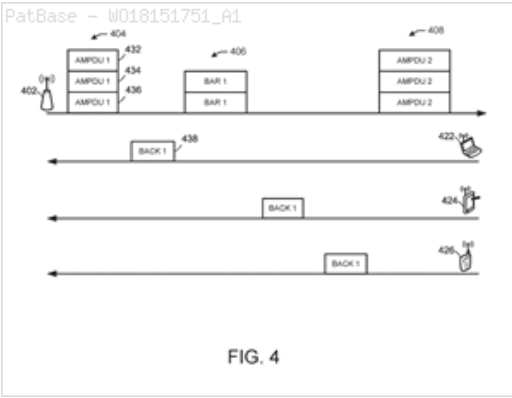
24) Family number: 70862407 (WO18151751A1)

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Title: BLOCK ACKNOWLEDGMENT FOR MULTI-USER MULTIPLE INPUT MULTIPLE OUTPUT

Abstract: This disclosure describes systems, methods, and devices related to block acknowledgment for MU-MIMO. A device may determine a first multiuser frame comprised of one or more subframes to be sent to one or more devices in a multiuser multiple input and multiple output (MU MIMO) group. The device may cause to set a first acknowledgement policy field in a first subframe of the first multiuser frame. The device may cause to send the first MU frame to the one or more devices. The device may identify a first block acknowledgement frame received from a first device of the one or more devices.

Classifications:
International (IPC 8-9): H04L1/16 H04L27/26 (Advanced/Invention)
CPC: H04L1/16 H04L27/2601



Family:

Publication number	Publication date	Application number	Application date
WO18151751 A1	20180823	WO2017US39796	20170628

Priority:

US20170460337P 20170217

Probable Assignee: INTEL CORP

Assignee(s): (std): INTEL IP CORP

Assignee(s): INTEL CORP

Inventor(s): (std): CARIOU LAURENT ; CORDEIRO CARLOS ; GHOSH CHITABRATA ; TRAININ SOLOMON ; YANG OU

Agent(s): GRIFFIN III MALVERN U ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DJ DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JO JP KE KG KH KM KN KP KR KW KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

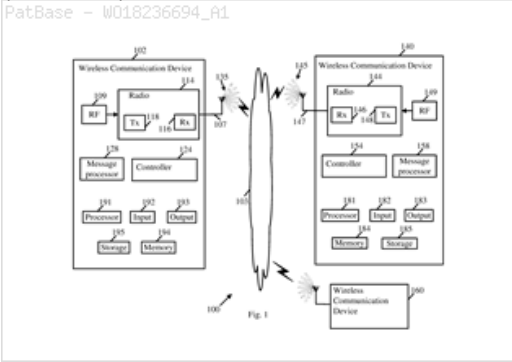
25) Family number: 72570533 (WO18236694A1)

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Title: APPARATUS, SYSTEM AND METHOD OF ACKNOWLEDGING A MULTI USER (MU) MULTIPLE-INPUT-MULTIPLE-OUTPUT (MIMO) (MU-MIMO) TRANSMISSION

Abstract: For example, an EDMG STA may be configured to receive an A-MPDU for the EDMG STA in an EDMG MU PPDU from an EDMG MU-MIMO initiator station; to determine, according to an ordered acknowledgement scheme, a Block Acknowledgement (BA) period in which the EDMG STA is to be awake to allow transmission of a BA from the EDMG STA to the EDMG MU-MIMO initiator STA; to allow the EDMG STA to be in a power save mode during a first power save period from a time of an End of Frame (EOF) field in the A-MPDU for the EDMG STA until a beginning of the BA period; to transmit the BA to the EDMG MU-MIMO initiator; and to allow the EDMG STA to be in the power save mode during a second power save period after transmission of the BA.

Classifications:
International (IPC 8-9): H04B7/0452 H04W52/02 (Advanced/Invention)
CPC: H04W52/0216 H04W52/02 H04B7/0452



Family:

Publication number	Publication date	Application number	Application date
WO18236694 A1	20181227	WO2018US37961	20180617

Priority:

US20170523380P 20170622

Probable Assignee: INTEL CORP

Assignee(s): (std): INTEL IP CORP

Assignee(s): INTEL CORP

Inventor(s): (std): CHEN CHENG ; CORDEIRO CARLOS ; DA SILVA CLAUDIO ; KEDEM OREN

Agent(s): SHICHRUR NAIM AVRAHAM

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DJ DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JO JP KE KG KH KM KN KP KR KW KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN

MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI
SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW