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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/145,670	01/11/2021	Woojin AHN	QUS-0003.01	9828

34610 7590 08/01/2023

KED & ASSOCIATES, LLP
P.O. Box 8638
Reston, VA 20195

EXAMINER
SHARMA, GAUTAM

ART UNIT	PAPER NUMBER
2467	

NOTIFICATION DATE	DELIVERY MODE
08/01/2023	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):

ked-docket@ked-iplaw.com
keddocket@gmail.com
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APPLICATION NO.	ISSUE DATE	PATENT NO.
17/145,670	01-Aug-2023	11716171

KED & ASSOCIATES, LLP
P.O. Box 8638
Reston, VA 20195

EGRANT NOTIFICATION

Your electronic patent grant (eGrant) is now available, which can be accessed via Patent Center at https://patentcenter.uspto.gov

The electronic patent grant is the official patent grant under 35 U.S.C. 153. For more information, please visit https://www.uspto.gov/electronicgrants

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/145,670	08/01/2023	11716171	QUS-0003.01	9828

34610 7590 07/12/2023

KED & ASSOCIATES, LLP
P.O. Box 8638
Reston, VA 20195

ISSUE NOTIFICATION

The projected patent number and issue date are specified above. The patent will issue electronically. The electronically issued patent is the official patent grant pursuant to 35 U.S.C. § 153. The patent may be accessed on or after the issue date through Patent Center at https://patentcenter.uspto.gov/. The patent will be available in both the public and the private sides of Patent Center. Further assistance in electronically accessing the patent, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-888-217-9197.

The USPTO is implementing electronic patent issuance with a transition period, during which period the USPTO will mail a ceremonial paper copy of the electronic patent grant to the correspondence address of record. Additional copies of the patent (i.e., certified and presentation copies) may be ordered for a fee from the USPTO's Certified Copy Center at https://certifiedcopycenter.uspto.gov/index.html. The Certified Copy Center may be reached at (800)972-6382.

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 146 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Patents Stakeholder Experience (OPSE), Stakeholder Support Division (SSD) at (571)-272-4200.

INVENTOR(s) (Please see PAIR WEB site http://pair.uspto.gov for additional inventors):

Woojin AHN, Seoul, KOREA, REPUBLIC OF;
Yongho KIM, Incheon, KOREA, REPUBLIC OF;
Jinsam KWAK, Gyeonggi-do, KOREA, REPUBLIC OF;
Juhyung SON, Gyeonggi-do, KOREA, REPUBLIC OF;

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC., Seoul, KOREA, REPUBLIC OF;
SK TELECOM CO. LTD., Seoul, KOREA, REPUBLIC OF;

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.

LIST OF ART CITED BY APPLICANT

(PTO-1449)

ATTORNEY. DOCKET NO.	APPLICATION SERIAL NO.
QUS-0003.01	Continuation of U.S. Patent Application Serial No. 16/377,829

APPLICANT(S)

Woojin AHN; Yongho KIM; Jinsam KWAK; and Juhyung SON

FILING DATE	GROUP
January 11, 2021	2467

U.S. PATENT DOCUMENTS

EXAMINER'S INITIALS	*PATENT NO.	*ISSUE DATE	*INVENTOR NAME	CLASS	SUBCLASS	FILING DATE

U.S. PATENT APPLICATION PUBLICATIONS

EXAMINER'S INITIALS	*APPLICATION PUBLICATION NO.	*PUBLICATION DATE	*INVENTOR	CLASS	SUBCLASS	FILING DATE
	2017/0373813	12/2017	ASTERJADHI, Alfred			
	2016/0227437	08/2016	BLANKSBY, Andrew			
	2006/0034317	02/2006	HONG, Jin-woo			
	2012/0314697	12/2012	NOH, Yu Jin			
	2017/0250784	08/2017	SAKAI, Eisuke			
	2013/0301569	11/2013	WANG et al.			
	2013/0286959	10/2013	LOU et al.			
	2017/0272138 09/2017 ~~09/2019~~		CHUN; Jinyoung			
	2015/0003367	01/2015	SEOK, Yongho			
	2016/0165574	06/2016	CHU; Liwen			

Change(s) applied to document, /P.P./ 3/14/2022

FOREIGN PATENT DOCUMENTS

EXAMINER'S INITIALS	PATENT NO.	PUBLICATION DATE	COUNTRY	CLASS	SUBCLASS	Translation Yes	Translation No
	2011/102575	08/2011	WIPO			X	
	2014/171788	10/2014	WIPO			X	

OTHER ART (Including Author, Title, Date, Pertinent Pages, Publisher, Place of Publication, Etc.)

	International Search Report for PCT/KR2016/002199 mailed on July 8, 2016 and English translation
	Written Opinion of the International Searching Authority for PCT/KR2016/002199 mailed on July 8, 2016 and English translation
	AHN, Woo Jin et al., "UL-OFMA Procedure in IEEE 802.11ax", IEEE 802.11-15/0091rl, 13 January 2015, slides 3-10
	U.S. Office Action dated July 2, 2018 issued in Application No. 15/555,075
	U.S. Office Action dated October 4, 2019 issued in Application No. 16/377,829
	U.S. Office Action dated May 19, 2020 issued in Application No. 16/377,829

EXAMINER	DATE CONSIDERED
/GAUTAM SHARMA/	09/26/2022

EXAMINER: Initial if reference has been considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /G.S/

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)

34610 7590 03/13/2023
KED & ASSOCIATES, LLP
P.O. Box 8638
Reston, VA 20195

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.
17/145,670	01/11/2021	Woojin AHN	QUS-0003.01	9828

TITLE OF INVENTION: WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION

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	06/13/2023

EXAMINER	ART UNIT	CLASS-SUBCLASS
SHARMA, GAUTAM	2467	370-329000

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

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

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

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 KED & Associates LLP
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)
WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC.	Seoul, Korea
SK TELECOM CO., LTD.	Seoul, Korea

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. 16-0607

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 /David C. Oren/ Date 06/13/2023

Typed or printed name David C. Oren Registration No. 38,694

Electronic Patent Application Fee Transmittal

Application Number:	17145670
Filing Date:	11-Jan-2021
Title of Invention:	WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION
First Named Inventor/Applicant Name:	Woojin AHN
Filer:	Daniel Y.J. Kim/Kathy Humphries
Attorney Docket Number:	QUS-0003.01

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	1501	1	1200	1200

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1200**

Electronic Acknowledgement Receipt	
EFS ID:	48144044
Application Number:	17145670
International Application Number:	
Confirmation Number:	9828
Title of Invention:	WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION
First Named Inventor/Applicant Name:	Woojin AHN
Customer Number:	34610
Filer:	Daniel Y.J. Kim/Kathy Humphries
Filer Authorized By:	Daniel Y.J. Kim
Attorney Docket Number:	QUS-0003.01
Receipt Date:	13-JUN-2023
Filing Date:	11-JAN-2021
Time Stamp:	13:58:30
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	E20236CD58445138
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	IF-Trns.pdf	134140 9d85e579079d0f44a65894c5a54a65f32fce65f8	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	37987 8f2fdb999b397f6d4649f1e6aa2f8eaec3d61379	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	172127		

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.

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NOTICE OF ALLOWANCE AND FEE(S) DUE

34610 7590 03/13/2023

KED & ASSOCIATES, LLP
P.O. Box 8638
Reston, VA 20195

EXAMINER
SHARMA, GAUTAM

ART UNIT	PAPER NUMBER
2467	

DATE MAILED: 03/13/2023

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/145,670	01/11/2021	Woojin AHN	QUS-0003.01	9828

TITLE OF INVENTION: WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION

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	06/13/2023

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 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

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

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

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

PART B - FEE(S) TRANSMITTAL

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

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

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

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

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

34610 7590 03/13/2023
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P.O. Box 8638
Reston, VA 20195

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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.
17/145,670	01/11/2021	Woojin AHN	QUS-0003.01	9828

TITLE OF INVENTION: WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
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EXAMINER	ART UNIT	CLASS-SUBCLASS
SHARMA, GAUTAM	2467	370-329000

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

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

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1_____
2_____
3_____

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

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

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

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

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

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

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

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

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

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

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

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/145,670	01/11/2021	Woojin AHN	QUS-0003.01	9828

34610 7590 03/13/2023

KED & ASSOCIATES, LLP
P.O. Box 8638
Reston, VA 20195

EXAMINER	
SHARMA, GAUTAM	
ART UNIT	PAPER NUMBER
2467	

DATE MAILED: 03/13/2023

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.** 17/145,670	**Applicant(s)** AHN et al.	
	Examiner GAUTAM SHARMA	**Art Unit** 2467	**AIA (FITF) Status** Yes

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

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

1. ☑ This communication is responsive to 01/04/2023.
   ☐ 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 13-28 . 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 _____.

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

Allowability Notice

Notice of Pre-AIA or AIA Status

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

2. Claims 13-28 are allowed.

Allowable Subject Matter

3. The following is an examiner's statement of reasons for allowance**: As to claim 13,** the following limitations are novel and not obvious over the art of record in combination with the remaining limitations "*receive a frame for allocating resource for uplink (UL) multi-user (MU) transmission to one or more terminals, wherein the frame includes an association identifier (ATID) field and a frame check sequence (FCS) field, where the AID field is set to a value related to a first padding field, when the first padding field is included in the frame, where the first padding field is used to adjust a length of the frame, and wherein the first padding field 1s related to a preparation of a response frame for the frame, and* ".

4. **As to claims 14-19 and 27,** the claims are allowed as being dependent from an allowable claim.

5. **As to claim 20,** the claim are allowed as applied to claim 1 above with similar limitations.

6. **As to claims 21-26 and 28,** the claims are allowed as being dependent from an allowable claim.

7. 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

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GAUTAM SHARMA whose telephone number is (571)270-7182. The examiner can normally be reached 11am-8pm.

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

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

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/GAUTAM SHARMA/
Examiner, Art Unit 2467

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

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/145,670	AHN et al.
	Examiner	**Art Unit**
	GAUTAM SHARMA	2467

CPC							
Symbol						**Type**	**Version**
H04L	/	1	/	1664		F	2013-01-01
H04L	/	1	/	1614		I	2013-01-01
H04L	/	1	/	1671		I	2013-01-01
H04W	/	72	/	21		I	2023-01-01
H04W	/	72	/	542		I	2023-01-01
H04L	/	1	/	1621		I	2013-01-01
H04W	/	72	/	121		I	2013-01-01
H04W	/	74	/	085		A	2013-01-01

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

/GAUTAM SHARMA/ Examiner, Art Unit 2467	06 March 2023	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	16	
/HASSAN A PHILLIPS/ Supervisory Patent Examiner, Art Unit 2467	07 March 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	16

U.S. Patent and Trademark Office — Part of Paper No.: 20230306

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/145,670	AHN et al.
	Examiner	**Art Unit**
	GAUTAM SHARMA	2467

INTERNATIONAL CLASSIFICATION				
CLAIMED				
H04L	/	1	/	16

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

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

/GAUTAM SHARMA/ Examiner, Art Unit 2467	06 March 2023	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	16	
/HASSAN A PHILLIPS/ Supervisory Patent Examiner, Art Unit 2467	07 March 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	16

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/145,670	AHN et al.
	Examiner	**Art Unit**
	GAUTAM SHARMA	2467

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☑ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		10	7	19	16	28								
	2		11	9	20										
	3		12	10	21										
	4	1	13	11	22										
	5	2	14	12	23										
	6	3	15	13	24										
	7	4	16	14	25										
	8	5	17	15	26										
	9	6	18	8	27										

/GAUTAM SHARMA/ Examiner, Art Unit 2467	06 March 2023	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	16	
/HASSAN A PHILLIPS/ Supervisory Patent Examiner, Art Unit 2467	07 March 2023	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	16

U.S. Patent and Trademark Office — Part of Paper No.: 20230306

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/145,670	AHN et al.
	Examiner	**Art Unit**
	GAUTAM SHARMA	2467

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

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☑ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	09/27/2019	03/06/2023							
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	2	-	-							
	3	-	-							
	4	-	-							
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	9	-	-							
	10	-	-							
	11	-	-							
	12	-	-							
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2	14	✓	=							
3	15	O	=							
4	16	✓	=							
5	17	✓	=							
6	18	✓	=							
7	19	✓	=							
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13	24	✓	=							
14	25	✓	=							
15	26	✓	=							
8	27		=							
16	28		=							

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/145,670	AHN et al.
	Examiner	Art Unit
	GAUTAM SHARMA	2467

CPC - Searched*		
Symbol	Date	Examiner

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

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

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/145,670	AHN et al.
	Examiner	Art Unit
	GAUTAM SHARMA	2467

Search Notes		
Search Notes	**Date**	**Examiner**
East Search	09/25/2022	Gautam Sharma
Inventor Search	09/25/2022	Gautam Sharma
Classification Search (H04W: 74/085, 74/0841, 74/0833, 74/08, 74/00, 72/1284, 72/1278, 72/12, 72/1231, 72/1226, 72/121, 72/1205, 72/00, 72/ 0413, 72/0406, 72/04, 72/00, 1/1664, 1/1621, 1/16, 1/12, 1/00)	09/25/2022	Gautam Sharma
East Search	03/06/2023	Gautam Sharma
Inventor Search	03/06/2023	Gautam Sharma
Classification Search (H04W: 74/085, 74/0841, 74/0833, 74/08, 74/00, 72/1284, 72/1278, 72/12, 72/1231, 72/1226, 72/121, 72/1205, 72/00, 72/ 0413, 72/0406, 72/04, 72/00, 1/1664, 1/1621, 1/16, 1/12, 1/00)	03/06/2023	Gautam Sharma
Classification Search (H04L:1/1664, 1/1607, 1/16, 1/12, 1/00)	03/06/2023	Gautam Sharma

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
H04W	74/085, 74/0841, 74/0833, 74/08, 74/00, 72/1284, 72/1278, 72/12, 72/1231, 72/1226, 72/121, 72/1205, 72/00, 72/ 0413, 72/0406, 72/04, 72/00, 1/1664, 1/1621, 1/16, 1/12, 1/00)	03/06/2023	Gautam Sharma
H04L	1/1664, 1/1607, 1/16, 1/12, 1/00	03/06/2023	Gautam Sharma

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
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			JPO)				
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L46	12	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L47	362	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L48	6	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L49	67	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L50	74	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM

L51	5	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L52	17490	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L53	1519	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L54	673	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L55	154	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L56	13	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L57	19	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L58	527	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L59	222	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L60	118	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L61	15	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L62	48	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L63	33	L62 not L61	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L64	5	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2019/09/27 04:25 PM

			JPO)				
L65	4163	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L66	27	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L67	192	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L68	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L69	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L70	4	(("trigger frame" or "trigger packet") with (pad or padding)) and ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L71	7	("trigger frame" or "trigger packet").clm. and (fcs or "frame check" or "check frame").clm. and (pad or padding).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L72	2	sharma-gautam.xa. and ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L73	2	sharma-gautam.xa. and ("legacy preamble")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L74	3	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L75	41	sharma-gautam.xa. and ("20 mhz")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L76	3	sharma-gautam.xa. and (("20 mhz") with (legacy))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L77	2	sharma-gautam.xa. and (("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L78	358	(("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L79	169	(("20 mhz") with ("he-	(US-PGPUB; USPAT;	OR	OFF	OFF	2019/09/27

		sig-a") with legacy)	USOCR; FPRS; EPO; JPO)				04:25 PM
L80	57	("same time") with ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L81	2	("20130286959"|"20130301569").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:25 PM
L82	128	ahn-woojin.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L83	245	kim-yongho.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L84	728	kwak-jinsam.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L85	380	son-juhyung.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L86	3533	H04W74/085.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L87	1441	H04W74/0841.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L88	18726	H04W74/0833.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L89	10061	H04W74/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L90	7707	H04W74/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L91	8445	H04W72/1284.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L92	6677	H04W72/1278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L93	13418	H04W72/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L94	6421	H04W72/1231.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L95	3880	H04W72/1226.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L96	4091	H04W72/121.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM

L97	3427	H04W72/1205.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L98	8631	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L99	29929	H04W72/0413.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L100	23745	H04W72/0406.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L101	32544	H04W72/04.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L102	8631	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L103	0	H04W1/1664.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L104	0	H04W1/1621.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L105	0	H04W1/1607.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L106	0	H04W1/16.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L107	0	H04W1/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L108	0	H04W1/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L109	3	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L110	5	"predetermined association ID"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L111	0	wo2011102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L112	22	"2011102575"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L113	1	2011-102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L114	833	noh.in. and seok.in. and	(US-PGPUB; USPAT;	OR	OFF	OFF	2019/09/27

		lg.as.	USOCR; FPRS; EPO; JPO)				04:25 PM
L115	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L116	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L117	12	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L118	362	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L119	6	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L120	67	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L121	74	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L122	5	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L123	17490	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L124	1519	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L125	673	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L126	154	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L127	13	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L128	19	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM

		)					
L129	527	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L130	222	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L131	118	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L132	15	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L133	48	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L134	33	L133 not L132	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L135	5	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L136	4163	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L137	27	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L138	192	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L139	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L140	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L141	4	(("trigger frame" or "trigger packet") with (pad or padding)) and ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L142	4	L71 and L86	(US-PGPUB; USPAT;	OR	OFF	OFF	2019/09/27

			USOCR; FPRS; EPO; JPO)				04:26 PM
L143	0	L71 and L87	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L144	0	L71 and L88	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L145	0	L71 and L89	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L146	0	L71 and L90	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L147	3	L71 and L91	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L148	0	L71 and L92	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L149	0	L71 and L93	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L150	3	L71 and L94	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L151	0	L71 and L95	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L152	5	L71 and L96	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L153	0	L71 and L97	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L154	0	L71 and L98	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L155	6	L71 and L99	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L156	0	L71 and L100	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L157	0	L71 and L101	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L158	0	L71 and L102	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L159	0	L71 and L103	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2019/09/27 04:26 PM

			JPO)				
L160	0	L71 and L104	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L161	0	L71 and L105	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L162	0	L71 and L106	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L163	0	L71 and L107	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L164	0	L71 and L108	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L165	3	L71 and L109	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L166	3	L71 and L110	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L167	0	L71 and L111	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L168	3	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L169	352	("predetermined assocaition id" or "aid") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L170	2	("predetermined assocaition id" or "aid") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:59 PM
L171	2	("predetermined assocaition id" or"association identifier" or "predetermined assocaition identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 05:13 PM
L172	2	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 05:26 PM

L173	359	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 05:27 PM
L174	359	("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 05:27 PM
L175	237	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and (pad or padding or add or adding or exten or extending or encapsulat$6)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 05:28 PM
L176	132	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and ((pad or padding or add or adding or exten or extending or encapsulat$6) with (packet or frame or message))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 05:29 PM
L177	14	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) same((pad or padding or add or adding or exten or extending or encapsulat$6) with (packet or frame or message))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 05:29 PM
L178	3	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 06:33 PM
L222	1	"16377829"	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2020/04/09 05:49 PM

			JPO)				
L223	26	("block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 05:51 PM
L224	6	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:05 PM
L225	300	("trigger frame") with ("bar" or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:06 PM
L226	211	("trigger frame") with ("block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:07 PM
L227	0	("trigger frame") with ("bar" or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:07 PM
L228	43	(("trigger frame") with ("bar")) and (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:07 PM
L229	168	("trigger frame") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:09 PM
L230	3	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:22 PM
L231	40960	("block ack" or BA or "bar") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:25 PM
L232	115	("block ack") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:25 PM
L233	3	("block ack") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:28 PM
L234	285	("block ack" or BA or "bar") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:29 PM
L235	1	"16320158"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/10 12:43 PM
L236	121	"trigger frame" with "aid" with (ulink or "ul")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/17 05:46 PM
L237	150	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/17 05:46 PM
L238	0	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/17 05:46 PM

L239	47	"aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/17 05:47 PM
L240	4	"partial aid" with (frame or packet) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/17 06:20 PM
L241	248	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/17 06:20 PM
L242	503	(frame or packet) with (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/17 06:52 PM
L243	70	(frame or packet) near5 (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/17 06:54 PM
L244	4	sharma-gautam.xa. and ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L245	3	sharma-gautam.xa. and ("legacy preamble")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L246	4	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L247	52	sharma-gautam.xa. and ("20 mhz")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L248	4	sharma-gautam.xa. and (("20 mhz") with (legacy))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L249	3	sharma-gautam.xa. and (("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L250	464	(("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L251	205	(("20 mhz") with ("he-sig-a") with legacy)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L252	63	("same time") with ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L253	2	("20130286959"|"20130301569").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/09/02 07:00 PM

L254	195	ahn-woojin.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L255	284	kim-yongho.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L256	884	kwak-jinsam.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L257	524	son-juhyung.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L258	4786	H04W74/085.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L259	1835	H04W74/0841.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L260	27437	H04W74/0833.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L261	13954	H04W74/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L262	9278	H04W74/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L263	12143	H04W72/1284.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L264	9159	H04W72/1278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L265	19898	H04W72/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L266	8392	H04W72/1231.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L267	5413	H04W72/1226.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L268	5669	H04W72/121.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L269	4791	H04W72/1205.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L270	11062	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L271	42071	H04W72/0413.cpc.	(US-PGPUB; USPAT;	OR	OFF	OFF	2020/09/02

			USOCR; FPRS; EPO; JPO)				07:00 PM
L272	32171	H04W72/0406.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L273	47760	H04W72/04.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L274	11062	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L275	0	H04W1/1664.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L276	0	H04W1/1621.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L277	0	H04W1/1607.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L278	0	H04W1/16.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L279	0	H04W1/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L280	0	H04W1/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L281	3	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L282	6	"predetermined association ID"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L283	0	wo2011102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L284	27	"2011102575"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L285	1	2011-102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L286	852	noh.in. and seok.in. and lg.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L287	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L288	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2020/09/02 07:00 PM

			JPO)				
L289	15	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L290	395	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L291	6	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L292	79	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L293	87	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L294	6	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L295	18728	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L296	1666	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L297	782	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L298	199	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L299	14	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L300	21	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L301	572	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L302	233	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM

L303	126	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L304	20	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L305	55	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L306	35	L305 not L304	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L307	6	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L308	5118	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L309	56	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L310	293	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L311	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L312	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L313	5	(("trigger frame" or "trigger packet") with (pad or padding)) and ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L314	9	("trigger frame" or "trigger packet").clm. and (fcs or "frame check" or "check frame").clm. and (pad or padding).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L315	4	sharma-gautam.xa. and ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM

L316	3	sharma-gautam.xa. and ("legacy preamble")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L317	4	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L318	52	sharma-gautam.xa. and ("20 mhz")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L319	4	sharma-gautam.xa. and (("20 mhz") with (legacy))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L320	3	sharma-gautam.xa. and (("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L321	464	(("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L322	205	(("20 mhz") with ("he-sig-a") with legacy)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L323	63	("same time") with ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L324	2	("20130286959"|"20130301569").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/09/02 07:00 PM
L325	195	ahn-woojin.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L326	284	kim-yongho.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L327	884	kwak-jinsam.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L328	524	son-juhyung.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L329	4786	H04W74/085.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L330	1835	H04W74/0841.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L331	27437	H04W74/0833.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L332	13954	H04W74/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L333	9278	H04W74/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2020/09/02 07:00 PM

			JPO)				
L334	12143	H04W72/1284.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L335	9159	H04W72/1278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L336	19898	H04W72/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L337	8392	H04W72/1231.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L338	5413	H04W72/1226.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L339	5669	H04W72/121.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L340	4791	H04W72/1205.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L341	11062	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L342	42071	H04W72/0413.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L343	32171	H04W72/0406.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L344	47760	H04W72/04.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L345	11062	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L346	0	H04W1/1664.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L347	0	H04W1/1621.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L348	0	H04W1/1607.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L349	0	H04W1/16.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L350	0	H04W1/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM

L351	0	H04W1/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L352	3	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L353	6	"predetermined association ID"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L354	0	wo2011102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L355	27	"2011102575"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L356	1	2011-102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L357	852	noh.in. and seok.in. and lg.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L358	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L359	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L360	15	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L361	395	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L362	6	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L363	79	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L364	87	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L365	6	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L366	18728	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM

L367	1666	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L368	782	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L369	199	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L370	14	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L371	21	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L372	572	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L373	233	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L374	126	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L375	20	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L376	55	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L377	35	L376 not L375	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L378	6	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L379	5118	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L380	56	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM

L381	293	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L382	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L383	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L384	5	(("trigger frame" or "trigger packet") with (pad or padding)) and ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L385	5	L314 and L329	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L386	0	L314 and L330	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L387	0	L314 and L331	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L388	0	L314 and L332	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L389	0	L314 and L333	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L390	3	L314 and L334	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L391	0	L314 and L335	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L392	0	L314 and L336	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L393	3	L314 and L337	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L394	0	L314 and L338	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L395	5	L314 and L339	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L396	0	L314 and L340	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2020/09/02 07:00 PM

			JPO)				
L397	0	L314 and L341	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L398	7	L314 and L342	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L399	0	L314 and L343	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L400	0	L314 and L344	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L401	0	L314 and L345	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L402	0	L314 and L346	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L403	0	L314 and L347	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L404	0	L314 and L348	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L405	0	L314 and L349	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L406	0	L314 and L350	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L407	0	L314 and L351	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L408	3	L314 and L352	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L409	3	L314 and L353	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L410	0	L314 and L354	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L411	3	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L412	514	("predetermined assocaition id" or "aid") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L413	5	("predetermined assocaition id" or "aid") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM

		with (pad or padding or add or adding)					
L414	5	("predetermined assocaition id" or"association identifier" or "predetermined assocaition identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L415	5	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L416	525	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L417	525	("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L418	358	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and (pad or padding or add or adding or exten or extending or encapsulat$6)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L419	207	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and ((pad or padding or add or adding or exten or extending or encapsulat$6) with (	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM

		packet or frame or message))					
L420	19	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) same((pad or padding or add or adding or exten or extending or encapsulat$6) with (packet or frame or message))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L421	3	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L422	1	"16377829"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L423	27	("block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L424	6	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L425	337	("trigger frame") with ("bar" or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L426	236	("trigger frame") with ("block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L427	1	("trigger frame") with ("bar" or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L428	53	(("trigger frame") with ("bar")) and (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L429	200	("trigger frame") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L430	3	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L431	41260	("block ack" or BA or "bar") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L432	128	("block ack") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L433	3	("block ack") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2020/09/02 07:00 PM

			JPO)				
L434	288	("block ack" or BA or "bar") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L435	1	"16320158"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L436	142	"trigger frame" with "aid" with (ulink or "ul")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L437	177	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L438	0	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L439	51	"aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L440	4	"partial aid" with (frame or packet) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L441	293	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L442	519	(frame or packet) with (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L443	71	(frame or packet) near5 (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L444	15	(frame or packet).clm. and (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id").clm. and (pad or padding).clm. and (trigger).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:08 PM
L445	4	L444 and L258	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM

L446	0	L444 and L259	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L447	0	L444 and L260	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L448	0	L444 and L261	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L449	0	L444 and L262	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L450	3	L444 and L263	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L451	0	L444 and L264	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L452	1	L444 and L265	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L453	3	L444 and L266	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L454	0	L444 and L267	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L455	3	L444 and L268	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L456	0	L444 and L269	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L457	0	L444 and L270	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L458	3	L444 and L271	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:12 PM
L459	0	L444 and L272	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:12 PM
L460	2	L444 and L273	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:12 PM
L461	0	L444 and L274	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:12 PM
L462	0	L444 and L275	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:12 PM
L463	0	L444 and L276	(US-PGPUB; USPAT;	OR	OFF	OFF	2020/09/02

			USOCR; FPRS; EPO; JPO)				07:12 PM
L464	0	L444 and L277	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:12 PM
L465	0	L444 and L278	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:12 PM
L466	0	L444 and L279	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:12 PM
L467	0	L444 and L280	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:12 PM
L468	3	L444 and L281	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:12 PM
L469	4	sharma-gautam.xa. and ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L470	3	sharma-gautam.xa. and ("legacy preamble")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L471	4	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L472	63	sharma-gautam.xa. and ("20 mhz")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L473	4	sharma-gautam.xa. and (("20 mhz") with (legacy))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L474	3	sharma-gautam.xa. and (("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L475	707	(("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L476	254	(("20 mhz") with ("he-sig-a") with legacy)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L477	76	("same time") with ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L478	2	("20130286959"|"20130301569").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2022/09/26 02:49 PM
L479	367	ahn-woojin.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L480	376	kim-yongho.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L481	1370	kwak-jinsam.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L482	915	son-juhyung.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L483	6610	H04W74/085.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L484	3905	H04W74/0841.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L485	45025	H04W74/0833.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L486	17923	H04W74/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L487	10280	H04W74/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L488	18172	H04W72/1284.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L489	13257	H04W72/1278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L490	26527	H04W72/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L491	10638	H04W72/1231.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L492	7062	H04W72/1226.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L493	7816	H04W72/121.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L494	6467	H04W72/1205.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L495	12401	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L496	56480	H04W72/0413.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L497	42441	H04W72/0406.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L498	62073	H04W72/04.cpc.	(US-PGPUB; USPAT;	OR	OFF	OFF	2022/09/26

			USOCR; FPRS; EPO; JPO)				02:49 PM
L499	12401	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L500	0	H04W1/1664.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L501	0	H04W1/1621.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L502	0	H04W1/1607.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L503	0	H04W1/16.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L504	0	H04W1/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L505	0	H04W1/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L506	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L507	9	"predetermined association ID"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L508	0	wo2011102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L509	31	"2011102575"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L510	1	2011-102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L511	867	noh.in. and seok.in. and lg.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L512	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L513	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L514	19	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L515	504	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2022/09/26 02:49 PM

			JPO)				
L516	11	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L517	105	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L518	135	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L519	8	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L520	22866	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L521	1270	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L522	838	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L523	289	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L524	17	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L525	27	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L526	661	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L527	258	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L528	126	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L529	19	(("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

		) with (frame or packet or datagram or pdu or ppdu)					
L530	76	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L531	57	L62 not L61	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L532	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L533	7520	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L534	149	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L535	582	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L536	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L537	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L538	8	(("trigger frame" or "trigger packet") with (pad or padding)) and ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L539	10	("trigger frame" or "trigger packet").clm. and (fcs or "frame check" or "check frame").clm. and (pad or padding).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L540	4	sharma-gautam.xa. and ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L541	3	sharma-gautam.xa. and ("legacy preamble")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L542	4	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L543	63	sharma-gautam.xa. and ("20 mhz")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L544	4	sharma-gautam.xa. and (("20 mhz") with (legacy))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L545	3	sharma-gautam.xa. and (("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L546	707	(("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L547	254	(("20 mhz") with ("he-sig-a") with legacy)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L548	76	("same time") with ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L549	2	("20130286959"|"20130301569").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2022/09/26 02:49 PM
L550	367	ahn-woojin.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L551	376	kim-yongho.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L552	1370	kwak-jinsam.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L553	915	son-juhyung.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L554	6610	H04W74/085.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L555	3905	H04W74/0841.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L556	45025	H04W74/0833.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L557	17923	H04W74/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L558	10280	H04W74/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L559	18172	H04W72/1284.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L560	13257	H04W72/1278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2022/09/26 02:49 PM

			JPO)				
L561	26527	H04W72/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L562	10638	H04W72/1231.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L563	7062	H04W72/1226.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L564	7816	H04W72/121.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L565	6467	H04W72/1205.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L566	12401	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L567	56480	H04W72/0413.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L568	42441	H04W72/0406.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L569	62073	H04W72/04.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L570	12401	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L571	0	H04W1/1664.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L572	0	H04W1/1621.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L573	0	H04W1/1607.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L574	0	H04W1/16.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L575	0	H04W1/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L576	0	H04W1/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L577	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L578	9	"predetermined association ID"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L579	0	wo2011102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L580	31	"2011102575"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L581	1	2011-102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L582	867	noh.in. and seok.in. and lg.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L583	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L584	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L585	19	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L586	504	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L587	11	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L588	105	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L589	135	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L590	8	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L591	22866	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L592	1270	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L593	838	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L594	289	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L595	17	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L596	27	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L597	661	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L598	258	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L599	126	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L600	19	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L601	76	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L602	57	L133 not L132	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L603	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L604	7520	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L605	149	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L606	582	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L607	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

		association")					
L608	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L609	8	(("trigger frame" or "trigger packet") with (pad or padding)) and ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L610	6	L71 and L86	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L611	0	L71 and L87	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L612	0	L71 and L88	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L613	0	L71 and L89	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L614	0	L71 and L90	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L615	4	L71 and L91	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L616	0	L71 and L92	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L617	0	L71 and L93	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L618	4	L71 and L94	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L619	0	L71 and L95	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L620	6	L71 and L96	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L621	0	L71 and L97	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L622	0	L71 and L98	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L623	8	L71 and L99	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L624	0	L71 and L100	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L625	0	L71 and L101	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L626	0	L71 and L102	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L627	0	L71 and L103	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L628	0	L71 and L104	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L629	0	L71 and L105	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L630	0	L71 and L106	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L631	0	L71 and L107	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L632	0	L71 and L108	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L633	4	L71 and L109	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L634	3	L71 and L110	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L635	0	L71 and L111	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L636	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L637	898	("predetermined assocaition id" or "aid") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L638	20	("predetermined assocaition id" or "aid") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L639	20	("predetermined assocaition id" or"association identifier" or "predetermined assocaition identifier" or "aid" or "association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

		) with ("trigger frame") with (pad or padding or add or adding)					
L640	20	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L641	919	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L642	919	("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L643	672	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and (pad or padding or add or adding or exten or extending or encapsulat$6)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L644	431	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and ((pad or padding or add or adding or exten or extending or encapsulat$6) with (packet or frame or message))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L645	34	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

		) with ("trigger frame")) same((pad or padding or add or adding or exten or extending or encapsulat$6) with (packet or frame or message))					
L646	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L647	3	"16377829"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L648	37	("block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L649	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L650	606	("trigger frame") with ("bar" or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L651	412	("trigger frame") with ("block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L652	2	("trigger frame") with ("bar" or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L653	132	(("trigger frame") with ("bar")) and (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L654	400	("trigger frame") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L655	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L656	27395	("block ack" or BA or "bar") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L657	186	("block ack") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L658	4	("block ack") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L659	185	("block ack" or BA or "bar") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L660	2	"16320158"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L661	257	"trigger frame" with "aid"	(US-PGPUB; USPAT;	OR	OFF	OFF	2022/09/26

		with (ulink or "ul")	USOCR; FPRS; EPO; JPO)				02:49 PM
L662	301	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L663	2	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L664	34	"aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L665	4	"partial aid" with (frame or packet) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L666	582	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L667	479	(frame or packet) with (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L668	69	(frame or packet) near5 (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L669	4	sharma-gautam.xa. and ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L670	3	sharma-gautam.xa. and ("legacy preamble")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L671	4	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L672	63	sharma-gautam.xa. and ("20 mhz")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L673	4	sharma-gautam.xa. and (("20 mhz") with (legacy))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L674	3	sharma-gautam.xa. and (("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L675	707	(("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L676	254	(("20 mhz") with ("he-sig-a") with legacy)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L677	76	("same time") with ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L678	2	("20130286959"|"20130301569").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2022/09/26 02:49 PM
L679	367	ahn-woojin.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L680	376	kim-yongho.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L681	1370	kwak-jinsam.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L682	915	son-juhyung.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L683	6610	H04W74/085.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L684	3905	H04W74/0841.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L685	45025	H04W74/0833.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L686	17923	H04W74/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L687	10280	H04W74/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L688	18172	H04W72/1284.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L689	13257	H04W72/1278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L690	26527	H04W72/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L691	10638	H04W72/1231.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L692	7062	H04W72/1226.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2022/09/26 02:49 PM

			JPO)				
L693	7816	H04W72/121.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L694	6467	H04W72/1205.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L695	12401	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L696	56480	H04W72/0413.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L697	42441	H04W72/0406.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L698	62073	H04W72/04.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L699	12401	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L700	0	H04W1/1664.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L701	0	H04W1/1621.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L702	0	H04W1/1607.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L703	0	H04W1/16.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L704	0	H04W1/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L705	0	H04W1/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L706	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L707	9	"predetermined association ID"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L708	0	wo2011102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L709	31	"2011102575"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L710	1	2011-102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L711	867	noh.in. and seok.in. and lg.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L712	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L713	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L714	19	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L715	504	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L716	11	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L717	105	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L718	135	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L719	8	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L720	22866	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L721	1270	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L722	838	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L723	289	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L724	17	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L725	27	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L726	661	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L727	258	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L728	126	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L729	19	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L730	76	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L731	57	L305 not L304	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L732	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L733	7520	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L734	149	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L735	582	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L736	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L737	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L738	8	(("trigger frame" or "trigger packet") with (pad or padding)) and	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

		("predetermined association")					
L739	10	("trigger frame" or "trigger packet").clm. and (fcs or "frame check" or "check frame").clm. and (pad or padding).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L740	4	sharma-gautam.xa. and ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L741	3	sharma-gautam.xa. and ("legacy preamble")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L742	4	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L743	63	sharma-gautam.xa. and ("20 mhz")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L744	4	sharma-gautam.xa. and (("20 mhz") with (legacy))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L745	3	sharma-gautam.xa. and (("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L746	707	(("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L747	254	(("20 mhz") with ("he-sig-a") with legacy)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L748	76	("same time") with ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L749	2	("20130286959"|"20130301569").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2022/09/26 02:49 PM
L750	367	ahn-woojin.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L751	376	kim-yongho.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L752	1370	kwak-jinsam.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L753	915	son-juhyung.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L754	6610	H04W74/085.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L755	3905	H04W74/0841.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L756	45025	H04W74/0833.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L757	17923	H04W74/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L758	10280	H04W74/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L759	18172	H04W72/1284.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L760	13257	H04W72/1278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L761	26527	H04W72/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L762	10638	H04W72/1231.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L763	7062	H04W72/1226.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L764	7816	H04W72/121.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L765	6467	H04W72/1205.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L766	12401	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L767	56480	H04W72/0413.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L768	42441	H04W72/0406.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L769	62073	H04W72/04.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L770	12401	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L771	0	H04W1/1664.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L772	0	H04W1/1621.cpc.	(US-PGPUB; USPAT;	OR	OFF	OFF	2022/09/26

			USOCR; FPRS; EPO; JPO)				02:49 PM
L773	0	H04W1/1607.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L774	0	H04W1/16.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L775	0	H04W1/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L776	0	H04W1/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L777	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L778	9	"predetermined association ID"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L779	0	wo2011102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L780	31	"2011102575"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L781	1	2011-102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L782	867	noh.in. and seok.in. and lg.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L783	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L784	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L785	19	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L786	504	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L787	11	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L788	105	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L789	135	("bitmap" with (pad or	(US-PGPUB; USPAT;	OR	OFF	OFF	2022/09/26

		padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	USOCR; FPRS; EPO; JPO)				02:49 PM
L790	8	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L791	22866	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L792	1270	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L793	838	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L794	289	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L795	17	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L796	27	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L797	661	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L798	258	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L799	126	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L800	19	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L801	76	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L802	57	L376 not L375	(US-PGPUB; USPAT;	OR	OFF	OFF	2022/09/26

			USOCR; FPRS; EPO; JPO)				02:49 PM
L803	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L804	7520	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L805	149	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L806	582	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L807	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L808	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L809	8	(("trigger frame" or "trigger packet") with (pad or padding)) and ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L810	6	L314 and L329	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L811	0	L314 and L330	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L812	0	L314 and L331	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L813	0	L314 and L332	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L814	0	L314 and L333	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L815	4	L314 and L334	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L816	0	L314 and L335	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L817	0	L314 and L336	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L818	4	L314 and L337	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L819	0	L314 and L338	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L820	6	L314 and L339	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L821	0	L314 and L340	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L822	0	L314 and L341	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L823	8	L314 and L342	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L824	0	L314 and L343	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L825	0	L314 and L344	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L826	0	L314 and L345	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L827	0	L314 and L346	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L828	0	L314 and L347	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L829	0	L314 and L348	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L830	0	L314 and L349	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L831	0	L314 and L350	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L832	0	L314 and L351	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L833	4	L314 and L352	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L834	3	L314 and L353	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L835	0	L314 and L354	(US-PGPUB; USPAT;	OR	OFF	OFF	2022/09/26

			USOCR; FPRS; EPO; JPO)				02:49 PM
L836	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L837	898	("predetermined assocaition id" or "aid") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L838	20	("predetermined assocaition id" or "aid") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L839	20	("predetermined assocaition id" or"association identifier" or "predetermined assocaition identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L840	20	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L841	919	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L842	919	("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L843	672	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and (pad or padding or add or adding or exten or extending or	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

		encapsulat$6)					
L844	431	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and ((pad or padding or add or adding or exten or extending or encapsulat$6) with (packet or frame or message))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L845	34	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) same((pad or padding or add or adding or exten or extending or encapsulat$6) with (packet or frame or message))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L846	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L847	3	"16377829"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L848	37	("block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L849	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L850	606	("trigger frame") with ("bar" or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L851	412	("trigger frame") with ("block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L852	2	("trigger frame") with ("bar" or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L853	132	(("trigger frame") with ("bar")) and (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L854	400	("trigger frame") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L855	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L856	27395	("block ack" or BA or "bar") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L857	186	("block ack") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L858	4	("block ack") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L859	185	("block ack" or BA or "bar") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L860	2	"16320158"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L861	257	"trigger frame" with "aid" with (ulink or "ul")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L862	301	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L863	2	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L864	34	"aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L865	4	"partial aid" with (frame or packet) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L866	582	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L867	479	(frame or packet) with (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L868	69	(frame or packet) near5 (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L869	22	(frame or packet).clm. and (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id").clm. and (pad or padding).clm. and (trigger).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L870	5	L444 and L258	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L871	0	L444 and L259	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L872	0	L444 and L260	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L873	0	L444 and L261	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L874	0	L444 and L262	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L875	4	L444 and L263	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L876	0	L444 and L264	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L877	1	L444 and L265	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L878	4	L444 and L266	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L879	0	L444 and L267	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L880	4	L444 and L268	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L881	0	L444 and L269	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L882	0	L444 and L270	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L883	4	L444 and L271	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L884	0	L444 and L272	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L885	2	L444 and L273	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L886	0	L444 and L274	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L887	0	L444 and L275	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L888	0	L444 and L276	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L889	0	L444 and L277	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L890	0	L444 and L278	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L891	0	L444 and L279	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L892	0	L444 and L280	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L893	4	L444 and L281	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L894	5	"15555075"	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/26 02:55 PM
L895	2	"15555075"	(USPAT)	OR	ON	ON	2022/09/26 02:55 PM
L896	1	("20170272138").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/26 04:10 PM
L897	0	("20170272138").pn. AND (aid SAME fcs)	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/26 04:17 PM
L898	0	("20170272138").pn. AND ("aid" SAME "fcs")	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/26 04:17 PM
L899	1	("20160165574").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/26 04:29 PM
L900	1	("20160165574").pn. AND (bit WITH ($3aid OR "association id" OR "association identif$5"))	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/26 11:02 PM
L901	0	("20160165574").pn. AND (bit WITH ($3aid OR "association id" OR "association identif$5") WITH (pad OR padding OR length OR duration))	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/26 11:05 PM
L902	14103	(bit WITH ($3aid OR "association id" OR	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/26 11:05 PM

		"association identif$5") WITH (pad OR padding OR length OR duration))					
L903	54996	((bit OR value) WITH ($3aid OR "association id" OR "association identif$5") WITH (pad OR padding OR length OR duration))	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/26 11:05 PM
L904	9146	((bit OR value) near3 ($3aid OR "association id" OR "association identif$5") near3 (pad OR padding OR length OR duration))	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/26 11:06 PM
L905	1074	((bit OR value) near4 ($3aid OR "association id" OR "association identif$5") NEAR (pad OR padding OR length OR duration) near4 (one OR "1"))	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/26 11:09 PM
L906	2435283	((bit OR value) near4 ($3aid OR "association id" OR "association identif$5") nearw (pad OR padding OR length OR duration) near4 (one OR "1"))	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/26 11:10 PM
L907	2285	((bit OR value) near4 ($3aid OR "association id" OR "association identif$5") near4 (pad OR padding OR length OR duration) near4 (one OR "1"))	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/26 11:10 PM
L908	157	((bit OR value) near4 ($3aid OR "association id" OR "association identif$5") near4 (pad OR padding OR length OR duration) near4 (one OR "1") WITH (frame OR packet))	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/26 11:10 PM
L909	517	((bit OR value) near4 ($3aid OR "association id" OR "association identif$5") near4 (pad OR padding OR length OR duration) near4 (frame OR packet))	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/26 11:10 PM
L910	5	(($3aid OR "association id" OR "association identif$5")	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/26 11:12 PM

		WITH (pad OR padding OR length OR duration) WITH (frame OR packet) WITH (trigger) WITH (particular OR specific) WITH (bit OR value))					
L911	39	(($3aid OR "association id" OR "association identif$5") WITH (pad OR padding OR length OR duration) WITH (frame OR packet) WITH (trigger) WITH (particular OR specific OR "1" OR "one") WITH (bit OR value))	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/26 11:12 PM
L912	18	(($3aid OR "association id" OR "association identif$5") WITH (pad OR padding OR length OR duration) WITH (frame OR packet) WITH (trigger) WITH ((particular OR specific OR "1" OR "one") near2 (bit OR value)))	(US-PGPUB; USPAT)	OR	ON	ON	2022/09/26 11:12 PM
L913	89	(($3aid OR "association id" OR "association identif$5") WITH (pad OR padding OR length OR duration) WITH (frame OR packet) WITH (trigger) WITH ((particular OR specific OR "1" OR "one") near2 (bit OR value)))	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO)	OR	ON	ON	2022/09/26 11:13 PM
L914	51	((aid OR staid OR paid OR "association id" OR "association identif$5") WITH (pad OR padding OR length OR duration) WITH (frame OR packet) WITH (trigger) WITH ((particular OR specific OR "1" OR "one") near2 (bit OR value)))	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA,	OR	ON	ON	2022/09/26 11:16 PM

			VN); FPRS; EPO; JPO)				
L915	39	"201261639877"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO)	OR	ON	ON	2022/09/26 11:22 PM
L916	0	("201261639877").pn.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO)	OR	ON	ON	2022/09/26 11:22 PM
L917	5	"14397618"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO)	OR	ON	ON	2022/09/26 11:23 PM
L918	4	sharma-gautam.xa. and ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L919	3	sharma-gautam.xa. and ("legacy preamble")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L920	4	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

L921	66	sharma-gautam.xa. and ("20 mhz")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L922	4	sharma-gautam.xa. and (("20 mhz") with (legacy))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L923	3	sharma-gautam.xa. and (("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L924	784	(("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L925	263	(("20 mhz") with ("he-sig-a") with legacy)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L926	81	("same time") with ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L927	2	("20130286959"|"20130301569").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2023/03/06 06:13 PM
L928	435	ahn-woojin.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L929	398	kim-yongho.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L930	1512	kwak-jinsam.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L931	1041	son-juhyung.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L932	7161	H04W74/085.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L933	4772	H04W74/0841.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L934	50429	H04W74/0833.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L935	19123	H04W74/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L936	10539	H04W74/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L937	303	H04W72/1284.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L938	233	H04W72/1278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2023/03/06 06:13 PM

			JPO)				
L939	34405	H04W72/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L940	232	H04W72/1231.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L941	143	H04W72/1226.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L942	8724	H04W72/121.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L943	140	H04W72/1205.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L944	12822	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L945	1378	H04W72/0413.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L946	944	H04W72/0406.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L947	66256	H04W72/04.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L948	12822	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L949	0	H04W1/1664.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L950	0	H04W1/1621.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L951	0	H04W1/1607.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L952	0	H04W1/16.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L953	0	H04W1/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L954	0	H04W1/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L955	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

L956	9	"predetermined association ID"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L957	0	wo2011102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L958	31	"2011102575"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L959	1	2011-102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L960	871	noh.in. and seok.in. and lg.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L961	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L962	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L963	20	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L964	523	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L965	12	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L966	111	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L967	141	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L968	9	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L969	23817	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L970	1366	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L971	919	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

L972	324	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L973	17	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L974	28	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L975	675	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L976	265	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L977	131	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L978	19	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L979	79	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L980	60	L62 not L61	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L981	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L982	8263	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L983	180	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L984	701	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L985	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

		association")					
L986	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L987	8	(("trigger frame" or "trigger packet") with (pad or padding)) and ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L988	10	("trigger frame" or "trigger packet").clm. and (fcs or "frame check" or "check frame").clm. and (pad or padding).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L989	4	sharma-gautam.xa. and ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L990	3	sharma-gautam.xa. and ("legacy preamble")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L991	4	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L992	66	sharma-gautam.xa. and ("20 mhz")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L993	4	sharma-gautam.xa. and (("20 mhz") with (legacy))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L994	3	sharma-gautam.xa. and (("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L995	784	(("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L996	263	(("20 mhz") with ("he-sig-a") with legacy)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L997	81	("same time") with ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L998	2	("20130286959"|"20130301569").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2023/03/06 06:13 PM
L999	435	ahn-woojin.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1000	398	kim-yongho.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1001	1512	kwak-jinsam.in.	(US-PGPUB; USPAT;	OR	OFF	OFF	2023/03/06

			USOCR; FPRS; EPO; JPO)				06:13 PM
L1002	1041	son-juhyung.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1003	7161	H04W74/085.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1004	4772	H04W74/0841.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1005	50429	H04W74/0833.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1006	19123	H04W74/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1007	10539	H04W74/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1008	303	H04W72/1284.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1009	233	H04W72/1278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1010	34405	H04W72/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1011	232	H04W72/1231.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1012	143	H04W72/1226.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1013	8724	H04W72/121.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1014	140	H04W72/1205.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1015	12822	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1016	1378	H04W72/0413.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1017	944	H04W72/0406.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1018	66256	H04W72/04.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2023/03/06 06:13 PM

			JPO)				
L1019	12822	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1020	0	H04W1/1664.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1021	0	H04W1/1621.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1022	0	H04W1/1607.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1023	0	H04W1/16.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1024	0	H04W1/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1025	0	H04W1/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1026	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1027	9	"predetermined association ID"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1028	0	wo2011102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1029	31	"2011102575"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1030	1	2011-102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1031	871	noh.in. and seok.in. and lg.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1032	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1033	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1034	20	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1035	523	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

L1036	12	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1037	111	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1038	141	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1039	9	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1040	23817	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1041	1366	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1042	919	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1043	324	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1044	17	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1045	28	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1046	675	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1047	265	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1048	131	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1049	19	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

		or datagram or pdu or ppdu)					
L1050	79	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1051	60	L133 not L132	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1052	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1053	8263	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1054	180	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1055	701	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1056	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1057	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1058	8	(("trigger frame" or "trigger packet") with (pad or padding)) and ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1059	6	L71 and L86	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1060	0	L71 and L87	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1061	0	L71 and L88	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1062	0	L71 and L89	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1063	0	L71 and L90	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

L1064	0	L71 and L91	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1065	0	L71 and L92	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1066	0	L71 and L93	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1067	0	L71 and L94	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1068	0	L71 and L95	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1069	6	L71 and L96	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1070	0	L71 and L97	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1071	0	L71 and L98	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1072	0	L71 and L99	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1073	0	L71 and L100	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1074	0	L71 and L101	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1075	0	L71 and L102	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1076	0	L71 and L103	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1077	0	L71 and L104	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1078	0	L71 and L105	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1079	0	L71 and L106	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1080	0	L71 and L107	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1081	0	L71 and L108	(US-PGPUB; USPAT;	OR	OFF	OFF	2023/03/06

			USOCR; FPRS; EPO; JPO)				06:13 PM
L1082	4	L71 and L109	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1083	3	L71 and L110	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1084	0	L71 and L111	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1085	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1086	1044	("predetermined assocaition id" or "aid") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1087	23	("predetermined assocaition id" or "aid") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1088	23	("predetermined assocaition id" or"association identifier" or "predetermined assocaition identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1089	23	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1090	1076	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1091	1076	("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

L1092	798	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and (pad or padding or add or adding or exten or extending or encapsulat$6)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1093	535	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and ((pad or padding or add or adding or exten or extending or encapsulat$6) with (packet or frame or message))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1094	38	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) same((pad or padding or add or adding or exten or extending or encapsulat$6) with (packet or frame or message))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1095	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1096	3	"16377829"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1097	39	("block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1098	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1099	720	("trigger frame") with ("bar" or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1100	504	("trigger frame") with ("block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

L1101	2	("trigger frame") with ("bar" or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1102	160	(("trigger frame") with ("bar")) and (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1103	482	("trigger frame") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1104	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1105	27726	("block ack" or BA or "bar") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1106	206	("block ack") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1107	4	("block ack") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1108	187	("block ack" or BA or "bar") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1109	2	"16320158"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1110	287	"trigger frame" with "aid" with (ulink or "ul")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1111	332	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1112	3	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1113	37	"aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1114	5	"partial aid" with (frame or packet) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1115	701	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1116	498	(frame or packet) with (staid or "sta-id" or aid or "partial aid" or "predetermined	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

		association Id" or "sta id") with (pad or padding)					
L1117	76	(frame or packet) near5 (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1118	4	sharma-gautam.xa. and ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1119	3	sharma-gautam.xa. and ("legacy preamble")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1120	4	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1121	66	sharma-gautam.xa. and ("20 mhz")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1122	4	sharma-gautam.xa. and (("20 mhz") with (legacy))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1123	3	sharma-gautam.xa. and (("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1124	784	(("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1125	263	(("20 mhz") with ("he-sig-a") with legacy)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1126	81	("same time") with ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1127	2	("20130286959"|"20130301569").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2023/03/06 06:13 PM
L1128	435	ahn-woojin.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1129	398	kim-yongho.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1130	1512	kwak-jinsam.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1131	1041	son-juhyung.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1132	7161	H04W74/085.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2023/03/06 06:13 PM

			JPO)				
L1133	4772	H04W74/0841.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1134	50429	H04W74/0833.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1135	19123	H04W74/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1136	10539	H04W74/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1137	303	H04W72/1284.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1138	233	H04W72/1278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1139	34405	H04W72/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1140	232	H04W72/1231.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1141	143	H04W72/1226.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1142	8724	H04W72/121.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1143	140	H04W72/1205.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1144	12822	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1145	1378	H04W72/0413.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1146	944	H04W72/0406.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1147	66256	H04W72/04.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1148	12822	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1149	0	H04W1/1664.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

L1150	0	H04W1/1621.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1151	0	H04W1/1607.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1152	0	H04W1/16.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1153	0	H04W1/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1154	0	H04W1/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1155	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1156	9	"predetermined association ID"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1157	0	wo2011102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1158	31	"2011102575"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1159	1	2011-102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1160	871	noh.in. and seok.in. and lg.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1161	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1162	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1163	20	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1164	523	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1165	12	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1166	111	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

L1167	141	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1168	9	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1169	23817	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1170	1366	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1171	919	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1172	324	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1173	17	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1174	28	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1175	675	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1176	265	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1177	131	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1178	19	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1179	79	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

L1180	60	L305 not L304	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1181	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1182	8263	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1183	180	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1184	701	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1185	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1186	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1187	8	(("trigger frame" or "trigger packet") with (pad or padding)) and ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1188	10	("trigger frame" or "trigger packet").clm. and (fcs or "frame check" or "check frame").clm. and (pad or padding).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1189	4	sharma-gautam.xa. and ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1190	3	sharma-gautam.xa. and ("legacy preamble")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1191	4	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1192	66	sharma-gautam.xa. and ("20 mhz")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1193	4	sharma-gautam.xa. and (("20 mhz") with (legacy))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1194	3	sharma-gautam.xa. and (("20 mhz") with ("he-	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2023/03/06 06:13 PM

		sig-a"))	JPO)				
L1195	784	(("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1196	263	(("20 mhz") with ("he-sig-a") with legacy)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1197	81	("same time") with ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1198	2	("20130286959"|"20130301569").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2023/03/06 06:13 PM
L1199	435	ahn-woojin.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1200	398	kim-yongho.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1201	1512	kwak-jinsam.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1202	1041	son-juhyung.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1203	7161	H04W74/085.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1204	4772	H04W74/0841.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1205	50429	H04W74/0833.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1206	19123	H04W74/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1207	10539	H04W74/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1208	303	H04W72/1284.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1209	233	H04W72/1278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1210	34405	H04W72/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1211	232	H04W72/1231.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1212	143	H04W72/1226.cpc.	(US-PGPUB; USPAT;	OR	OFF	OFF	2023/03/06

			USOCR; FPRS; EPO; JPO)				06:13 PM
L1213	8724	H04W72/121.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1214	140	H04W72/1205.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1215	12822	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1216	1378	H04W72/0413.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1217	944	H04W72/0406.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1218	66256	H04W72/04.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1219	12822	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1220	0	H04W1/1664.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1221	0	H04W1/1621.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1222	0	H04W1/1607.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1223	0	H04W1/16.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1224	0	H04W1/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1225	0	H04W1/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1226	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1227	9	"predetermined association ID"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1228	0	wo2011102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1229	31	"2011102575"	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2023/03/06 06:13 PM

			JPO)				
L1230	1	2011-102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1231	871	noh.in. and seok.in. and lg.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1232	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1233	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1234	20	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1235	523	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1236	12	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1237	111	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1238	141	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1239	9	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1240	23817	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1241	1366	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1242	919	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1243	324	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1244	17	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

		) and ("same time")					
L1245	28	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1246	675	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1247	265	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1248	131	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1249	19	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1250	79	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1251	60	L376 not L375	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1252	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1253	8263	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1254	180	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1255	701	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1256	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1257	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1258	8	(("trigger frame" or	(US-PGPUB; USPAT;	OR	OFF	OFF	2023/03/06

		"trigger packet") with (pad or padding)) and ("predetermined association")	USOCR; FPRS; EPO; JPO)				06:13 PM
L1259	6	L314 and L329	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1260	0	L314 and L330	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1261	0	L314 and L331	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1262	0	L314 and L332	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1263	0	L314 and L333	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1264	0	L314 and L334	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1265	0	L314 and L335	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1266	0	L314 and L336	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1267	0	L314 and L337	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1268	0	L314 and L338	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1269	6	L314 and L339	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1270	0	L314 and L340	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1271	0	L314 and L341	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1272	0	L314 and L342	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1273	0	L314 and L343	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1274	0	L314 and L344	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

L1275	0	L314 and L345	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1276	0	L314 and L346	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1277	0	L314 and L347	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1278	0	L314 and L348	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1279	0	L314 and L349	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1280	0	L314 and L350	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1281	0	L314 and L351	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1282	4	L314 and L352	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1283	3	L314 and L353	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1284	0	L314 and L354	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1285	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1286	1044	("predetermined assocaition id" or "aid") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1287	23	("predetermined assocaition id" or "aid") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1288	23	("predetermined assocaition id" or"association identifier" or "predetermined assocaition identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1289	23	("predetermined assocaition id" or "association identifier"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

		or "predetermined association identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)					
L1290	1076	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1291	1076	("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1292	798	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and (pad or padding or add or adding or exten or extending or encapsulat$6)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1293	535	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and ((pad or padding or add or adding or exten or extending or encapsulat$6) with (packet or frame or message))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1294	38	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) same((pad or padding or add or adding or exten or extending or encapsulat$6) with (packet or frame or	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

		message))					
L1295	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1296	3	"16377829"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1297	39	("block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1298	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1299	720	("trigger frame") with ("bar" or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1300	504	("trigger frame") with ("block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1301	2	("trigger frame") with ("bar" or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1302	160	(("trigger frame") with ("bar")) and (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1303	482	("trigger frame") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1304	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1305	27726	("block ack" or BA or "bar") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1306	206	("block ack") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1307	4	("block ack") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1308	187	("block ack" or BA or "bar") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1309	2	"16320158"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1310	287	"trigger frame" with "aid" with (ulink or "ul")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1311	332	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

		ack")					
L1312	3	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1313	37	"aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1314	5	"partial aid" with (frame or packet) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1315	701	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1316	498	(frame or packet) with (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1317	76	(frame or packet) near5 (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1318	23	(frame or packet).clm. and (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id").clm. and (pad or padding).clm. and (trigger).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1319	5	L444 and L258	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1320	0	L444 and L259	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1321	0	L444 and L260	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1322	0	L444 and L261	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1323	0	L444 and L262	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1324	0	L444 and L263	(US-PGPUB; USPAT;	OR	OFF	OFF	2023/03/06

			USOCR; FPRS; EPO; JPO)				06:13 PM
L1325	0	L444 and L264	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1326	1	L444 and L265	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1327	0	L444 and L266	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1328	0	L444 and L267	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1329	4	L444 and L268	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1330	0	L444 and L269	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1331	0	L444 and L270	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1332	0	L444 and L271	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1333	0	L444 and L272	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1334	2	L444 and L273	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1335	0	L444 and L274	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1336	0	L444 and L275	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1337	0	L444 and L276	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1338	0	L444 and L277	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1339	0	L444 and L278	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1340	0	L444 and L279	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1341	0	L444 and L280	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2023/03/06 06:13 PM

			JPO)				
L1342	4	L444 and L281	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1343	4	sharma-gautam.xa. and ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1344	3	sharma-gautam.xa. and ("legacy preamble")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1345	4	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1346	66	sharma-gautam.xa. and ("20 mhz")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1347	4	sharma-gautam.xa. and (("20 mhz") with (legacy))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1348	3	sharma-gautam.xa. and (("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1349	784	(("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1350	263	(("20 mhz") with ("he-sig-a") with legacy)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1351	81	("same time") with ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1352	2	("20130286959"|"20130301569").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2023/03/06 06:13 PM
L1353	435	ahn-woojin.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1354	398	kim-yongho.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1355	1512	kwak-jinsam.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1356	1041	son-juhyung.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1357	7161	H04W74/085.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1358	4772	H04W74/0841.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1359	50429	H04W74/0833.cpc.	(US-PGPUB; USPAT;	OR	OFF	OFF	2023/03/06

			USOCR; FPRS; EPO; JPO)				06:13 PM
L1360	19123	H04W74/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1361	10539	H04W74/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1362	303	H04W72/1284.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1363	233	H04W72/1278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1364	34405	H04W72/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1365	232	H04W72/1231.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1366	143	H04W72/1226.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1367	8724	H04W72/121.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1368	140	H04W72/1205.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1369	12822	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1370	1378	H04W72/0413.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1371	944	H04W72/0406.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1372	66256	H04W72/04.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1373	12822	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1374	0	H04W1/1664.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1375	0	H04W1/1621.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1376	0	H04W1/1607.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2023/03/06 06:13 PM

			JPO)				
L1377	0	H04W1/16.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1378	0	H04W1/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1379	0	H04W1/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1380	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1381	9	"predetermined association ID"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1382	0	wo2011102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1383	31	"2011102575"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1384	1	2011-102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1385	871	noh.in. and seok.in. and lg.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1386	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1387	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1388	20	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1389	523	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1390	12	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1391	111	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1392	141	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

L1393	9	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1394	23817	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1395	1366	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1396	919	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1397	324	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1398	17	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1399	28	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1400	675	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1401	265	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1402	131	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1403	19	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1404	79	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1405	60	L62 not L61	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1406	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2023/03/06 06:13 PM

			JPO)				
L1407	8263	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1408	180	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1409	701	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1410	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1411	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1412	8	(("trigger frame" or "trigger packet") with (pad or padding)) and ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1413	10	("trigger frame" or "trigger packet").clm. and (fcs or "frame check" or "check frame").clm. and (pad or padding).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1414	4	sharma-gautam.xa. and ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1415	3	sharma-gautam.xa. and ("legacy preamble")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1416	4	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1417	66	sharma-gautam.xa. and ("20 mhz")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1418	4	sharma-gautam.xa. and (("20 mhz") with (legacy))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1419	3	sharma-gautam.xa. and (("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1420	784	(("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1421	263	(("20 mhz") with ("he-	(US-PGPUB; USPAT;	OR	OFF	OFF	2023/03/06

		sig-a") with legacy)	USOCR; FPRS; EPO; JPO)				06:13 PM
L1422	81	("same time") with ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1423	2	("20130286959"|"20130301569").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2023/03/06 06:13 PM
L1424	435	ahn-woojin.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1425	398	kim-yongho.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1426	1512	kwak-jinsam.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1427	1041	son-juhyung.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1428	7161	H04W74/085.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1429	4772	H04W74/0841.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1430	50429	H04W74/0833.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1431	19123	H04W74/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1432	10539	H04W74/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1433	303	H04W72/1284.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1434	233	H04W72/1278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1435	34405	H04W72/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1436	232	H04W72/1231.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1437	143	H04W72/1226.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1438	8724	H04W72/121.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

L1439	140	H04W72/1205.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1440	12822	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1441	1378	H04W72/0413.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1442	944	H04W72/0406.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1443	66256	H04W72/04.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1444	12822	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1445	0	H04W1/1664.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1446	0	H04W1/1621.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1447	0	H04W1/1607.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1448	0	H04W1/16.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1449	0	H04W1/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1450	0	H04W1/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1451	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1452	9	"predetermined association ID"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1453	0	wo2011102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1454	31	"2011102575"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1455	1	2011-102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1456	871	noh.in. and seok.in. and	(US-PGPUB; USPAT;	OR	OFF	OFF	2023/03/06

		lg.as.	USOCR; FPRS; EPO; JPO)				06:13 PM
L1457	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1458	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1459	20	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1460	523	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1461	12	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1462	111	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1463	141	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1464	9	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1465	23817	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1466	1366	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1467	919	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1468	324	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1469	17	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1470	28	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

		)					
L1471	675	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1472	265	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1473	131	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1474	19	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1475	79	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1476	60	L133 not L132	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1477	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1478	8263	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1479	180	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1480	701	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1481	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1482	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1483	8	(("trigger frame" or "trigger packet") with (pad or padding)) and ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1484	6	L71 and L86	(US-PGPUB; USPAT;	OR	OFF	OFF	2023/03/06

			USOCR; FPRS; EPO; JPO)				06:13 PM
L1485	0	L71 and L87	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1486	0	L71 and L88	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1487	0	L71 and L89	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1488	0	L71 and L90	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1489	0	L71 and L91	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1490	0	L71 and L92	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1491	0	L71 and L93	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1492	0	L71 and L94	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1493	0	L71 and L95	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1494	6	L71 and L96	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1495	0	L71 and L97	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1496	0	L71 and L98	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1497	0	L71 and L99	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1498	0	L71 and L100	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1499	0	L71 and L101	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1500	0	L71 and L102	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1501	0	L71 and L103	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2023/03/06 06:13 PM

			JPO)				
L1502	0	L71 and L104	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1503	0	L71 and L105	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1504	0	L71 and L106	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1505	0	L71 and L107	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1506	0	L71 and L108	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1507	4	L71 and L109	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1508	3	L71 and L110	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1509	0	L71 and L111	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1510	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1511	1044	("predetermined assocaition id" or "aid") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1512	23	("predetermined assocaition id" or "aid") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1513	23	("predetermined assocaition id" or"association identifier" or "predetermined assocaition identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1514	23	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

L1515	1076	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1516	1076	("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1517	798	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and (pad or padding or add or adding or exten or extending or encapsulat$6)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1518	535	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and ((pad or padding or add or adding or exten or extending or encapsulat$6) with (packet or frame or message))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1519	38	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) same((pad or padding or add or adding or exten or extending or encapsulat$6) with (packet or frame or message))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1520	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1521	3	"16377829"	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2023/03/06 06:13 PM

			JPO)				
L1522	39	("block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1523	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1524	720	("trigger frame") with ("bar" or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1525	504	("trigger frame") with ("block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1526	2	("trigger frame") with ("bar" or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1527	160	(("trigger frame") with ("bar")) and (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1528	482	("trigger frame") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1529	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1530	27726	("block ack" or BA or "bar") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1531	206	("block ack") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1532	4	("block ack") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1533	187	("block ack" or BA or "bar") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1534	2	"16320158"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1535	287	"trigger frame" with "aid" with (ulink or "ul")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1536	332	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1537	3	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

L1538	37	"aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1539	5	"partial aid" with (frame or packet) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1540	701	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1541	498	(frame or packet) with (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1542	76	(frame or packet) near5 (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1543	4	sharma-gautam.xa. and ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1544	3	sharma-gautam.xa. and ("legacy preamble")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1545	4	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1546	66	sharma-gautam.xa. and ("20 mhz")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1547	4	sharma-gautam.xa. and (("20 mhz") with (legacy))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1548	3	sharma-gautam.xa. and (("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1549	784	(("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1550	263	(("20 mhz") with ("he-sig-a") with legacy)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1551	81	("same time") with ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1552	2	("20130286959"|"20130301569").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2023/03/06 06:13 PM

L1553	435	ahn-woojin.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1554	398	kim-yongho.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1555	1512	kwak-jinsam.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1556	1041	son-juhyung.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1557	7161	H04W74/085.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1558	4772	H04W74/0841.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1559	50429	H04W74/0833.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1560	19123	H04W74/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1561	10539	H04W74/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1562	303	H04W72/1284.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1563	233	H04W72/1278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1564	34405	H04W72/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1565	232	H04W72/1231.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1566	143	H04W72/1226.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1567	8724	H04W72/121.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1568	140	H04W72/1205.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1569	12822	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1570	1378	H04W72/0413.cpc.	(US-PGPUB; USPAT;	OR	OFF	OFF	2023/03/06

			USOCR; FPRS; EPO; JPO)				06:13 PM
L1571	944	H04W72/0406.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1572	66256	H04W72/04.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1573	12822	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1574	0	H04W1/1664.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1575	0	H04W1/1621.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1576	0	H04W1/1607.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1577	0	H04W1/16.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1578	0	H04W1/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1579	0	H04W1/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1580	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1581	9	"predetermined association ID"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1582	0	wo2011102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1583	31	"2011102575"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1584	1	2011-102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1585	871	noh.in. and seok.in. and lg.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1586	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1587	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2023/03/06 06:13 PM

			JPO)				
L1588	20	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1589	523	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1590	12	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1591	111	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1592	141	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1593	9	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1594	23817	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1595	1366	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1596	919	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1597	324	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1598	17	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1599	28	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1600	675	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1601	265	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

L1602	131	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1603	19	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1604	79	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1605	60	L305 not L304	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1606	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1607	8263	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1608	180	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1609	701	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1610	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1611	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1612	8	(("trigger frame" or "trigger packet") with (pad or padding)) and ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1613	10	("trigger frame" or "trigger packet").clm. and (fcs or "frame check" or "check frame").clm. and (pad or padding).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1614	4	sharma-gautam.xa. and ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

L1615	3	sharma-gautam.xa. and ("legacy preamble")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1616	4	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1617	66	sharma-gautam.xa. and ("20 mhz")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1618	4	sharma-gautam.xa. and (("20 mhz") with (legacy))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1619	3	sharma-gautam.xa. and (("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1620	784	(("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1621	263	(("20 mhz") with ("he-sig-a") with legacy)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1622	81	("same time") with ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1623	2	("20130286959"|"20130301569").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2023/03/06 06:13 PM
L1624	435	ahn-woojin.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1625	398	kim-yongho.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1626	1512	kwak-jinsam.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1627	1041	son-juhyung.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1628	7161	H04W74/085.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1629	4772	H04W74/0841.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1630	50429	H04W74/0833.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1631	19123	H04W74/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1632	10539	H04W74/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2023/03/06 06:13 PM

			JPO)				
L1633	303	H04W72/1284.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1634	233	H04W72/1278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1635	34405	H04W72/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1636	232	H04W72/1231.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1637	143	H04W72/1226.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1638	8724	H04W72/121.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1639	140	H04W72/1205.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1640	12822	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1641	1378	H04W72/0413.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1642	944	H04W72/0406.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1643	66256	H04W72/04.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1644	12822	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1645	0	H04W1/1664.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1646	0	H04W1/1621.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1647	0	H04W1/1607.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1648	0	H04W1/16.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1649	0	H04W1/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

L1650	0	H04W1/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1651	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1652	9	"predetermined association ID"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1653	0	wo2011102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1654	31	"2011102575"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1655	1	2011-102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1656	871	noh.in. and seok.in. and lg.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1657	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1658	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1659	20	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1660	523	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1661	12	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1662	111	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1663	141	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1664	9	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1665	23817	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

L1666	1366	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1667	919	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1668	324	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1669	17	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1670	28	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1671	675	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1672	265	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1673	131	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1674	19	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1675	79	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1676	60	L376 not L375	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1677	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1678	8263	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1679	180	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

L1680	701	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1681	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1682	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1683	8	(("trigger frame" or "trigger packet") with (pad or padding)) and ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1684	6	L314 and L329	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1685	0	L314 and L330	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1686	0	L314 and L331	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1687	0	L314 and L332	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1688	0	L314 and L333	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1689	0	L314 and L334	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1690	0	L314 and L335	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1691	0	L314 and L336	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1692	0	L314 and L337	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1693	0	L314 and L338	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1694	6	L314 and L339	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1695	0	L314 and L340	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2023/03/06 06:13 PM

			JPO)				
L1696	0	L314 and L341	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1697	0	L314 and L342	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1698	0	L314 and L343	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1699	0	L314 and L344	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1700	0	L314 and L345	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1701	0	L314 and L346	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1702	0	L314 and L347	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1703	0	L314 and L348	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1704	0	L314 and L349	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1705	0	L314 and L350	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1706	0	L314 and L351	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1707	4	L314 and L352	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1708	3	L314 and L353	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1709	0	L314 and L354	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1710	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1711	1044	("predetermined assocaition id" or "aid") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1712	23	("predetermined assocaition id" or "aid") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

		with (pad or padding or add or adding)					
L1713	23	("predetermined assocaition id" or"association identifier" or "predetermined assocaition identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1714	23	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1715	1076	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1716	1076	("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1717	798	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and (pad or padding or add or adding or exten or extending or encapsulat$6)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1718	535	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and ((pad or padding or add or adding or exten or extending or encapsulat$6) with (	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

		packet or frame or message))					
L1719	38	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) same((pad or padding or add or adding or exten or extending or encapsulat$6) with (packet or frame or message))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1720	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1721	3	"16377829"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1722	39	("block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1723	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1724	720	("trigger frame") with ("bar" or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1725	504	("trigger frame") with ("block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1726	2	("trigger frame") with ("bar" or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1727	160	(("trigger frame") with ("bar")) and (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1728	482	("trigger frame") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1729	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1730	27726	("block ack" or BA or "bar") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1731	206	("block ack") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1732	4	("block ack") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2023/03/06 06:13 PM

			JPO)				
L1733	187	("block ack" or BA or "bar") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1734	2	"16320158"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1735	287	"trigger frame" with "aid" with (ulink or "ul")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1736	332	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1737	3	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1738	37	"aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1739	5	"partial aid" with (frame or packet) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1740	701	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1741	498	(frame or packet) with (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1742	76	(frame or packet) near5 (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1743	23	(frame or packet).clm. and (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id").clm. and (pad or padding).clm. and (trigger).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1744	5	L444 and L258	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM

L1745	0	L444 and L259	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1746	0	L444 and L260	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1747	0	L444 and L261	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1748	0	L444 and L262	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1749	0	L444 and L263	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1750	0	L444 and L264	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1751	1	L444 and L265	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1752	0	L444 and L266	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1753	0	L444 and L267	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1754	4	L444 and L268	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1755	0	L444 and L269	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1756	0	L444 and L270	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1757	0	L444 and L271	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1758	0	L444 and L272	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1759	2	L444 and L273	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1760	0	L444 and L274	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1761	0	L444 and L275	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1762	0	L444 and L276	(US-PGPUB; USPAT;	OR	OFF	OFF	2023/03/06

			USOCR; FPRS; EPO; JPO)				06:13 PM
L1763	0	L444 and L277	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1764	0	L444 and L278	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1765	0	L444 and L279	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1766	0	L444 and L280	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1767	4	L444 and L281	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2023/03/06 06:13 PM
L1768	5	"15555075"	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:13 PM
L1769	2	"15555075"	(USPAT)	OR	ON	ON	2023/03/06 06:13 PM
L1770	1	("20170272138").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:13 PM
L1771	0	("20170272138").pn. AND (aid SAME fcs)	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:13 PM
L1772	0	("20170272138").pn. AND ("aid" SAME "fcs")	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:13 PM
L1773	1	("20160165574").pn.	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:13 PM
L1774	1	("20160165574").pn. AND (bit WITH ($3aid OR "association id" OR "association identif$5"))	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:13 PM
L1775	0	("20160165574").pn. AND (bit WITH ($3aid OR "association id" OR "association identif$5") WITH (pad OR padding OR length OR duration))	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:13 PM
L1776	14297	(bit WITH ($3aid OR "association id" OR "association identif$5") WITH (pad OR padding OR length OR duration))	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:13 PM
L1777	55678	((bit OR value) WITH ($3aid OR "association id" OR "association identif$5") WITH (pad OR padding OR length OR duration))	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:13 PM
L1778	9224	((bit OR value) near3	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06

		($3aid OR "association id" OR "association identif$5") near3 (pad OR padding OR length OR duration))					06:13 PM
L1779	1077	((bit OR value) near4 ($3aid OR "association id" OR "association identif$5") NEAR (pad OR padding OR length OR duration) near4 (one OR "1"))	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:13 PM
L1780	2491420	((bit OR value) near4 ($3aid OR "association id" OR "association identif$5") nearw (pad OR padding OR length OR duration) near4 (one OR "1"))	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:13 PM
L1781	2298	((bit OR value) near4 ($3aid OR "association id" OR "association identif$5") near4 (pad OR padding OR length OR duration) near4 (one OR "1"))	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:13 PM
L1782	158	((bit OR value) near4 ($3aid OR "association id" OR "association identif$5") near4 (pad OR padding OR length OR duration) near4 (one OR "1") WITH (frame OR packet))	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:13 PM
L1783	519	((bit OR value) near4 ($3aid OR "association id" OR "association identif$5") near4 (pad OR padding OR length OR duration) near4 (frame OR packet))	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:13 PM
L1784	5	(($3aid OR "association id" OR "association identif$5") WITH (pad OR padding OR length OR duration) WITH (frame OR packet) WITH (trigger) WITH (particular OR specific) WITH (bit OR value))	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:13 PM
L1785	40	(($3aid OR "association id" OR "association identif$5") WITH (pad OR padding OR length OR duration)	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:13 PM

		WITH (frame OR packet) WITH (trigger) WITH (particular OR specific OR "1" OR "one") WITH (bit OR value))					
L1786	19	(($3aid OR "association id" OR "association identif$5") WITH (pad OR padding OR length OR duration) WITH (frame OR packet) WITH (trigger) WITH ((particular OR specific OR "1" OR "one") near2 (bit OR value)))	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:13 PM
L1787	91	(($3aid OR "association id" OR "association identif$5") WITH (pad OR padding OR length OR duration) WITH (frame OR packet) WITH (trigger) WITH ((particular OR specific OR "1" OR "one") near2 (bit OR value)))	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO)	OR	ON	ON	2023/03/06 06:13 PM
L1788	53	((aid OR staid OR paid OR "association id" OR "association identif$5") WITH (pad OR padding OR length OR duration) WITH (frame OR packet) WITH (trigger) WITH ((particular OR specific OR "1" OR "one") near2 (bit OR value)))	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO)	OR	ON	ON	2023/03/06 06:13 PM
L1789	39	"201261639877"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO,	OR	ON	ON	2023/03/06 06:13 PM

			NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO)				
L1790	0	("201261639877").pn.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO)	OR	ON	ON	2023/03/06 06:13 PM
L1791	5	"14397618"	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO)	OR	ON	ON	2023/03/06 06:13 PM
L1792	1279	H04L1/1664.cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:19 PM
L1793	3839	H04L1/1607.cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:20 PM
L1794	2259	H04L1/16.cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:20 PM
L1795	285	H04L1/12.cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:20 PM
L1796	5216	H04L1/00.cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:20 PM
L1797	5	L444 AND L1792	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:23 PM
L1798	0	L444 AND L1793	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:23 PM
L1799	0	L444 AND L1794	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:23 PM
L1800	0	L444 AND L1795	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06 06:23 PM
L1801	0	L444 AND L1796	(US-PGPUB; USPAT)	OR	ON	ON	2023/03/06

							06:23 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N179	7	("trigger frame" or "trigger packet").clm. and (fcs or "frame check" or "check frame").clm. and (pad or padding).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N180	1397	H04W74/085.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N181	491	H04W74/0841.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N182	6469	H04W74/0833.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N183	2924	H04W74/08.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N184	2425	H04W74/00.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N185	2730	H04W72/1284.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N186	2244	H04W72/1278.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N187	4073	H04W72/12.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N188	2362	H04W72/1231.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N189	1483	H04W72/1226.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N190	1552	H04W72/121.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N191	1114	H04W72/1205.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N192	2959	H04W72/00.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N193	0	H04W7/0413.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N194	0	H04W7/0406.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N195	0	H04W1/1664.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N196	0	H04W1/1621.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N197	0	H04W1/1607.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N198	0	H04W1/16.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N199	0	H04W1/12.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27

							04:26 PM
N200	0	H04W1/00.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N201	4	N179 and N180	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N202	0	N179 and N181	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N203	0	N179 and N182	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N204	0	N179 and N183	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N205	0	N179 and N184	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N206	3	N179 and N185	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N207	0	N179 and N186	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N208	0	N179 and N187	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
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Doc Code: DIST.E.FILE **Document Description: Electronic Terminal Disclaimer - Filed**	PTO/SB/26 U.S. Patent and Trademark Office Department of Commerce

Electronic Petition Request	**TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT**
Application Number	17145670
Filing Date	11-Jan-2021
First Named Inventor	Woojin AHN
Attorney Docket Number	QUS-0003.01
Title of Invention	WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION

☒ Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action

☒ This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.

Owner	Percent Interest
WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC.	50 %
SK TELECOM CO., LTD.	50 %

The owner(s) with percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent number(s)

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as the term of said prior patent is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later:
- expires for failure to pay a maintenance fee;
- is held unenforceable;
- is found invalid by a court of competent jurisdiction;
- is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
- has all claims canceled by a reexamination certificate;
- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

◉ Terminal disclaimer fee under 37 CFR 1.20(d) is included with Electronic Terminal Disclaimer request.

○ I certify, in accordance with 37 CFR 1.4(d)(4), that the terminal disclaimer fee under 37 CFR 1.20(d) required for this terminal disclaimer has already been paid in the above-identified application.

Applicant claims the following fee status:

○ Small Entity

○ Micro Entity

◉ Regular Undiscounted

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:

◉ An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application

Registration Number 38694

○ A sole inventor

○ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application

○ A joint inventor; all of whom are signing this request

Signature	/David C. Oren/
Name	David C. Oren

*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

Electronic Patent Application Fee Transmittal

Application Number:	17145670
Filing Date:	11-Jan-2021
Title of Invention:	WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION
First Named Inventor/Applicant Name:	Woojin AHN
Filer:	Daniel Y.J. Kim/Kathy Humphries
Attorney Docket Number:	QUS-0003.01

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
STATUTORY OR TERMINAL DISCLAIMER	1814	1	170	170
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**170**

Doc Code: DISQ.E.FILE
Document Description: Electronic Terminal Disclaimer – Approved

Application No.: 17145670

Filing Date: 11-Jan-2021

Applicant/Patent under Reexamination: AHN et al.

Electronic Terminal Disclaimer filed on March 6, 2023

☒ APPROVED

This patent is subject to a terminal disclaimer

☐ DISAPPROVED

Approved/Disapproved by: Electronic Terminal Disclaimer automatically approved by EFS-Web

U.S. Patent and Trademark Office

Electronic Acknowledgement Receipt	
EFS ID:	47632344
Application Number:	17145670
International Application Number:	
Confirmation Number:	9828
Title of Invention:	WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION
First Named Inventor/Applicant Name:	Woojin AHN
Customer Number:	34610
Filer:	Daniel Y.J. Kim/Kathy Humphries
Filer Authorized By:	Daniel Y.J. Kim
Attorney Docket Number:	QUS-0003.01
Receipt Date:	06-MAR-2023
Filing Date:	11-JAN-2021
Time Stamp:	11:06:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$170
RAM confirmation Number	E202336B06568807
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Terminal Disclaimer-Filed (Electronic)	eTerminal-Disclaimer.pdf	43167 808dc21029d362ffd0e608581e2fb341f816166e	no	3
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	38028 2d5dd0bd931fb41d75c763bb07ae25240833b06d	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	81195		

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.

Docket No.: **QUS-0003.01** PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Confirmation No.: **9828**
Woojin AHN; Yongho KIM; Jinsam KWAK; and Juhyung SON	Group Art Unit: **2467**
Serial No.: **17/145,670**	Examiner: **Gautam Sharma**
Filed: **January 11, 2021**	Customer No.: **34610**

For: **WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION**

AMENDMENT

U.S. Patent and Trademark Office
Customer Window, Mail Stop Amendment
Randolph Building
401 Dulany Street
Alexandria, Virginia 22314

Sir:

In reply to the Office Action dated October 4, 2022, please amend the above-identified application as follows:

Amendments to the Claims are reflected in the listing of claims.

Remarks begin after the listing of the claims.

AMENDMENTS TO THE CLAIMS

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

Listing of Claims:

1-12. (Cancelled)

13. (Currently Amended) A wireless communication terminal, the terminal comprising:

a transceiver; and

a processor,

wherein the processor is configured to:

receive a frame for allocating resource for uplink (UL) multi-user (MU) transmission to one or more terminals,

wherein the frame includes an association identifier (AID) field and a frame check sequence (FCS) field,

wherein ~~a specific~~ the AID field is set to a value related to a first padding field, when the first padding field is included in the frame,

wherein the first padding field ~~for adjusting~~ is used to adjust a length of the frame ~~is included in the frame according to a value of the AID field~~, and

wherein the ~~specific~~ first padding field is related to a preparation of a response frame for the frame, and

transmit the response frame in response to the frame.

14. (Currently Amended) The wireless communication terminal of claim 13, wherein whether or not the ~~specific~~ first padding field is included in the frame ~~when the value of~~ is identified by the AID field ~~is set to a specific value~~.

15. (Currently Amended) The wireless communication terminal of claim 14, wherein the ~~specific value~~ first padding field consists of at least one bit, and wherein all of the at least one bit are set to '1'.

16. (Currently Amended) The wireless communication terminal of claim 13, wherein the ~~specific~~ first padding field is located before the FCS field in the frame.

17. (Currently Amended) The wireless communication terminal of claim 13, ~~wherein the AID field is used to identify whether the frame includes the specific field to which padding is applied~~ wherein the response frame includes a second padding field, when a specific condition is satisfied.

18. (Currently Amended) The wireless communication terminal of claim 13, wherein the ~~specific~~ first padding field is used to extend the length of the frame.

19. (Currently Amended) The wireless communication terminal of claim 13,

wherein a duration of the ~~specific~~ first padding field is set based on a time needed for one or more terminals to process the frame.

20. (Currently Amended) A wireless communication method of a wireless communication terminal, comprising:

receiving a frame for allocating resource for uplink (UL) multi-user (MU) transmission to one or more terminals,

wherein the frame includes an association identifier (AID) field and a frame check sequence (FCS) field,

wherein ~~a specific~~ the AID field is set to a value related to a first padding field, when the first padding field is included in the frame,

wherein first padding field ~~for adjusting~~ is used to adjust a length of the frame ~~is included in the frame according to a value of the AID field~~, and

wherein the ~~specific~~ first padding field is related to a preparation of a response frame for the frame; and

transmitting the response frame in response to the frame.

21. (Currently Amended) The wireless communication method of claim 20,

wherein whether or not the ~~specific~~ first padding field is included in the frame ~~when the value of~~ is identified by the AID field ~~is set to a specific value~~.

22. (Currently Amended) The wireless communication method of claim 21, wherein the ~~specific value~~ first padding field consists of at least one bit, and wherein all of the at least one bit are set to '1'.

23. (Currently Amended) The wireless communication method of claim 20, wherein the ~~specific~~ first padding field is located before the FCS field in the frame.

24. (Currently Amended) The wireless communication method of claim 20, wherein ~~the AID field is used to identify whether the frame includes the specific field to which padding is applied~~ the response frame includes a second padding field, when a specific condition is satisfied.

25. (Currently Amended) The wireless communication method of claim 20, wherein the ~~specific~~ first padding field is used to extend the length of the frame.

26. (Currently Amended) The wireless communication method of claim 20, wherein a duration of the ~~specific~~ first padding field is set based on a time needed for the one or more terminals to process the frame.

27. (New) The wireless communication terminal of claim 13,

wherein the second padding field is used to set a same lengths of the response frames when two or more terminals transmit response frames in response to the trigger frame.

28. (New) The wireless communication method of claim 20,

wherein the second padding field is used to set a same lengths of the response frames when two or more terminals transmit response frames in response to the trigger frame.

REMARKS

Claims 13-28 are pending in this application. By this Amendment, claims 13-26 are amended, and new claims 27-28 are added. Various amendments may be made for clarity, and may be unrelated to issues of patentability.

Applicant gratefully acknowledges the Office Action's indication that dependent claims 15 and 22 contain allowable subject matter. However, as will be discussed below, all claims are believed to be allowable.

The Office Action (on pages 2-6) rejects claims on the ground of nonstatutory double patenting over claim 1 of U.S. Patent No. 10,305,638 and/or over claims 1-3 of U.S. Patent No. 10,911,186.

Independent claim 13 recites the following:

> wherein the AID field is set to a value related to a first padding field, when the first padding field is included in the frame.
> wherein the first padding field is used to adjust a length of the frame

However, independent claim 1 of U.S. Patent No. 10,305,638 is limited in that the AID indicates insertion of predetermined padding, and claims 1-3 of U.S. Patent No. 10,911,186 is limited in that the padding field is included in the trigger frame when the AID is a specific value. More specifically, independent claim 1 of U.S. Patent No. 10,305,638 recites "wherein a predetermined association ID (AID) field information is inserted to the trigger frame to indicate the predetermined padding." Additionally, independent claim 1 of U.S. Patent No. 10,911,186 recites "wherein the AID field is used to identify whether the

trigger frame includes a padding field to which padding is applied, and wherein the trigger frame further includes the padding field when the AID field is set to a specific value."

Independent claim 1 of U.S. Patent No. 10,305,638 and claims 1-3 of U.S. Patent No. 10,911,186 do not disclose that "the first padding field is used to adjust a length of the frame." Therefore, claim 1 of U.S. Patent No. 10,305,638 and claims 1-3 of U.S. Patent No. 10,911,186 do not cover the same scope as recited independent claim 1 (of the present application) since there is a difference in the use of the padding field.

In view of the above, the nonstatutory double patenting rejections should be withdrawn.

The Office Action rejects claims 13, 16-20 and 23-26 under 35 U.S.C. §103 over U.S. Patent Publication 2016/0165574 to Chu et al. (hereafter Chu). The rejection is respectfully traversed with respect to the pending claims.

Independent claim 13 recites the following features (emphasis added):

> a transceiver; and
> a processor,
> wherein the processor is configured to:
> receive a frame for allocating resource for uplink (UL) multi-user (MU) transmission to one or more terminals,
> wherein the frame includes an association identifier (AID) field and a frame check sequence (FCS) field,
> wherein the AID field is set to a value related to a first padding field, when the first padding field is included in the frame,
> wherein the first padding field is used to adjust a length of the frame, and
> wherein the first padding field is related to a preparation of a response frame for the frame, and
> transmit the response frame in response to the frame.

The Office Action cites Chu. The Office Action states that the Frame body 510 (in FIG. 5B) including padding, the padding being before Frame Check Section 512. See Chu's FIG. 5 and paragraphs [091] and [0095] as follows:

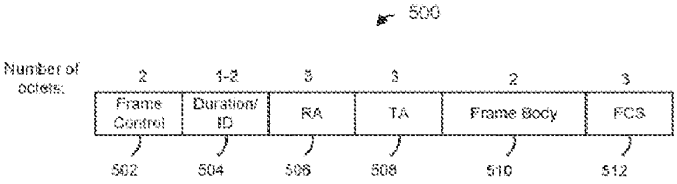


FIG. 5A

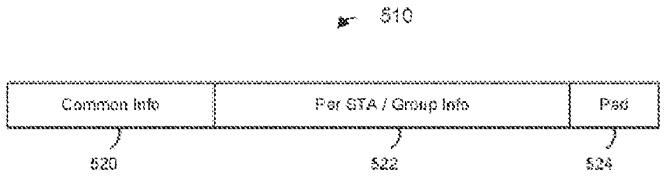


FIG. 5B

[0091] Time t2 at each client station 25 begins upon expiration of a predetermined time interval, such as for example a time interval corresponding to a short inter-frame space (SIFS), after completion of reception of the trigger frame 402 at the client station 25, in an embodiment. In another embodiment, a predetermined time period that is greater than SIFS is defined, and time t2 at each client station 25 begins upon expiration of a predetermined time interval corresponding to the predetermined time interval greater than SIFS. For example, a predetermined time period that is greater than SIFS and less than point coordination function (PCF) interframe space (PIFS) is defined. The greater predetermined time interval may provide sufficient time for the client stations 25 to decode the trigger frame 402 and to prepare for uplink transmission based on the uplink scheduling information provided by the trigger frame 402, in at least some embodiments. Additionally or alternatively, the trigger frame 402 includes one or more padding bits at the end of the trigger frame 402 to provide sufficient time for the client stations 25 to prepare for uplink transmission based on the uplink scheduling

> information provided by the trigger frame 402, in some embodiments. For example, a MAC header included in the trigger frame 402 indicates a length of a valid payload, wherein the one or more padding bits follow the valid payload, in an embodiment. Further, a signal field of a PHY preamble of the trigger frame 402 includes an indication of the entire length of the trigger frame 402, which includes the one or more padding bits at the end of the trigger frame 402, in an embodiment.
>
> [0095] The trigger frame 500 includes a plurality of fields, including a frame control field 502, a duration/ID field 504, a first address field (e.g., a receiver address (RA) field) 506, a second address field (e.g., a transmitter address (TA) field) 508, a frame body field 510 and a frame check field 512. In an embodiment, the duration/ID field 504 includes an indication of a duration until the end of the TXOP during which the trigger frame 500 is transmitted, in an embodiment. The first address field (RA field) 506 includes a broadcast MAC address to indicate that the trigger frame 500 is being broadcast to a plurality of client stations 25, in an embodiment. The second address field (TA field) 508 includes the address of the AP 14, in an embodiment. The frame body 510 includes subchannel allocation and indicates transition parameters to be used by respective client stations 25 for uplink transmission by the respective client stations 25. Referring to FIG. 5B, in an embodiment, the frame body 510 includes a common information field 520 and one or more per-STA information fields 522. The frame body 510 also includes padding bits 524, in some embodiments and scenarios. In an embodiment, padding bits 524 include one or more bits to ensure that the frame body 510 includes a number of bits that is an integer multiple of an octet. In another embodiment, padding bits 524 include one or more bits to provide sufficient time for a receiving device (e.g., a client station) to generate the uplink transmission being triggered by the trigger frame 500. In some embodiments and/or scenarios, the frame body 510 omits the padding bits 524.

Chu merely discloses that a padding field is included before the FCS 512 of the trigger frame 500. Chu does not disclose a method for AID to be set to a related value when the trigger frame includes a padding field. More specifically, Chu does not teach or suggest the AID field is set to a value related to a first padding field, when the first padding field is included in the frame, as recited in independent claim 13.

In Chu, padding bits 524 are inserted into the Frame Body field before the FCS field to secure the processing type regardless of the setting of the AID value when the padding field is inserted. Chu does not teach or suggest the AID field is set to a value related to a first padding field, when the first padding field is included in the frame, as recited in independent claim 13.

For at least these reasons, Chu does not teach or suggest all the features of independent claim 13. Independent claim 13 therefore defines patentable subject matter.

For at least similar reasons as set forth above, Chu does not teach or suggest at least the following features of independent claim 20 (emphasis added):

> wherein the AID field is set to a value related to a first padding field, when the first padding field is included in the frame,
> wherein first padding field is used to adjust a length of the frame, and
> wherein the first padding field is related to a preparation of a response frame for the frame

Accordingly, independent claim 20 defines patentable subject matter.

For at least the reasons set forth above, each of independent claims 13 and 20 defines patentable subject matter. Each of the dependent claims depends from one of the independent claims and therefore defines patentable subject matter at least for this reason. In addition, the dependent claims recite features that further and independently distinguish over the applied references.

CONCLUSION

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Favorable consideration and prompt allowance of claims 13-28 are earnestly solicited. If the Examiner believes that any additional changes would place the application in better condition for allowance, the Examiner is invited to contact the undersigned attorney, David C. Oren, at the telephone number listed below or contact via email at mail@ked-iplaw.com.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this, concurrent and future replies, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
KED & ASSOCIATES, LLP

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Electronic Acknowledgement Receipt

EFS ID:	47318008
Application Number:	17145670
International Application Number:	
Confirmation Number:	9828
Title of Invention:	WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION
First Named Inventor/Applicant Name:	Woojin AHN
Customer Number:	34610
Filer:	Daniel Y.J. Kim/Jaime Barker
Filer Authorized By:	Daniel Y.J. Kim
Attorney Docket Number:	QUS-0003.01
Receipt Date:	04-JAN-2023
Filing Date:	11-JAN-2021
Time Stamp:	17:20:20
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	Transmittal Letter	Transmittal.pdf	63670 90a5a324ab90087aca465d7492d557a8cd57e003	no	1

Warnings:

Information:					
2		Amendment.pdf	164908 f9a38f1ca2c7e63a65a396acaaecd0929af63d1d	yes	12
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Amendment/Request for Reconsideration-After Non-Final Rejection		1	1	
	Claims		2	6	
	Applicant Arguments/Remarks Made in an Amendment		7	12	
Warnings:					
Information:					
		Total Files Size (in bytes):	228578		

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.

Docket No.: **QUS-0003.01** PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of		Confirmation No.:	**9828**
Woojin AHN; Yongho KIM; Jinsam KWAK; and Juhyung SON		Group Art Unit:	**2467**
Serial No:	**17/145,670**	Examiner :	**Gautam Sharma**
Filed:	**January 11, 2021**	Customer No.:	**34610**

For: **WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION**

U.S. Patent and Trademark Office
Customer Window, **MAIL STOP AMENDMENT**
Randolph Building
401 Dulany Street
Alexandria, Virginia 22314

Dear Sir:

Transmitted herewith is an Amendment and/or Reply in the above identified application.
☒ No additional fee is required.
☐ Also attached:

The fee has been calculated as shown below:

	NO. OF CLAIMS	HIGHEST PREVIOUSLY PAID FOR	EXTRA CLAIMS	RATE	FEE
Total Claims	**16**	**20**	**0**	x $100.00 =	**$0.00**
Independent Claims	**2**	**3**	**0**	x $480.00 =	**$0.00**
		If multiple claims newly presented, add $860.00			**$0.00**
		Fee for extension of time			**$0.00**
		TOTAL FEE DUE			**$0.00**

☐ Please charge my Deposit Account No. 16-0607 in the amount of $_____. An additional copy of this transmittal sheet is submitted herewith.

☐ Please charge my Credit Card.

☒ The Commissioner is hereby authorized to charge payment of any fees associated with this communication or credit any overpayment, to Deposit Account No. 16-0607, including any filing fees under 37 C.F.R.§1.16 for presentation of extra claims and any patent application processing fees under 37 C.F.R. §1.17.

Respectfully submitted,
KED & ASSOCIATES, LLP

/David C. Oren/

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
17/145,670	01/11/2021	Woojin AHN	QUS-0003.01	9828

34610 7590 10/04/2022

KED & ASSOCIATES, LLP
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Reston, VA 20195

EXAMINER	
SHARMA, GAUTAM	

ART UNIT	PAPER NUMBER
2467	

NOTIFICATION DATE	DELIVERY MODE
10/04/2022	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):

ked-docket@ked-iplaw.com
keddocket@gmail.com
mydocket@icloud.com

Office Action Summary	**Application No.** 17/145,670	**Applicant(s)** AHN et al.	
	Examiner GAUTAM SHARMA	**Art Unit** 2467	**AIA (FITF) Status** Yes

-- 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 01/11/2020.

☐ 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) 13-26 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) 13-14,16-21 and 23-26 is/are rejected.

8) ☑ Claim(s) 15 and 22 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 01/11/2020 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, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

2. Claims 13-26 are pending.

Double Patenting

3. 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 conflicting claims 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); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

4. 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 nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research

agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(l)(1) - 706.02(l)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

5. The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) 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 www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

6. **Claims 13, 16, 20 and 23 are rejected** on the ground of nonstatutory double patenting as being unpatentable over claim 1 of U.S. Patent No. 10,305,638 as mapped below. Although the claims at issue are not identical, they are not patentably distinct from each other because they cover the same scope.

Instant Application	*Parent Patent 10,305,638*
13. (New) A wireless communication terminal, the terminal comprising: a transceiver; and a processor, wherein the processor is configured to: receive a frame for uplink (UL) multi-user (MU) transmission, wherein the frame includes	*1. A base wireless communication terminal, the terminal comprising: a transceiver; and a processor, wherein the processor is configured to: transmit, through the transceiver, a trigger frame triggering a multi-user uplink transmission*

an association identifier (AID) field and a frame check sequence (FCS) field, wherein a specific field for adjusting a length of the frame is included in the frame according to a value of the AID field, and wherein the specific field is related to a preparation of a response frame for the frame, transmit the response frame in response to the frame. *16. (New) The wireless communication terminal of claim 13, wherein the specific field is located before the FCS field in the frame.*	*of one or more terminals, and receive, through the transceiver, uplink packet(s) transmitted from one or more terminals in response to the trigger frame, wherein a predetermined padding is performed before a frame check sequence (FCS) field of the trigger frame, and wherein a predetermined association ID (AID) field information is inserted to the trigger frame to indicate the predetermined padding.*

7. **As to claims 20 and 23,** the claims are double patent rejected as applied to claims 13 and 16 respectively of the instant application by claim 1 above by parent patent no. 10,305,638.

8. **Claims 13, 14, 16, 19-21, 23 and 26 are rejected** on the ground of nonstatutory double patenting as being unpatentable over claims 1-3 of U.S. Patent No. 10,911,186 as mapped below. Although the claims at issue are not identical, they are not patentably distinct from each other because they cover the same scope.

Instant Application	*Parent Patent No. 10,911,186*
13. (New) A wireless communication terminal, the terminal comprising: a transceiver; and a	*1. A wireless communication terminal, the terminal comprising: a transceiver; and a*

processor, wherein the processor is configured to: receive a frame for uplink (UL) multi-user (MU) transmission, wherein the frame includes an association identifier (AID) field and a frame check sequence (FCS) field, wherein a specific field for adjusting a length of the frame is included in the frame according to a value of the AID field, and wherein the specific field is related to a preparation of a response frame for the frame, transmit the response frame in response to the frame. *14. (New) The wireless communication terminal of claim 13, wherein the specific field is included in the frame when the value of the AID field is set to a specific value.*	*processor, wherein the processor is configured to: receive, through the transceiver, a trigger frame indicating uplink transmission of one or more terminals, wherein the trigger frame includes an association identifier (AID) field, and perform, through the transceiver, an uplink transmission in response to the trigger frame, wherein the AID field is used to identify whether the trigger frame includes a padding field to which padding is applied, and wherein the trigger frame further includes the padding field when the AID field is set to a specific value.*
19. (New) The wireless communication terminal of claim 13, wherein a duration of the specific field is set based on a time needed for one or more terminals to process the frame.	*2. The wireless communication terminal of claim 1, wherein a duration of the padding field is set based on a time needed for the one or more terminals to process the trigger frame.*
16. (New) The wireless communication terminal of claim 13, wherein the specific field is located before the FCS field in the frame.	*3. The wireless communication terminal of claim 1, wherein the padding field is contained before a frame check sequence (FCS) field included in the trigger frame.*

9. **As to claims 20, 21, 26 and 23,** the claims are double patent rejected as applied to claims 13 14, 19 and 16 respectively above of the instant application by claims 1-3 parent patent No. 10,911,186.

Claim Rejections - 35 USC § 102

10. 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 –
> (a)(2) the claimed invention was described in a patent issued under section 151, or in an application for patent published or deemed published under section 122(b), in which the patent or application, as the case may be, names another inventor and was effectively filed before the effective filing date of the claimed invention.

11. **Claims 13, 16-20 and 23-26 are rejected** under 35 U.S.C. 102(a)(2) as being anticipate by Chu et al, application no. 2016/0165574, hereinafter known as Chu.

12. **As to claim 13,** Chu discloses *a wireless communication terminal, the terminal comprising: a transceiver; and a processor, wherein the processor* (Chu, Figure 1, [0067], Terminals (stations and AP's with plural parts including processors) *is configured to: receive a frame for uplink (UL) multi-user (MU) transmission, wherein the frame includes an association identifier (AID) field and a frame check sequence (FCS) field* (Chu, [0155], [0159], figure 23-28, plural Multiuser frames with AID field and FCS field), *wherein a specific field for adjusting a length of the frame is included in the frame according to a value of the AID field, and wherein the specific field is related to a preparation of a response frame for the frame* (Chu, figure 3A-9B; plural trigger frame disclosed; [0091] Trigger frame with padding, the padding allowing sufficient processing time for terminals before responding; Figure 5A and 5B, trigger frame with plural sections including duration/ID section that indicates the length of trigger frame that has bearing on padding required, that is analogous to AID; Frame body 510 further explained in figure

5B including padding, the padding being before Frame Check Section 512), *transmit the response frame in response to the frame* (Chu, fig.33 and 34, trigger frame and response frame to the trigger frame).

13. **As to claim 16,** Chu discloses *wherein the specific field is located before the FCS field in the frame* (Chu, figure 5A, Frame body 510 further explained in figure 5B including padding, the padding being before Frame Check Section 512).

14. **As to claim 17,** Chu discloses *wherein the AID field is used to identify whether the frame includes the specific field to which padding is applied* (Chu, 0091], Trigger frame with padding, the padding allowing sufficient processing time for terminals before responding; Figure 5A and 5B, trigger frame with plural sections including duration/ID section that indicates the length of trigger frame that has bearing on padding required, that is analogous to AID; Frame body 510 further explained in figure 5B including padding, the padding being before Frame Check Section 512).

15. **As to claim 18,** Chu discloses *wherein the specific field is used to extend the length of the frame* (Chu, [0091] Trigger frame with padding, the padding allowing sufficient processing time for terminals before responding, padding extending length of frame).

16. **As to claim 19,** Chu discloses *wherein a duration of the specific field is set based on a time needed for one or more terminals to process the frame* (Chu, [0091] Trigger frame with padding, the padding allowing sufficient processing time for terminals before responding).

17. **Claims 20 and 23-26,** the claims are rejected as applied to claims 13 and 16-19 respectively above by Chu.

Allowable Subject Matter

18. **Claims 15 and 22 are objected to** as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GAUTAM SHARMA whose telephone number is (571)270-7182. The examiner can normally be reached on 11am-8pm.

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

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

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available

through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/GAUTAM SHARMA/
Examiner, Art Unit 2467

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

Notice of References Cited	Application/Control No. 17/145,670	Applicant(s)/Patent Under Reexamination AHN et al.	
	Examiner GAUTAM SHARMA	Art Unit 2467	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20180131471-A1	05-2018	AHN; Woojin	H04L1/1671	1/1
*	B	US-20120314697-A1	12-2012	Noh; Yu Jin	H04L1/1628	370/338
*	C	US-20170250784-A1	08-2017	SAKAI; Eisuke	H04L1/08	1/1
*	D	US-20170373813-A1	12-2017	Asterjadhi; Alfred	H04L69/324	1/1
*	E	US-20060034317-A1	02-2006	Hong; Jin-woo	H04L1/1614	370/445
*	F	US-20160227437-A1	08-2016	Blanksby; Andrew	H04L1/00	1/1
*	G	US-20150003367-A1	01-2015	Seok; Yongho	H04W74/002	370/329
*	H	US-20160294515-A1	10-2016	Wentink; Maarten Menzo	H04L5/005	1/1
*	I	US-20200112991-A1	04-2020	Fujimori; Yuki	H04W74/006	1/1
*	J	US-20200107318-A1	04-2020	CHU; Liwen	H04L5/0007	1/1
*	K	US-20170302422-A1	10-2017	CHU; Liwen	H04W72/085	1/1
*	L	US-20160165574-A1	06-2016	CHU; Liwen	H04W72/0413	370/312
	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.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/145,670	AHN et al.
	Examiner	**Art Unit**
	GAUTAM SHARMA	2467

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

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	09/27/2019								
	1	-								
	2	-								
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	4	-								
	5	-								
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	10	-								
	11	-								
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	19	✓								
	20	✓								
	21	✓								
	22	O								
	23	✓								
	24	✓								
	25	✓								
	26	✓								

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/145,670	AHN et al.
	Examiner	Art Unit
	GAUTAM SHARMA	2467

CPC - Searched*		
Symbol	Date	Examiner

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

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

Search Notes		
Search Notes	Date	Examiner
East Search	09/25/2022	Gautam Sharma
Inventor Search	09/25/2022	Gautam Sharma
Classification Search (H04W: 74/085, 74/0841, 74/0833, 74/08, 74/00, 72/1284, 72/1278, 72/12, 72/1231, 72/1226, 72/121, 72/1205, 72/00, 72/ 0413, 72/0406, 72/04, 72/00, 1/1664, 1/1621, 1/16, 1/12, 1/00)	09/25/2022	Gautam Sharma

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

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	17/145,670	AHN et al.
	Examiner	Art Unit
	GAUTAM SHARMA	2467

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
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L51	5	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
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L53	1519	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
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L55	154	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
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L61	15	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L62	48	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L63	33	L62 not L61	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L64	5	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2019/09/27 04:25 PM

			JPO)				
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L66	27	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
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L74	3	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
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L114	833	noh.in. and seok.in. and	(US-PGPUB; USPAT;	OR	OFF	OFF	2019/09/27

		lg.as.	USOCR; FPRS; EPO; JPO)				04:25 PM
L115	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L116	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L117	12	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L118	362	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L119	6	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L120	67	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L121	74	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L122	5	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L123	17490	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L124	1519	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L125	673	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L126	154	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L127	13	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L128	19	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM

		)					
L129	527	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L130	222	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:25 PM
L131	118	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L132	15	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L133	48	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L134	33	L133 not L132	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L135	5	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L136	4163	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L137	27	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L138	192	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L139	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L140	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L141	4	(("trigger frame" or "trigger packet") with (pad or padding)) and ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L142	4	L71 and L86	(US-PGPUB; USPAT;	OR	OFF	OFF	2019/09/27

			USOCR; FPRS; EPO; JPO)				04:26 PM
L143	0	L71 and L87	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L144	0	L71 and L88	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L145	0	L71 and L89	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L146	0	L71 and L90	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L147	3	L71 and L91	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L148	0	L71 and L92	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L149	0	L71 and L93	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L150	3	L71 and L94	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L151	0	L71 and L95	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L152	5	L71 and L96	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L153	0	L71 and L97	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L154	0	L71 and L98	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L155	6	L71 and L99	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L156	0	L71 and L100	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L157	0	L71 and L101	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L158	0	L71 and L102	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L159	0	L71 and L103	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2019/09/27 04:26 PM

			JPO)				
L160	0	L71 and L104	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L161	0	L71 and L105	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L162	0	L71 and L106	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L163	0	L71 and L107	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L164	0	L71 and L108	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L165	3	L71 and L109	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L166	3	L71 and L110	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L167	0	L71 and L111	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L168	3	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L169	352	("predetermined assocaition id" or "aid") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:26 PM
L170	2	("predetermined assocaition id" or "aid") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 04:59 PM
L171	2	("predetermined assocaition id" or"association identifier" or "predetermined assocaition identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 05:13 PM
L172	2	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 05:26 PM

L173	359	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 05:27 PM
L174	359	("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 05:27 PM
L175	237	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and (pad or padding or add or adding or exten or extending or encapsulat$6)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 05:28 PM
L176	132	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and ((pad or padding or add or adding or exten or extending or encapsulat$6) with (packet or frame or message))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 05:29 PM
L177	14	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) same((pad or padding or add or adding or exten or extending or encapsulat$6) with (packet or frame or message))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 05:29 PM
L178	3	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2019/09/27 06:33 PM
L222	1	"16377829"	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2020/04/09 05:49 PM

			JPO)				
L223	26	("block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 05:51 PM
L224	6	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:05 PM
L225	300	("trigger frame") with ("bar" or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:06 PM
L226	211	("trigger frame") with ("block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:07 PM
L227	0	("trigger frame") with ("bar" or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:07 PM
L228	43	(("trigger frame") with ("bar")) and (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:07 PM
L229	168	("trigger frame") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:09 PM
L230	3	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:22 PM
L231	40960	("block ack" or BA or "bar") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:25 PM
L232	115	("block ack") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:25 PM
L233	3	("block ack") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:28 PM
L234	285	("block ack" or BA or "bar") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/09 06:29 PM
L235	1	"16320158"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/10 12:43 PM
L236	121	"trigger frame" with "aid" with (ulink or "ul")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/17 05:46 PM
L237	150	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/17 05:46 PM
L238	0	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/17 05:46 PM

L239	47	"aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/17 05:47 PM
L240	4	"partial aid" with (frame or packet) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/17 06:20 PM
L241	248	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/17 06:20 PM
L242	503	(frame or packet) with (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/17 06:52 PM
L243	70	(frame or packet) near5 (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/04/17 06:54 PM
L244	4	sharma-gautam.xa. and ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L245	3	sharma-gautam.xa. and ("legacy preamble")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L246	4	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L247	52	sharma-gautam.xa. and ("20 mhz")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L248	4	sharma-gautam.xa. and (("20 mhz") with (legacy))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L249	3	sharma-gautam.xa. and (("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L250	464	(("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L251	205	(("20 mhz") with ("he-sig-a") with legacy)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L252	63	("same time") with ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L253	2	("20130286959"|"20130301569").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/09/02 07:00 PM

L254	195	ahn-woojin.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L255	284	kim-yongho.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L256	884	kwak-jinsam.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L257	524	son-juhyung.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L258	4786	H04W74/085.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L259	1835	H04W74/0841.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L260	27437	H04W74/0833.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L261	13954	H04W74/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L262	9278	H04W74/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L263	12143	H04W72/1284.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L264	9159	H04W72/1278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L265	19898	H04W72/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L266	8392	H04W72/1231.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L267	5413	H04W72/1226.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L268	5669	H04W72/121.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L269	4791	H04W72/1205.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L270	11062	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L271	42071	H04W72/0413.cpc.	(US-PGPUB; USPAT;	OR	OFF	OFF	2020/09/02

			USOCR; FPRS; EPO; JPO)				07:00 PM
L272	32171	H04W72/0406.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L273	47760	H04W72/04.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L274	11062	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L275	0	H04W1/1664.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L276	0	H04W1/1621.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L277	0	H04W1/1607.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L278	0	H04W1/16.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L279	0	H04W1/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L280	0	H04W1/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L281	3	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L282	6	"predetermined association ID"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L283	0	wo2011102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L284	27	"2011102575"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L285	1	2011-102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L286	852	noh.in. and seok.in. and lg.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L287	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L288	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2020/09/02 07:00 PM

			JPO)				
L289	15	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L290	395	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L291	6	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L292	79	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L293	87	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L294	6	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L295	18728	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L296	1666	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L297	782	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L298	199	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L299	14	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L300	21	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L301	572	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L302	233	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM

L303	126	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L304	20	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L305	55	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L306	35	L305 not L304	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L307	6	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L308	5118	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L309	56	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L310	293	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L311	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L312	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L313	5	(("trigger frame" or "trigger packet") with (pad or padding)) and ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L314	9	("trigger frame" or "trigger packet").clm. and (fcs or "frame check" or "check frame").clm. and (pad or padding).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L315	4	sharma-gautam.xa. and ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM

L316	3	sharma-gautam.xa. and ("legacy preamble")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L317	4	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L318	52	sharma-gautam.xa. and ("20 mhz")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L319	4	sharma-gautam.xa. and (("20 mhz") with (legacy))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L320	3	sharma-gautam.xa. and (("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L321	464	(("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L322	205	(("20 mhz") with ("he-sig-a") with legacy)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L323	63	("same time") with ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L324	2	("20130286959"|"20130301569").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2020/09/02 07:00 PM
L325	195	ahn-woojin.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L326	284	kim-yongho.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L327	884	kwak-jinsam.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L328	524	son-juhyung.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L329	4786	H04W74/085.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L330	1835	H04W74/0841.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L331	27437	H04W74/0833.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L332	13954	H04W74/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L333	9278	H04W74/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2020/09/02 07:00 PM

			JPO)				
L334	12143	H04W72/1284.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L335	9159	H04W72/1278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L336	19898	H04W72/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L337	8392	H04W72/1231.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L338	5413	H04W72/1226.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L339	5669	H04W72/121.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L340	4791	H04W72/1205.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L341	11062	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L342	42071	H04W72/0413.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L343	32171	H04W72/0406.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L344	47760	H04W72/04.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L345	11062	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L346	0	H04W1/1664.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L347	0	H04W1/1621.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L348	0	H04W1/1607.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L349	0	H04W1/16.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L350	0	H04W1/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM

L351	0	H04W1/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L352	3	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L353	6	"predetermined association ID"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L354	0	wo2011102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L355	27	"2011102575"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L356	1	2011-102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L357	852	noh.in. and seok.in. and lg.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L358	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L359	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L360	15	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L361	395	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L362	6	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L363	79	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L364	87	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L365	6	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L366	18728	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM

L367	1666	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L368	782	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L369	199	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L370	14	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L371	21	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L372	572	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L373	233	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L374	126	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L375	20	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L376	55	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L377	35	L376 not L375	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L378	6	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L379	5118	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L380	56	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM

L381	293	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L382	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L383	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L384	5	(("trigger frame" or "trigger packet") with (pad or padding)) and ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L385	5	L314 and L329	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L386	0	L314 and L330	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L387	0	L314 and L331	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L388	0	L314 and L332	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L389	0	L314 and L333	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L390	3	L314 and L334	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L391	0	L314 and L335	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L392	0	L314 and L336	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L393	3	L314 and L337	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L394	0	L314 and L338	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L395	5	L314 and L339	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L396	0	L314 and L340	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2020/09/02 07:00 PM

			JPO)				
L397	0	L314 and L341	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L398	7	L314 and L342	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L399	0	L314 and L343	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L400	0	L314 and L344	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L401	0	L314 and L345	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L402	0	L314 and L346	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L403	0	L314 and L347	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L404	0	L314 and L348	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L405	0	L314 and L349	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L406	0	L314 and L350	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L407	0	L314 and L351	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L408	3	L314 and L352	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L409	3	L314 and L353	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L410	0	L314 and L354	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L411	3	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L412	514	("predetermined assocaition id" or "aid") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L413	5	("predetermined assocaition id" or "aid") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM

		with (pad or padding or add or adding)					
L414	5	("predetermined assocaition id" or"association identifier" or "predetermined assocaition identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L415	5	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L416	525	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L417	525	("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L418	358	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and (pad or padding or add or adding or exten or extending or encapsulat$6)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L419	207	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and ((pad or padding or add or adding or exten or extending or encapsulat$6) with (	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM

		packet or frame or message))					
L420	19	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) same((pad or padding or add or adding or exten or extending or encapsulat$6) with (packet or frame or message))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L421	3	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L422	1	"16377829"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L423	27	("block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L424	6	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L425	337	("trigger frame") with ("bar" or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L426	236	("trigger frame") with ("block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L427	1	("trigger frame") with ("bar" or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L428	53	(("trigger frame") with ("bar")) and (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L429	200	("trigger frame") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L430	3	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L431	41260	("block ack" or BA or "bar") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L432	128	("block ack") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L433	3	("block ack") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2020/09/02 07:00 PM

			JPO)				
L434	288	("block ack" or BA or "bar") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L435	1	"16320158"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L436	142	"trigger frame" with "aid" with (ulink or "ul")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L437	177	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L438	0	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L439	51	"aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L440	4	"partial aid" with (frame or packet) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L441	293	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L442	519	(frame or packet) with (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L443	71	(frame or packet) near5 (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:00 PM
L444	15	(frame or packet).clm. and (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id").clm. and (pad or padding).clm. and (trigger).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:08 PM
L445	4	L444 and L258	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM

L446	0	L444 and L259	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L447	0	L444 and L260	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L448	0	L444 and L261	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L449	0	L444 and L262	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L450	3	L444 and L263	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L451	0	L444 and L264	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L452	1	L444 and L265	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L453	3	L444 and L266	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L454	0	L444 and L267	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L455	3	L444 and L268	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L456	0	L444 and L269	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L457	0	L444 and L270	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:11 PM
L458	3	L444 and L271	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:12 PM
L459	0	L444 and L272	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:12 PM
L460	2	L444 and L273	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:12 PM
L461	0	L444 and L274	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:12 PM
L462	0	L444 and L275	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:12 PM
L463	0	L444 and L276	(US-PGPUB; USPAT;	OR	OFF	OFF	2020/09/02

			USOCR; FPRS; EPO; JPO)				07:12 PM
L464	0	L444 and L277	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:12 PM
L465	0	L444 and L278	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:12 PM
L466	0	L444 and L279	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:12 PM
L467	0	L444 and L280	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:12 PM
L468	3	L444 and L281	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2020/09/02 07:12 PM
L469	4	sharma-gautam.xa. and ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L470	3	sharma-gautam.xa. and ("legacy preamble")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L471	4	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L472	63	sharma-gautam.xa. and ("20 mhz")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L473	4	sharma-gautam.xa. and (("20 mhz") with (legacy))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L474	3	sharma-gautam.xa. and (("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L475	707	(("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L476	254	(("20 mhz") with ("he-sig-a") with legacy)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L477	76	("same time") with ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L478	2	("20130286959"|"20130301569").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2022/09/26 02:49 PM
L479	367	ahn-woojin.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L480	376	kim-yongho.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L481	1370	kwak-jinsam.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L482	915	son-juhyung.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L483	6610	H04W74/085.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L484	3905	H04W74/0841.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L485	45025	H04W74/0833.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L486	17923	H04W74/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L487	10280	H04W74/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L488	18172	H04W72/1284.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L489	13257	H04W72/1278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L490	26527	H04W72/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L491	10638	H04W72/1231.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L492	7062	H04W72/1226.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L493	7816	H04W72/121.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L494	6467	H04W72/1205.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L495	12401	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L496	56480	H04W72/0413.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L497	42441	H04W72/0406.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L498	62073	H04W72/04.cpc.	(US-PGPUB; USPAT;	OR	OFF	OFF	2022/09/26

			USOCR; FPRS; EPO; JPO)				02:49 PM
L499	12401	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L500	0	H04W1/1664.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L501	0	H04W1/1621.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L502	0	H04W1/1607.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L503	0	H04W1/16.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L504	0	H04W1/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L505	0	H04W1/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L506	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L507	9	"predetermined association ID"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L508	0	wo2011102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L509	31	"2011102575"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L510	1	2011-102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L511	867	noh.in. and seok.in. and lg.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L512	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L513	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L514	19	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L515	504	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2022/09/26 02:49 PM

			JPO)				
L516	11	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L517	105	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L518	135	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L519	8	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L520	22866	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L521	1270	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L522	838	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L523	289	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L524	17	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L525	27	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L526	661	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L527	258	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L528	126	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L529	19	(("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

		) with (frame or packet or datagram or pdu or ppdu)					
L530	76	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L531	57	L62 not L61	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L532	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L533	7520	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L534	149	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L535	582	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L536	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L537	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L538	8	(("trigger frame" or "trigger packet") with (pad or padding)) and ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L539	10	("trigger frame" or "trigger packet").clm. and (fcs or "frame check" or "check frame").clm. and (pad or padding).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L540	4	sharma-gautam.xa. and ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L541	3	sharma-gautam.xa. and ("legacy preamble")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L542	4	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L543	63	sharma-gautam.xa. and ("20 mhz")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L544	4	sharma-gautam.xa. and (("20 mhz") with (legacy))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L545	3	sharma-gautam.xa. and (("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L546	707	(("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L547	254	(("20 mhz") with ("he-sig-a") with legacy)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L548	76	("same time") with ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L549	2	("20130286959"|"20130301569").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2022/09/26 02:49 PM
L550	367	ahn-woojin.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L551	376	kim-yongho.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L552	1370	kwak-jinsam.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L553	915	son-juhyung.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L554	6610	H04W74/085.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L555	3905	H04W74/0841.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L556	45025	H04W74/0833.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L557	17923	H04W74/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L558	10280	H04W74/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L559	18172	H04W72/1284.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L560	13257	H04W72/1278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2022/09/26 02:49 PM

			JPO)				
L561	26527	H04W72/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L562	10638	H04W72/1231.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L563	7062	H04W72/1226.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L564	7816	H04W72/121.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L565	6467	H04W72/1205.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L566	12401	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L567	56480	H04W72/0413.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L568	42441	H04W72/0406.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L569	62073	H04W72/04.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L570	12401	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L571	0	H04W1/1664.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L572	0	H04W1/1621.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L573	0	H04W1/1607.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L574	0	H04W1/16.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L575	0	H04W1/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L576	0	H04W1/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L577	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L578	9	"predetermined association ID"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L579	0	wo2011102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L580	31	"2011102575"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L581	1	2011-102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L582	867	noh.in. and seok.in. and lg.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L583	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L584	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L585	19	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L586	504	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L587	11	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L588	105	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L589	135	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L590	8	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L591	22866	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L592	1270	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L593	838	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L594	289	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L595	17	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L596	27	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L597	661	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L598	258	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L599	126	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L600	19	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L601	76	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L602	57	L133 not L132	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L603	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L604	7520	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L605	149	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L606	582	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L607	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

		association")					
L608	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L609	8	(("trigger frame" or "trigger packet") with (pad or padding)) and ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L610	6	L71 and L86	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L611	0	L71 and L87	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L612	0	L71 and L88	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L613	0	L71 and L89	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L614	0	L71 and L90	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L615	4	L71 and L91	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L616	0	L71 and L92	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L617	0	L71 and L93	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L618	4	L71 and L94	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L619	0	L71 and L95	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L620	6	L71 and L96	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L621	0	L71 and L97	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L622	0	L71 and L98	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L623	8	L71 and L99	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L624	0	L71 and L100	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L625	0	L71 and L101	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L626	0	L71 and L102	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L627	0	L71 and L103	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L628	0	L71 and L104	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L629	0	L71 and L105	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L630	0	L71 and L106	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L631	0	L71 and L107	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L632	0	L71 and L108	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L633	4	L71 and L109	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L634	3	L71 and L110	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L635	0	L71 and L111	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L636	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L637	898	("predetermined assocaition id" or "aid") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L638	20	("predetermined assocaition id" or "aid") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L639	20	("predetermined assocaition id" or"association identifier" or "predetermined assocaition identifier" or "aid" or "association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

		) with ("trigger frame") with (pad or padding or add or adding)					
L640	20	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L641	919	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L642	919	("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L643	672	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and (pad or padding or add or adding or exten or extending or encapsulat$6)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L644	431	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and ((pad or padding or add or adding or exten or extending or encapsulat$6) with (packet or frame or message))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L645	34	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

		) with ("trigger frame")) same((pad or padding or add or adding or exten or extending or encapsulat$6) with (packet or frame or message))					
L646	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L647	3	"16377829"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L648	37	("block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L649	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L650	606	("trigger frame") with ("bar" or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L651	412	("trigger frame") with ("block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L652	2	("trigger frame") with ("bar" or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L653	132	(("trigger frame") with ("bar")) and (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L654	400	("trigger frame") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L655	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L656	27395	("block ack" or BA or "bar") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L657	186	("block ack") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L658	4	("block ack") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L659	185	("block ack" or BA or "bar") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L660	2	"16320158"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L661	257	"trigger frame" with "aid"	(US-PGPUB; USPAT;	OR	OFF	OFF	2022/09/26

		with (ulink or "ul")	USOCR; FPRS; EPO; JPO)				02:49 PM
L662	301	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L663	2	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L664	34	"aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L665	4	"partial aid" with (frame or packet) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L666	582	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L667	479	(frame or packet) with (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L668	69	(frame or packet) near5 (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L669	4	sharma-gautam.xa. and ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L670	3	sharma-gautam.xa. and ("legacy preamble")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L671	4	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L672	63	sharma-gautam.xa. and ("20 mhz")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L673	4	sharma-gautam.xa. and (("20 mhz") with (legacy))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L674	3	sharma-gautam.xa. and (("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L675	707	(("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L676	254	(("20 mhz") with ("he-sig-a") with legacy)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L677	76	("same time") with ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L678	2	("20130286959"|"20130301569").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2022/09/26 02:49 PM
L679	367	ahn-woojin.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L680	376	kim-yongho.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L681	1370	kwak-jinsam.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L682	915	son-juhyung.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L683	6610	H04W74/085.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L684	3905	H04W74/0841.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L685	45025	H04W74/0833.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L686	17923	H04W74/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L687	10280	H04W74/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L688	18172	H04W72/1284.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L689	13257	H04W72/1278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L690	26527	H04W72/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L691	10638	H04W72/1231.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L692	7062	H04W72/1226.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	OFF	OFF	2022/09/26 02:49 PM

			JPO)				
L693	7816	H04W72/121.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L694	6467	H04W72/1205.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L695	12401	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L696	56480	H04W72/0413.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L697	42441	H04W72/0406.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L698	62073	H04W72/04.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L699	12401	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L700	0	H04W1/1664.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L701	0	H04W1/1621.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L702	0	H04W1/1607.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L703	0	H04W1/16.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L704	0	H04W1/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L705	0	H04W1/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L706	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L707	9	"predetermined association ID"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L708	0	wo2011102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L709	31	"2011102575"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L710	1	2011-102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L711	867	noh.in. and seok.in. and lg.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L712	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L713	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L714	19	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L715	504	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L716	11	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L717	105	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L718	135	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L719	8	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L720	22866	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L721	1270	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L722	838	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L723	289	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L724	17	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L725	27	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L726	661	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L727	258	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L728	126	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L729	19	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L730	76	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L731	57	L305 not L304	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L732	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L733	7520	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L734	149	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L735	582	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L736	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L737	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L738	8	(("trigger frame" or "trigger packet") with (pad or padding)) and	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

		("predetermined association")					
L739	10	("trigger frame" or "trigger packet").clm. and (fcs or "frame check" or "check frame").clm. and (pad or padding).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L740	4	sharma-gautam.xa. and ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L741	3	sharma-gautam.xa. and ("legacy preamble")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L742	4	sharma-gautam.xa. and (legacy with preamble)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L743	63	sharma-gautam.xa. and ("20 mhz")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L744	4	sharma-gautam.xa. and (("20 mhz") with (legacy))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L745	3	sharma-gautam.xa. and (("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L746	707	(("20 mhz") with ("he-sig-a"))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L747	254	(("20 mhz") with ("he-sig-a") with legacy)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L748	76	("same time") with ("block ack" or "block acknowledge$5")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L749	2	("20130286959"|"20130301569").PN.	(US-PGPUB; USPAT)	OR	OFF	OFF	2022/09/26 02:49 PM
L750	367	ahn-woojin.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L751	376	kim-yongho.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L752	1370	kwak-jinsam.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L753	915	son-juhyung.in.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L754	6610	H04W74/085.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L755	3905	H04W74/0841.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L756	45025	H04W74/0833.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L757	17923	H04W74/08.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L758	10280	H04W74/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L759	18172	H04W72/1284.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L760	13257	H04W72/1278.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L761	26527	H04W72/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L762	10638	H04W72/1231.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L763	7062	H04W72/1226.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L764	7816	H04W72/121.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L765	6467	H04W72/1205.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L766	12401	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L767	56480	H04W72/0413.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L768	42441	H04W72/0406.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L769	62073	H04W72/04.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L770	12401	H04W72/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L771	0	H04W1/1664.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L772	0	H04W1/1621.cpc.	(US-PGPUB; USPAT;	OR	OFF	OFF	2022/09/26

			USOCR; FPRS; EPO; JPO)				02:49 PM
L773	0	H04W1/1607.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L774	0	H04W1/16.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L775	0	H04W1/12.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L776	0	H04W1/00.cpc.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L777	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L778	9	"predetermined association ID"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L779	0	wo2011102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L780	31	"2011102575"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L781	1	2011-102575	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L782	867	noh.in. and seok.in. and lg.as.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L783	1	"20130314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L784	1	"20120314697".pn.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L785	19	"ba bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L786	504	"bitmap" with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L787	11	"bitmap" with (pad or padding) with (duplicat$5 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L788	105	("bitmap" with (pad or padding)) and (multiuser or mimo or "mu mimo")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L789	135	("bitmap" with (pad or	(US-PGPUB; USPAT;	OR	OFF	OFF	2022/09/26

		padding)) and (multiuser or mimo or "mu mimo" or "multi-user")	USOCR; FPRS; EPO; JPO)				02:49 PM
L790	8	(pad or padding) with (multiuser or mimo or "mu mimo" or "multi-user") with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L791	22866	(pad or padding) with (duplicat$4 or repeat$5)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L792	1270	(ba or "block ack" or "block acknowledge") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L793	838	(ba or "block ack" or "block acknowledge") near7 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L794	289	((ba or "block ack" or "block acknowledge") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L795	17	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding)) and ("same time")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L796	27	(("block ack" or "block acknowledge" or "block acknowledgment") near7 (pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L797	661	("time to process" or "processing time") with ((pad or padding))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L798	258	("time to process" or "processing time") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L799	126	("time to process" or "processing time") near3 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L800	19	(("time to process" or "processing time") near3 (pad or padding)) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L801	76	("time to process" or "processing time") with (pad or padding) with (frame or packet or datagram or pdu or ppdu)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L802	57	L376 not L375	(US-PGPUB; USPAT;	OR	OFF	OFF	2022/09/26

			USOCR; FPRS; EPO; JPO)				02:49 PM
L803	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L804	7520	("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L805	149	("trigger frame") with (fcs) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L806	582	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L807	2	("trigger frame" or "trigger packet") with (pad or padding) with ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L808	2	(("trigger frame" or "trigger packet") with (pad or padding)) same ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L809	8	(("trigger frame" or "trigger packet") with (pad or padding)) and ("predetermined association")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L810	6	L314 and L329	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L811	0	L314 and L330	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L812	0	L314 and L331	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L813	0	L314 and L332	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L814	0	L314 and L333	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L815	4	L314 and L334	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L816	0	L314 and L335	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L817	0	L314 and L336	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L818	4	L314 and L337	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L819	0	L314 and L338	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L820	6	L314 and L339	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L821	0	L314 and L340	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L822	0	L314 and L341	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L823	8	L314 and L342	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L824	0	L314 and L343	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L825	0	L314 and L344	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L826	0	L314 and L345	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L827	0	L314 and L346	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L828	0	L314 and L347	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L829	0	L314 and L348	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L830	0	L314 and L349	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L831	0	L314 and L350	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L832	0	L314 and L351	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L833	4	L314 and L352	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L834	3	L314 and L353	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L835	0	L314 and L354	(US-PGPUB; USPAT;	OR	OFF	OFF	2022/09/26

			USOCR; FPRS; EPO; JPO)				02:49 PM
L836	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L837	898	("predetermined assocaition id" or "aid") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L838	20	("predetermined assocaition id" or "aid") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L839	20	("predetermined assocaition id" or"association identifier" or "predetermined assocaition identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L840	20	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame") with (pad or padding or add or adding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L841	919	("predetermined assocaition id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L842	919	("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L843	672	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and (pad or padding or add or adding or exten or extending or	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

		encapsulat$6)					
L844	431	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) and ((pad or padding or add or adding or exten or extending or encapsulat$6) with (packet or frame or message))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L845	34	(("predetermined association id" or "association identifier" or "predetermined association identifier" or "aid" or "association id") with ("trigger frame")) same((pad or padding or add or adding or exten or extending or encapsulat$6) with (packet or frame or message))	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L846	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L847	3	"16377829"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L848	37	("block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L849	9	"predetermined association id"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L850	606	("trigger frame") with ("bar" or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L851	412	("trigger frame") with ("block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L852	2	("trigger frame") with ("bar" or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L853	132	(("trigger frame") with ("bar")) and (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L854	400	("trigger frame") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L855	5	"15555075"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L856	27395	("block ack" or BA or "bar") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L857	186	("block ack") with (aid)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L858	4	("block ack") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L859	185	("block ack" or BA or "bar") with (aid) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L860	2	"16320158"	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L861	257	"trigger frame" with "aid" with (ulink or "ul")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L862	301	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack")	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L863	2	"trigger frame" with "aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L864	34	"aid" with (ulink or "ul" or ack or multiuser or "block ack") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L865	4	"partial aid" with (frame or packet) with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L866	582	("trigger frame") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L867	479	(frame or packet) with (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") with (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L868	69	(frame or packet) near5 (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id") near5 (pad or padding)	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L869	22	(frame or packet).clm. and (staid or "sta-id" or aid or "partial aid" or "predetermined association Id" or "sta id").clm. and (pad or padding).clm. and (trigger).clm.	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L870	5	L444 and L258	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L871	0	L444 and L259	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L872	0	L444 and L260	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L873	0	L444 and L261	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L874	0	L444 and L262	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L875	4	L444 and L263	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L876	0	L444 and L264	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L877	1	L444 and L265	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L878	4	L444 and L266	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L879	0	L444 and L267	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L880	4	L444 and L268	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L881	0	L444 and L269	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L882	0	L444 and L270	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L883	4	L444 and L271	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L884	0	L444 and L272	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

L885	2	L444 and L273	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L886	0	L444 and L274	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L887	0	L444 and L275	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L888	0	L444 and L276	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L889	0	L444 and L277	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L890	0	L444 and L278	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L891	0	L444 and L279	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L892	0	L444 and L280	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM
L893	4	L444 and L281	(US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO)	OR	OFF	OFF	2022/09/26 02:49 PM

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N179	7	("trigger frame" or "trigger packet").clm. and (fcs or "frame check" or "check frame").clm. and (pad or padding).clm.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N180	1397	H04W74/085.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N181	491	H04W74/0841.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N182	6469	H04W74/0833.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N183	2924	H04W74/08.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N184	2425	H04W74/00.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N185	2730	H04W72/1284.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N186	2244	H04W72/1278.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM

N187	4073	H04W72/12.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N188	2362	H04W72/1231.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N189	1483	H04W72/1226.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N190	1552	H04W72/121.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N191	1114	H04W72/1205.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N192	2959	H04W72/00.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N193	0	H04W7/0413.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N194	0	H04W7/0406.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N195	0	H04W1/1664.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N196	0	H04W1/1621.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N197	0	H04W1/1607.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N198	0	H04W1/16.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N199	0	H04W1/12.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N200	0	H04W1/00.cpc.	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N201	4	N179 and N180	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N202	0	N179 and N181	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N203	0	N179 and N182	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N204	0	N179 and N183	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N205	0	N179 and N184	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N206	3	N179 and N185	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N207	0	N179 and N186	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N208	0	N179 and N187	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N209	3	N179 and N188	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
N210	0	N179 and N189	(US-PGPUB; USPAT)	OR	OFF	OFF	2019/09/27 04:26 PM
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LIST OF ART CITED BY APPLICANT (PTO-1449)	ATTORNEY. DOCKET NO. QUS-0003.01	APPLICATION SERIAL NO. Continuation of U.S. Patent Application Serial No. 16/377,829
	APPLICANT(S) Woojin AHN; Yongho KIM; Jinsam KWAK; and Juhyung SON	
	FILING DATE January 11, 2021	GROUP 2467

U.S. PATENT DOCUMENTS

EXAMINER'S INITIALS	*PATENT NO.	*ISSUE DATE	*INVENTOR NAME	CLASS	SUBCLASS	FILING DATE

U.S. PATENT APPLICATION PUBLICATIONS

EXAMINER'S INITIALS	*APPLICATION PUBLICATION NO.	*PUBLICATION DATE	*INVENTOR	CLASS	SUBCLASS	FILING DATE
	2017/0373813	12/2017	ASTERJADHI, Alfred			
	2016/0227437	08/2016	BLANKSBY, Andrew			
	2006/0034317	02/2006	HONG, Jin-woo			
	2012/0314697	12/2012	NOH, Yu Jin			
	2017/0250784	08/2017	SAKAI, Eisuke			
	2013/0301569	11/2013	WANG et al.			
	2013/0286959	10/2013	LOU et al.			
	2017/0272138	09/2019	CHUN; Jinyoung			
	2015/0003367	01/2015	SEOK, Yongho			
	2016/0165574	06/2016	CHU; Liwen			

FOREIGN PATENT DOCUMENTS

EXAMINER'S INITIALS	PATENT NO.	PUBLICATION DATE	COUNTRY	CLASS	SUBCLASS	Translation Yes	Translation No
	2011/102575	08/2011	WIPO			X	
	2014/171788	10/2014	WIPO			X	

OTHER ART (Including Author, Title, Date, Pertinent Pages, Publisher, Place of Publication, Etc.)

	International Search Report for PCT/KR2016/002199 mailed on July 8, 2016 and English translation
	Written Opinion of the International Searching Authority for PCT/KR2016/002199 mailed on July 8, 2016 and English translation
	AHN, Woo Jin et al., "UL-OFMA Procedure in IEEE 802.11ax", IEEE 802.11-15/0091rl, 13 January 2015, slides 3-10
	U.S. Office Action dated July 2, 2018 issued in Application No. 15/555,075
	U.S. Office Action dated October 4, 2019 issued in Application No. 16/377,829
	U.S. Office Action dated May 19, 2020 issued in Application No. 16/377,829

EXAMINER	/GAUTAM SHARMA/	DATE CONSIDERED	09/26/2022

EXAMINER: Initial if reference has been considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /G.S/

Bibliographic Data

Application No: 17/145,670

Foreign Priority claimed: ◉ Yes ○ No

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

Verified and Acknowledged: /GAUTAM SHARMA/ Examiner's Signature | Initials

Title: WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
01/11/2021	370	2467	QUS-0003.01
RULE			

APPLICANTS

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Juhyung SON, Gyeonggi-do, KOREA, REPUBLIC OF

CONTINUING DATA

This application is a CON of 16377829 04/08/2019 PAT 10911186

16377829 is a CON of 15555075 01/02/2018 PAT 10305638

15555075 is a 371 of PCT/KR2016/002199 03/04/2016

FOREIGN APPLICATIONS

KOREA, REPUBLIC OF KR10-2015-0030369 03/04/2015

KOREA, REPUBLIC OF KR10-2015-0036754 03/17/2015

KOREA, REPUBLIC OF KR10-2015-0066670 05/13/2015

IF REQUIRED, FOREIGN LICENSE GRANTED**

01/22/2021

STATE OR COUNTRY

KOREA, REPUBLIC OF

ADDRESS

KED & ASSOCIATES, LLP

P.O. Box 8638

Reston, VA 20195
UNITED STATES

FILING FEE RECEIVED

$1,820

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
17/145,670	01/11/2021	Woojin AHN	QUS-0003.01

CONFIRMATION NO. 9828

34610
KED & ASSOCIATES, LLP
P.O. Box 8638
Reston, VA 20195

PUBLICATION NOTICE



Title:WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION

Publication No.US-2021-0211236-A1
Publication Date:07/08/2021

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.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

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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.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

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

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 17/145,670

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))	14 minus 20 =	*			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 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 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	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($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	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
17/145,670	01/11/2021	2642	1820	QUS-0003.01	14	2

CONFIRMATION NO. 9828

UPDATED FILING RECEIPT

34610
KED & ASSOCIATES, LLP
P.O. Box 8638
Reston, VA 20195

OC000000124425334

Date Mailed: 03/29/2021

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)

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Yongho KIM, Incheon, KOREA, REPUBLIC OF;
Jinsam KWAK, Gyeonggi-do, KOREA, REPUBLIC OF;
Juhyung SON, Gyeonggi-do, KOREA, REPUBLIC OF;

Applicant(s)

WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC., Seoul, KOREA, REPUBLIC OF;
SK TELECOM CO. LTD., Seoul, KOREA, REPUBLIC OF;

Power of Attorney: The patent practitioners associated with Customer Number 34610

Domestic Priority data as claimed by applicant

This application is a CON of 16/377,829 04/08/2019 PAT 10911186
which is a CON of 15/555,075 01/02/2018 PAT 10305638
which is a 371 of PCT/KR2016/002199 03/04/2016

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
REPUBLIC OF KOREA 10-2015-0030369 03/04/2015 Access Code Provided
REPUBLIC OF KOREA 10-2015-0036754 03/17/2015 Access Code Provided
REPUBLIC OF KOREA 10-2015-0066670 05/13/2015 Access Code Provided

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

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Request to Retrieve - This application either claims priority to one or more applications filed in an intellectual property Office that participates in the Priority Document Exchange (PDX) program or contains a proper **Request to Retrieve Electronic Priority Application(s)** (PTO/SB/38 or its equivalent). Consequently, the USPTO will attempt to electronically retrieve these priority documents.

If Required, Foreign Filing License Granted: 01/22/2021

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/145,670**

Projected Publication Date: 07/08/2021

Non-Publication Request: No

Early Publication Request: No

Title

WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION

Preliminary Class

455

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 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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특 허 청
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【발명의 국문명칭】 무선랜 광대역 다중 사용자 상향 데이터 전송을 위한 group ACK 전송 및 padding 방법

【발명의 영문명칭】 GROUP ACK TRANSMISSION AND PADDING METHODS FOR WIDEBAND WIRELESS LAN MULTIPLE USER UPLINK DATA TRANSMISSION

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【출원료】 0 면 46,000 원

【가산출원료】 33 면 0 원

【우선권주장료】 0 건 0 원

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【발명의 설명】

【발명의 명칭】

무선랜 광대역 다중 사용자 상향 데이터 전송을 위한 group ACK 전송 및 padding 방법{GROUP ACK TRANSMISSION AND PADDING METHODS FOR WIDEBAND WIRELESS LAN MULTIPLE USER UPLINK DATA TRANSMISSION}

【기술분야】

【0001】 본 발명은 무선랜을 위한 장치, 시스템 및 방법에 관한 것으로, 보다 상세하게는, 무선랜 광대역 다중 사용자 상향 데이터 전송을 위한 group ACK 전송 및 padding 방법에 관한 기술이다.

【발명의 배경이 되는 기술】

【0002】 최근 모바일 기기의 보급이 확대됨에 따라 이들에게 빠른 무선 인터넷 서비스를 제공할 수 있는 무선랜(Wireless LAN) 기술이 많은 각광을 받고 있다. 무선랜 기술은 근거리에서 무선 통신 기술을 바탕으로 스마트 폰, 스마트 패드, 랩탑 컴퓨터, 휴대형 멀티미디어 플레이어, 임베디드 기기 등과 같은 모바일 기기들이 무선으로 인터넷에 접속할 수 있도록 하는 기술이다.

【0003】 초기의 무선랜 기술은 IEEE(Institute of Electrical and Electronics Engineers) 802.11을 통해 2.4GHz 주파수를 사용하여 주파수 도약(hopping), 대역확산, 적외선 통신 등으로 1~2Mbps의 속도를 지원한 이래, 최근에는 OFDM(Orthogonal Frequency Division Multiplex)을 적용하여 최대 54Mbps의 속

도를 지원할 수 있다. 이외에도 IEEE 802.11에서는 QoS(Quality for Service)의 향상, 액세스 포인트(Access Point, AP) 프로토콜 호환, 보안 강화(security enhancement), 무선 자원 측정(radio resource measurement), 차량 환경을 위한 무선 접속(wireless access vehicular environment), 빠른 로밍(fast roaming), 메쉬 네트워크(mesh network), 외부 네트워크와의 상호작용(interworking with external network), 무선 네트워크 관리(wireless network management) 등 다양한 기술의 표준을 실용화 또는 개발 중에 있다.

【0004】 IEEE 802.11 중에서 IEEE 802.11b는 2.4GHz 밴드의 주파수를 사용하면서 최고 11Mbps의 통신 속도를 지원한다. IEEE 802.11b 이후에 상용화된 IEEE 802.11a는 2.4GHz 밴드가 아닌 5GHz 밴드의 주파수를 사용함으로써 상당히 혼잡한 2.4GHz 밴드의 주파수에 비해 간섭에 대한 영향을 줄였으며, OFDM 기술을 사용하여 통신 속도를 최대 54Mbps까지 향상시켰다. 그러나 IEEE 802.11a는 IEEE 802.11b에 비해 통신 거리가 짧은 단점이 있다. 그리고 IEEE 802.11g는 IEEE 802.11b와 마찬가지로 2.4GHz 밴드의 주파수를 사용하여 최대 54Mbps의 통신속도를 구현하며, 하위 호환성(backward compatibility)을 만족하고 있어 상당한 주목을 받았는데, 통신 거리에 있어서도 IEEE 802.11a보다 우위에 있다.

【0005】 그리고, 무선랜에서 취약점으로 지적되어온 통신 속도에 대한 한계를 극복하기 위하여 제정된 기술 규격으로써 IEEE 802.11n이 있다. IEEE 802.11n은 네트워크의 속도와 신뢰성을 증가시키고, 무선 네트워크의 운영 거리를 확장하는데 목적을 두고 있다. 보다 구체적으로, IEEE 802.11n에서는 데이터 처리 속도가 최대

540Mbps 이상인 고처리율(High Throughput, HT)을 지원하며, 또한 전송 에러를 최소화하고 데이터 속도를 최적화하기 위해 송신부와 수신부 양단 모두에 다중 안테나를 사용하는 MIMO(Multiple Inputs and Multiple Outputs) 기술에 기반을 두고 있다. 또한, 이 규격은 데이터 신뢰성을 높이기 위해 중복되는 사본을 여러 개 전송하는 코딩 방식을 사용할 뿐만 아니라, 속도를 증가시키기 위해 직교 주파수 분할 다중(Orthogonal Frequency Division Multiplex, OFDM)을 사용할 수도 있다.

【0006】무선랜의 보급이 활성화되고, 이를 이용한 어플리케이션이 다양화됨에 따라, 최근에는 IEEE 802.11n이 지원하는 데이터 처리 속도보다 더 높은 처리율(Very High Throughput, VHT)을 지원하기 위한 새로운 무선랜 시스템에 대한 필요성이 대두되고 있다. 이 중 IEEE 802.11ac는 5GHz 주파수에서 넓은 대역폭(80MHz~160MHz)을 지원한다. IEEE 802.11ac 표준은 5GHz 대역에서만 정의되어 있으나, 기존 2.4GHz 대역 제품들과의 하위 호환성을 위해 초기 11ac 칩셋들은 2.4GHz 대역에서의 동작도 지원할 것이다. 이때 802.11ac는 2.4GHz에서 최대 40MHz까지 대역폭을 지원한다. 이론적으로, 이 규격에 따르면 다중 단말의 무선랜 속도는 최소 1Gbps, 최대 단일 링크 속도는 최소 500Mbps까지 가능하게 된다. 이는 더 넓은 무선 주파수 대역폭(최대 160MHz), 더 많은 MIMO 공간적 스트림(최대 8개), 다중 사용자 MIMO, 그리고 높은 밀도의 변조(최대 256 QAM) 등 802.11n에서 받아들인 무선 인터페이스 개념을 확장하여 이루어진다. 또한, 기존 2.5GHz/5GHz 대신 60GHz 밴드를 사용해 데이터를 전송하는 방식으로 IEEE 802.11ad가 있다. IEEE 802.11ad는 빔포밍 기술을 이용하여 최대 7Gbps의 속도를 제공하는 전송규격으로써, 대용량의 데

이터나 무압축 HD 비디오 등 높은 비트레이트 동영상 스트리밍에 적합하다. 하지만 60GHz 주파수 밴드는 장애물 통과가 어려워 근거리 공간에서의 디바이스들 간에만 이용이 가능한 단점이 있다.

【0007】무선랜은 넓은 주파수 대역을 사용할 수 있다. 넓은 주파수 대역을 사용하기 위해 데이터를 전송하기 전에 일정 시간동안 가능한 대역이 있는지 살펴보고 데이터를 인접한 영역의 주파수 대역이 가용한지 여부에 따라 연접하여 주파수 대역을 사용한다. 예를 들어 20MHz 대역이 주 주파수 대역 (주 채널)이고 그 다음 20MHz가 사용가능하고 그 다음 20MHz가 사용 불가능 그 다음 20MHz가 사용 가능이라면 총 40MHz를 전송 대역으로 하여 데이터를 전송한다. 연접한 주파수 대역만을 데이터 전송 대역으로 사용하기 때문에 실제 가용한 주파수 대역이 있음에도 불구하고 사용하지 못하는 문제가 있다. 또한 종래의 무선 접속 기술은 동일한 Basic Service Set (BSS) 내에서 매 전송 시도마다 하나의 송신 단말 및 수신 단말의 일대일 접속만을 지원하기 때문에 단말들의 접속 환경이나 전송 데이터의 특성을 반영하지 못하여 비효율적이라는 문제를 지니고 있다.

【발명의 내용】

【해결하고자 하는 과제】

【0008】본 발명은 전술한 종래 기술의 문제점을 해결하기 위한 것으로서, 무선랜을 위한 다중채널 상향 패킷 전달 방법, 장치 및 시스템을 제공하고자 하는 목적을 가지고 있다.

【과제의 해결 수단】

【0009】 본 발명의 실시예에 따르면 무선랜을 위한 장치, 시스템 및 방법이 제공될 수 있다.

【발명의 효과】

【0010】 본 발명의 실시예에 따르면 경쟁 기반 채널 접근 시스템에서 다중 사용자 상향 전송 시에 불필요한 채널 점유를 줄일 수 있는 효과가 있다.

【0011】 또한, 본 발명의 실시예에 따르면 multiplexed group ACK을 이용하여 OBSS의 primary channel의 점유 확률을 증가시키는 효과가 있다.

【0012】 또한, 본 발명의 실시예에 따르면 과밀한 OBSS 환경에서 네트워크 전체의 spectral efficiency를 높일 수 있는 효과가 있다.

【0013】 또한, 무선랜을 이용하는 스테이션 내지 액세스 포인트, 셀룰러 통신을 이용하는 스테이션 내지 기지국 등 다양한 통신 디바이스에 사용 가능하다.

【도면의 간단한 설명】

【0014】 도 1은 본 발명의 일 실시예에 따른 무선랜 시스템을 도시하고 있다.

도 2는 본 발명의 다른 실시예에 따른 무선랜 시스템인 독립 BSS를 도시하고 있다.

도 3은 본 발명의 일 실시예에 따른 스테이션의 구성을 나타낸 블록도이다.

도 4는 본 발명의 일 실시예에 따른 AP의 구성을 나타낸 블록도이다.

도 5는 본 발명의 일 실시예에 관련된 STA이 AP와 링크를 설정하는 단계를 개략적으로 도시한 것이다.

도 6은 본 발명의 일 실시예에 관련된 STA의 패시브 스캐닝 방법을 도시한 것이다.

도 7은 본 발명의 일 실시예에 관련된 STA의 액티브 스캐닝 방법을 도시한 것이다.

도 8은 기본적인 다중 사용자 상향 데이터 전송 과정의 예시를 나타내고 있다.

도 9는 본 발명의 실시예에 따른 multiplexed group ACK의 구조를 도시하고 있다.

도 10은 본 발명의 다른 실시예에 따른 multiplexed group ACK 전송방법을 도시하고 있다.

도 11은 본 발명의 다른 실시예에 따른 BA length alignment를 위한 AID field padding 방법을 도시하고 있다.

도 12는 본 발명의 다른 실시예에 따른 다중 사용자 하향 데이터 전송 과정에서의 AID field padding의 활용과 Block ACK padding의 활용을 도시하고 있다.

【발명을 실시하기 위한 구체적인 내용】

【0015】 아래에서는 첨부한 도면을 참조하여 본 발명이 속하는 기술 분야에서 통상의 지식을 가진 자가 용이하게 실시할 수 있도록 본 발명의 실시예를 상세

히 설명한다. 그러나 본 발명은 여러 가지 상이한 형태로 구현될 수 있으며 여기에서 설명하는 실시예에 한정되지 않는다. 그리고 도면에서 본 발명을 명확하게 설명하기 위해서 설명과 관계없는 부분은 생략하였으며, 명세서 전체를 통하여 유사한 부분에 대해서는 유사한 도면 부호를 붙였다.

【0016】 명세서 전체에서, 어떤 부분이 다른 부분과 "연결"되어 있다고 할 때, 이는 "직접적으로 연결"되어 있는 경우뿐 아니라, 그 중간에 다른 소자를 사이에 두고 "전기적으로 연결"되어 있는 경우도 포함한다. 또한 어떤 부분이 어떤 구성요소를 "포함"한다고 할 때, 이는 특별히 반대되는 기재가 없는 한 다른 구성요소를 제외하는 것이 아니라 다른 구성요소를 더 포함할 수 있는 것을 의미한다.

【0018】 무선랜 시스템의 구조

【0019】 도 1은 본 발명의 일 실시예에 따른 무선랜 시스템을 도시하고 있다.

【0020】 무선랜 시스템은 하나 또는 그 이상의 기본 서비스 세트(Basic Service Set, BSS)를 포함하는데, BSS는 성공적으로 동기화를 이루어서 서로 통신할 수 있는 기기들의 집합을 나타낸다. 일반적으로 BSS는 인프라스트럭쳐 BSS(infrastructure BSS)와 독립 BSS(Independent BSS, IBSS)로 구분될 수 있으며, 도 1은 이 중 인프라스트럭쳐 BSS를 나타내고 있다.

【0021】도 1에 도시된 바와 같이 인프라스트럭쳐 BSS(BSS1, BSS2)는 하나 또는 그 이상의 스테이션(STA-1, STA-2, STA-3, STA-4, STA-5), 분배 서비스(Distribution Service)를 제공하는 스테이션인 액세스 포인트(PCP/AP-1, PCP/AP-2), 및 다수의 액세스 포인트(PCP/AP-1, PCP/AP-2)를 연결시키는 분배 시스템(Distribution System, DS)을 포함한다.

【0022】스테이션(Station, STA)은 IEEE 802.11 표준의 규정을 따르는 매체 접속 제어(Medium Access Control, MAC)와 무선 매체에 대한 물리층(Physical Layer) 인터페이스를 포함하는 임의의 디바이스로서, 광의로는 액세스 포인트(AP)와 비 액세스 포인트 STA(Non-AP Station)를 모두 포함한다. 무선 통신을 위한 스테이션은 프로세서(Processor)와 트랜시버(transceiver)를 포함하고, 실시예에 따라 사용자 인터페이스부와 디스플레이 유닛 등을 더 포함할 수 있다. 프로세서는 무선 네트워크를 통해 전송할 프레임을 생성하거나 또는 상기 무선 네트워크를 통해 수신된 프레임을 처리하며, 그 밖에 스테이션을 제어하기 위한 다양한 처리를 수행한다. 그리고, 트랜시버는 프로세서와 기능적으로 연결되어 있으며, 스테이션을 위하여 무선 네트워크를 통해 프레임을 송수신한다.

【0023】액세스 포인트(Access Point, AP)는 자신에게 결합된 스테이션을 위하여 무선 매체를 경유하여 분배시스템(DS)에 대한 접속을 제공하는 개체이다. 인프라스트럭쳐 BSS에서 AP와 접속되지 않은 STA들 사이의 통신은 AP를 경유하여 이루어지는 것이 원칙이지만, 다이렉트 링크가 설정된 경우에는 AP와 접속되지 않은 STA들 사이에서도 직접 통신이 가능하다. 한편, 본 발명에서 AP는 PCP(Personal

BSS Coordination Point)를 포함하는 개념으로 사용되며, 광의적으로는 집중 제어기, 기지국(Base Station, BS), 노드-B, BTS(Base Transceiver System), 또는 사이트 제어기 등의 개념을 모두 포함할 수 있다.

【0024】 복수의 인프라스트럭쳐 BSS는 분배 시스템(DS)을 통해 상호 연결될 수 있다. 이때, DS를 통하여 연결된 복수의 BSS를 확장 서비스 세트(Extended Service Set, ESS)라 한다. ESS에 포함되는 STA들은 서로 통신할 수 있으며, 동일한 ESS 내에서 AP와 접속되지 않은 STA들은 끊김 없이 통신하면서 하나의 BSS에서 다른 BSS로 이동할 수 있다.

【0025】 도 2는 본 발명의 다른 실시예에 따른 무선랜 시스템인 독립 BSS를 도시하고 있다. 도 2의 실시예에서 도 1의 실시예와 동일하거나 상응하는 부분은 중복적인 설명을 생략하도록 한다.

【0026】 도 2에 도시된 BSS-3는 독립 BSS이며 AP를 포함하지 않기 때문에, 모든 스테이션(STA-6, STA-7)이 AP와 접속되지 않은 상태이다. 독립 BSS는 DS로의 접속이 허용되지 않으며, 자기 완비적 네트워크(self-contained network)를 이룬다. 독립 BSS에서 각각의 스테이션들(STA-6, STA-7)은 다이렉트로 서로 연결될 수 있다.

【0028】 STA(스테이션)의 구성

【0029】 도 3은 본 발명의 일 실시예에 따른 스테이션의 구성을 나타낸 블록도이다.

【0030】 도시된 바와 같이, 본 발명의 실시예에 따른 STA(100)은 프로세서(110), 하나 이상의 네트워크 인터페이스 카드(NIC, Network Interface Card, 120), 유저 인터페이스부(140), 디스플레이 유닛(150) 및 메모리(160)를 포함할 수 있다.

【0031】 먼저, 네트워크 인터페이스 카드(120)는 무선랜 접속을 수행하기 위한 모듈로서, STA(100)에 내장되거나 외장으로 구비될 수 있다. 본 발명의 실시예에 따르면, 네트워크 인터페이스 카드 (120)는 서로 다른 주파수 밴드를 이용하는 복수의 네트워크 인터페이스 카드 모듈(120_1~120_n)을 포함할 수 있다. 이를테면, 네트워크 인터페이스 카드 모듈(120_1~120_n)은 2.4GHz, 5GHz 및 60GHz 등의 서로 다른 주파수 밴드의 네트워크 인터페이스 카드 모듈을 포함할 수 있다. 본 발명의 실시예에 따르면, STA(100)은 6GHz 이상의 주파수 밴드를 이용하는 적어도 하나의 네트워크 인터페이스 카드 모듈과, 6GHz 이하의 주파수 밴드를 이용하는 적어도 하나의 네트워크 인터페이스 카드 모듈을 구비할 수 있다. 각각의 네트워크 인터페이스 카드 모듈(120_1~120_n)은 해당 네트워크 인터페이스 카드 모듈(120_1~120_n)이 지원하는 주파수 밴드의 무선랜 규격에 따라 AP 또는 외부 STA과 무선 통신을 수행할 수 있다. 네트워크 인터페이스 카드(120)는 STA(100)의 성능 및 요구 사항에 따라 한 번에 하나의 네트워크 인터페이스 카드 모듈(120_1~120_n)만을 동작시키거나 동시에 다수의 네트워크 인터페이스 카드 모듈(120_1~120_n)

을 함께 동작시킬 수 있다.

【0032】 한편, 도 3의 블록도에서 STA(100)의 복수의 네트워크 인터페이스 카드 모듈(120_1~120_n)은 서로 분리되어 도시되어 있으며, 각각의 네트워크 인터페이스 카드 모듈(120_1~120_n)의 MAC/PHY 계층이 서로 독립적으로 운영된다. 다만, 본 발명은 이에 한정하지 않으며, 복수의 서로 다른 주파수 밴드의 네트워크 인터페이스 카드 모듈이 하나의 칩으로 통합된 상태로 STA(100)에 구비될 수도 있다.

【0033】 다음으로, 유저 인터페이스부(140)는 STA(100)에 구비된 다양한 형태의 입/출력 수단을 포함한다. 즉, 유저 인터페이스부(140)는 다양한 입력 수단을 이용하여 유저의 입력을 수신할 수 있으며, 프로세서(110)는 수신된 유저 입력에 기초하여 STA(100)을 제어할 수 있다. 또한, 유저 인터페이스부(140)는 다양한 출력 수단을 이용하여 프로세서(110)의 명령에 기초한 출력을 수행할 수 있다.

【0034】 다음으로, 디스플레이 유닛(150)은 디스플레이 화면에 이미지를 출력한다. 상기 디스플레이 유닛(150)은 프로세서(110)에 의해 실행되는 컨텐츠 또는 프로세서(110)의 제어 명령에 기초한 유저 인터페이스 등의 다양한 디스플레이 오브젝트를 출력할 수 있다. 또한, 메모리(160)는 STA(100)에서 사용되는 제어 프로그램 및 그에 따른 각종 데이터를 저장한다. 이러한 제어 프로그램에는 STA(100)이 AP 또는 외부 STA와 접속을 수행하는데 필요한 접속 프로그램이 포함될 수 있다.

【0035】 본 발명의 프로세서(110)는 다양한 명령 또는 프로그램을 실행하고, STA(100) 내부의 데이터를 프로세싱 할 수 있다. 또한, 프로세서(110)는 상술한 STA(100)의 각 유닛들을 제어하며, 유닛들 간의 데이터 송수신을 제어할 수 있다. 본 발명의 실시예에 따르면, 프로세서(110)는 STA(100)의 섹터 스윕 신호 전송/수신 및 이에 대응하는 피드백 신호 전송/수신 등의 커뮤니케이션 동작을 제어한다.

【0036】 또한, 프로세서(110)는 메모리(160)에 저장된 AP와의 접속을 실행하는 프로그램을 실행하여, AP가 전송한 통신 설정 메시지를 수신하고, 통신 설정 메시지에 포함된 STA(100)의 우선 조건에 대한 정보를 독출하고, STA(100)n의 우선 조건에 대한 정보에 따라 AP에 대한 접속을 요청한다. 이에 대한 구체적인 설명은 추후 기술하기로 한다.

【0037】 도 3에 도시된 STA(100)는 본 발명의 일 실시예에 따른 블록도로서, 분리하여 표시한 블록들은 디바이스의 엘리먼트들을 논리적으로 구별하여 도시한 것이다. 따라서 상술한 디바이스의 엘리먼트들은 디바이스의 설계에 따라 하나의 칩으로 또는 복수의 칩으로 장착될 수 있다. 또한, 본 발명의 실시예에서 STA(100)의 일부 구성들, 이를 테면 이동통신 모듈(130), 유저 인터페이스부(140) 및 디스플레이 유닛(150) 등은 STA(100)에 선택적으로 구비될 수 있다.

【0039】 AP(액세스 포인트)의 구성

【0040】도 4는 본 발명의 일 실시예에 따른 AP의 구성을 나타낸 블록도이다.

【0041】도시된 바와 같이, 본 발명의 실시예에 따른 AP(200)는 프로세서(210), NIC(Network Interface Card, 220) 및 메모리(160)를 포함할 수 있다. 도 4에서 AP(200)의 구성 중 도 3의 STA(100)의 구성과 동일하거나 상응하는 부분에 대해서는 중복적인 설명을 생략하도록 한다.

【0042】도 4를 참조하면, 본 발명에 따른 AP(200)는 적어도 하나의 주파수 밴드에서 BSS를 운영하기 위한 네트워크 인터페이스 카드(220)를 구비한다. 도 3의 실시예에서 전술한 바와 같이, AP(200)의 네트워크 인터페이스 카드 (220) 또한 서로 다른 주파수 밴드를 이용하는 복수의 네트워크 인터페이스 카드 모듈(220_1~220_m)을 포함할 수 있다. 즉, 본 발명의 실시예에 따른 AP(200)는 서로 다른 주파수 밴드, 이를 테면 2.4GHz, 5GHz, 60GHz 중 두 개 이상의 네트워크 인터페이스 카드 모듈을 함께 구비할 수 있다. 바람직하게는, AP(200)는 6GHz 이상의 주파수 밴드를 이용하는 적어도 하나의 네트워크 인터페이스 카드 모듈과, 6GHz 이하의 주파수 밴드를 이용하는 적어도 하나의 네트워크 인터페이스 카드 모듈을 구비할 수 있다. 각각의 네트워크 인터페이스 카드 모듈(220_1~220_m)은 해당 네트워크 인터페이스 카드 모듈(220_1~220_m)이 지원하는 주파수 밴드의 무선랜 규격에 따라 STA과 무선 통신을 수행할 수 있다. 네트워크 인터페이스 카드 (220)는 AP(200)의 성능 및 요구 사항에 따라 한 번에 하나의 네트워크 인터페이스 카드 모듈(220_1~220_m)만을 동작시키거나 동시에 다수의 네트워크 인터페이스 카드 모듈

(220_1~220_m)을 함께 동작시킬 수 있다.

【0043】 다음으로, 메모리(260)는 AP(200)에서 사용되는 제어 프로그램 및 그에 따른 각종 데이터를 저장한다. 이러한 제어 프로그램에는 STA의 접속을 관리하는 접속 프로그램이 포함될 수 있다. 또한, 프로세서(210)는 AP(200)의 각 유닛들을 제어하며, 유닛들 간의 데이터 송수신을 제어할 수 있다.

【0044】 또한, 프로세서(210)는 메모리(260)에 저장된 스테이션과의 접속을 실행하는 프로그램을 실행하여, 하나 이상의 STA(100)에 대하여 통신 설정 메시지를 전송하고, STA(100)의 접속 요청에 따라 접속 설정을 수행하되, 통신 설정 메시지는 각 스테이션의 접속 우선 조건에 대한 정보를 포함한다. 이에 대한 구체적인 설명은 추후 기술하기로 한다.

【0046】 링크 설정 단계

【0047】 도 5는 본 발명의 일 실시예에 관련된 STA이 AP와 링크를 설정하는 단계를 개략적으로 도시한 것이다.

【0048】 도 5를 참조하면, 본 발명에 따른 STA(100)가 AP(200)에 접속하는 단계는 크게 스캐닝(Scanning), 인증(Authentication) 및 결합(Association)의 3단계로 구분된다. 스캐닝단계는 STA(100)가 AP(200)가 운영하는 BSS의 접속 정보를 획득하는 단계이다. 스캐닝을 수행하기 위한 방법으로는 AP가 주기적으로 전송하는 비콘(Beacon) 메시지만을 활용하여 정보를 획득하는 패시브 스캐닝(Passive

Scanning) 기법(S101)과 STA가 AP에 프로브 요청(Probe Request)을 전송하고(S103), AP로부터 프로브 응답(Probe Response)을 수신하여(S105) 접속 정보를 획득하는 액티브 스캐닝(Active Scanning)기법이 있다.

【0049】 스캐닝 단계에서 성공적으로 무선 접속 정보를 수신한 STA(100)는 인증 요청(Authentication Request)을 송신(S107a)하고, 인증 응답(Authentication Response)을 수신(S107b)하여 인증 절차를 수행한다.

【0050】 성공적인 IEEE 802.11 계층에서의 인증 절차를 수행 후, 결합 단계(S109a, S109b)를 수행하고, 추가적으로 802.1X 기반의 인증(S111) 및 DHCP를 통한 IP 주소 획득(S113) 단계를 수행할 수 있다. AS(300)는 Authentication Server로서 STA(100)과 802.1X 기반의 인증을 처리하는 서버로서 AP(200)에 물리적으로 결합되어 존재하거나 별도의 서버로서 존재할 수 있다.

【0051】 도 6은 본 발명의 일 실시예에 관련된 STA의 패시브 스캐닝 방법을 도시한 것이다.

【0052】 도 6을 참조하면, 본 발명에 따른 제1 STA(110)는 주변에 위치한 제1 AP(210)와 제 2 AP(220)에서 주기적으로 송신하는 비콘 메시지를 수신하여 각각 AP들의 무선 접속 정보를 획득한다.

【0053】 도 7은 본 발명의 일 실시예에 관련된 STA의 액티브 스캐닝 방법을 도시한 것이다.

【0054】 도 7을 참조하면, 본 발명에 따른 제 1 STA(110)는 주변에 위치한 AP의 정보를 획득하기 위해 프로브 요청 메시지를 송신하고, 이에 대응하는 프로브 응답 메시지를 각각 제 1 AP(210)와 제 2 AP(220)로부터 수신하여 각각 AP들의 무선 접속 정보를 획득한다.

【0056】 다중 사용자 상향 전송

【0057】 도 8은 기본적인 다중 사용자 상향 데이터 전송 과정의 예시를 나타내고 있다. 다중 사용자 상향 전송의 경우 하향 전송과는 다르게 다수의 단말이 동시에 데이터를 전송해야 하기 때문에 BSS 내의 모든 단말과 통신을 수행할 수 있는 AP가 전송 과정을 관리하는 방법이 유력하다. 따라서 AP는 자원 할당과 데이터 전송의 충돌을 방지하기 위하여 실질적인 데이터 전송이 시작되는 이전 시점에 BSS 내 무선 단말들의 버퍼 내 상향 전송 데이터 존재 유무 및 TXOP 등의 정보를 알아야 하며, 또한 정확한 전송시점에 대한 정보를 단말들에게 전달해주어야 한다. 이러한 과정들은 다중 사용자 상향 데이터 전송을 위한 trigger 과정 및 scheduling 과정으로 나눌 수 있다. 사전에 미리 scheduiling에 관련된 정보를 수집한 뒤에 특정 조건을 만족했을 시에 trigger를 수행할 수도 있으며, 혹은 시간적인 조건에 따라 trigger를 수행한 뒤에 scheduling을 위한 정보를 그 즉시 수행하는 방법 역시 가능하다. Trigger 및 scheduling에는 AP와 무선 단말이 전송에 이용가능한 channel에 대한 정보를 서로 주고 받는 과정이 포함되며, 따라서 먼저 AP가 이용가능한 channel을 한정한 뒤에, 무선 단말들이 해당 channel들 중에서 이용가능한 모

든 channel 정보를 피드백 해야하는 방식으로 진행될 수 있다. 이 때 trigger는 이후에 이루어질 다중 사용자 상향 데이터 전송을 위한 NAV 설정 과정의 역할을 동시에 수행할 수 있다. 이때 trigger가 legacy format을 따르는 경우 trigger 프레임의 MAC header에 포함될 duration 값에 의하여 legacy 단말들도 trigger를 수신할 경우 정상적으로 NAV를 설정할 수 있다. Trigger를 활용한 NAV 설정의 경우 AP 만이 전송을 하기 때문에 AP 주변의 3rd party에 대한 NAV 설정은 정상적으로 이루어지지만 상향 전송 단말들은 trigger를 전송하지 않으므로 각 상향 전송 단말 주변의 3rd party에 대해서는 NAV 설정이 이루어지지 않을 수도 있다. 따라서 본 발명에서는 AP가 상향 전송 단말 주변에 부분적으로 존재할 수 있는 hidden node들에 대한 NAV 설정을 담당해 주기 위하여 trigger frame에 대해서만 증가된 파워로 송신하는 것이 가능하다.

【0058】 Trigger를 전송하면 AP가 정해준 시점에 AP로부터 할당받은 subcarrier를 통하여 다수의 단말이 동시에 데이터를 전송하며, 데이터 전송 후에는 AP가 상향 데이터 전송에 참여한 모든 단말에게 데이터 수신 여부를 알리는 ACK을 전송해야 한다.

【0059】 다중 사용자 상향 데이터 전송에서 과밀한 BSS 배치 환경으로 인하여 다수의 OBSS의 영향을 받게되면 무선 단말의 지리적인 위치에 따라 이용 가능한 채널이 각기 다르게 나타나게 되고, 이런 경우 각 채널에 전송 가능한 단말의 수가 각기 다르게 나타날 수 있다. 따라서 실질적인 상향 데이터 전송에 관여된 air time이 각 채널별로 각기 다르게 나타날 수 있다.

【0060】본 발명에서는 기존 802.11의 철학에 따라 모든 무선 단말이 primary channel을 통하여 UL-OFDMA trigger를 최초로 전송받고, 이후에 이용 가능한 secondary channel을 feedback 하는 것을 가정하기 때문에 primary channel을 이용할 수 없는 무선 단말은 다중 사용자 상향 전송에 참여할 수 없으며, 따라서 primary channel에 항상 가장 많은 무선 단말이 할당될 수 있다.

【0061】도 8의 예시와 같이 각 채널에 할당된 air time이 각기 다르게 나타나는 경우 각 channel 별로 ACK을 전송하지 않고 다중 사용자 상향 데이터 전송에 사용된 모든 channel의 ACK을 가장 긴 air time을 갖는 primary channel에 multiplexing 하여 전송할 수 있다.

【0062】Multiplexed group ACK을 이용하는 경우, secondary channel들은 상향 데이터 전송 air time이 끝난 시점에 바로 channel을 반환할 수 있기 때문에 해당 channel을 primary channel로 사용하는 OBSS가 더 이른 시점에 channel에 접속하는 것이 가능하다. 따라서 네트워크 전반의 spectral efficiency의 향상을 기대할 수 있다.

【0063】도 9는 본 발명의 실시예에 따른 multiplexed group ACK의 구조를 도시하고 있다.

【0064】Multiplexed group ACK은 기존의 Block ACK(BA)의 구조를 이용하여 구현할 수 있다. BA format의 BA control 내부 값들의 활성화 여부에 따라 BA information 부분이 가변적인 크기로 추가될 수 있다. 이 때 BA information 필드

내부의 Per TID info 부분에 reserved bit가 12개 존재하며 이 정보를 ACK 전송을 위한 단말의 AID 값으로 설정할 수 있다. 따라서 11bit로 구성되어 있는 B0~B10을 AID로 설정하고 B11 값은 해당 ACK이 일반 ACK의 형태인지 BA의 형태인지를 알려주는 indication bit로 활용할 수 있다. 따라서 B11이 도 9의 예시와 같이 ACK으로 설정된 경우는 뒤따라 전송되는 Block ACK start sequence control 및 Block ACK bitmap이 필요없기 때문에 해당 필드는 자동적으로 삭제될 수 있다. BA information 은 크기는 가변적이므로 해당 다중 사용자 상향 전송에 참여한 모든 단말에 대해 AID를 삽입할 수 있다. 즉, AID와 관련 block ack sequence control과 blockack bitmap을 단말당 반복하여 삽입하여 전송하는 것이다. B11이 ACK을 지시하는 경우는 block ack sequence control과 blockack bitmap은 생략되고 AID만 반복된다.

【0065】 도 10은 본 발명의 다른 실시예에 따른 multiplexed group ACK 전송 방법을 도시하고 있다.

【0066】 본 실시예에서는 trigger 이후에 전송되는 다중 사용자의 UL data가 scheduling 및 data padding 등에 의하여 동일한 시점에 전송이 종료되는 상황을 가정하고 있다. 이 경우 AP는 모든 ACK을 primary channel에 multiplexing 하지 않고, UL data를 전송한 송신 단말들에 대한 ACK을 각 채널에서 전송하도록 할 수 있다. 따라서 각 채널에 할당된 단말의 수가 서로 다를 경우, multiplexed group ACK에 사용되는 BA information 필드의 AID 값의 개수가 서로 다르기 때문에 각 20MHz 채널로 전송되는 multiplexed group ACK의 길이 역시 서로 다르게 설정될 수 있다.

그러나 802.11ax에서는 20MHz 이상의 wideband로 전송되는 PPDU에 대해서전송에 사용되는 모든 20MHz 단위의 채널에 동일한 L-SIG 및 HE-SIG A를 전송할 것을 명시하고 있기 때문에 L-SIG에 포함되는 PPDU length 값에 맞추어 모든 ACK이 동일한 길이를 갖도록 맞춰줄 필요성이 있다.

【0067】 도 11은 본 발명의 다른 실시예에 따른 BA length alignment를 위한 AID field padding 방법을 도시하고 있다.

【0068】 본 발명에서 사용하는 용어인 AID field padding 방법은 BA information의 구성 요소인 Per TID infor, block ack sequence control과 blockack bitmap을 각 채널마다 ACK을 하는 단말의 개수가 다를 경우에 길이를 맞춰 주기 위해 가장 길이가 긴 채널의 ACK만큼 길이가 짧은 ACK에 Per TID infor, block ack sequence control과 blockack bitmap을 반복하여 삽입하여 전송하는 것이다. B11이 ACK을 지시하는 경우는 block ack sequence control과 blockack bitmap은 생략되고 Per TID infor, 즉 AID만 반복된다.

【0070】 20MHz 단위 각 채널에 할당된 UL data 전송 단말의 수가 서로 다르게 나타날 경우 각 채널에 전송되는 multiplexed group ACK에서 BA information 부분의 길이가 달라질 수 있다. 따라서 L-SIG 등의 제약에 의하여 multiplexed group ACK들의 길이를 동일하게 맞추어야 할 경우 가장 긴 BA information이 할당된 채널을 기준으로 각 BA information의 길이를 잡을 수 있다. 따라서 남는 공간에는 zero padding을 하거나 BA information이 삽입된 순서대로 반복된 BA information

을 삽입할 수 있다. 또한 해당 PPDU가 BA가 아닌 ACK option을 활성화 할 경우에는 반복되는 모든 BA information에 대해서도 동일하게 ACK option을 활성화하여 BA starting sequence control/BA bitmap이 생략된 상태로 전송될 수 있다.

【0071】 도 12는 본 발명의 다른 실시예에 따른 다중 사용자 하향 데이터 전송 과정에서의 AID field padding의 활용과 Block ACK padding의 활용을 도시하고 있다.

【0072】 본 발명에서 제안한 BA의 AID field의 length alignment를 위한 padding 기법은 다중 사용자 하향 전송에서 AP가 각 채널에서 DL data를 전송받을 단말들을 알리는 DL-OFMDA trigger 과정에서 유사하게 활용될 수 있다. 다중 사용자 하향 데이터 전송 역시 각 채널별로 서로 다른 수의 단말이 수신 단말로 할당될 수 있으므로 DL-OFDMA trigger 과정에서 AP가 채널별로 할당된 단말의 AID를 알리는 과정에서 서로 다른 길이를 맞추어 주기 위하여 도 11과 동일한 형태로 zero padding을 삽입하거나 AID를 반복하는 형태로 trigger의 길이를 맞춰줄 수 있다.

【0073】 또한 본 발명에서 제안한 BA의 AID field padding 기법을 이용하여 BA가 전송되는 시간(air time)을 맞춰 줄 수 있다. 각 채널당 BA가 수신하는 단말의 개수만큼 전송되는데 본 실시예에서 보여지는 것과 같이 네번째 채널은 수신하는 단말이 한명이어서 BA가 하나만 전송되어 BA의 전송이 일찍 끝나게 된다. BA 전송 시간을 맞춰 주기 위해서 본 발명에서 제안한 AID field padding 기법을 이용하여 FCS전에 padding bit들을 삽입하여 전송 시간을 맞춰 줄 수 있다.

【0074】 본 발명에서 사용한 zero padding은 일 실시예이며 1을 padding해도

동일한 효과를 볼 수 있다.

【부호의 설명】

【특허청구범위】

【청구항 1】

무선랜을 위한 장치, 시스템 및 방법.

제출 일자 : 2015-03-17

【요약서】

【요약】

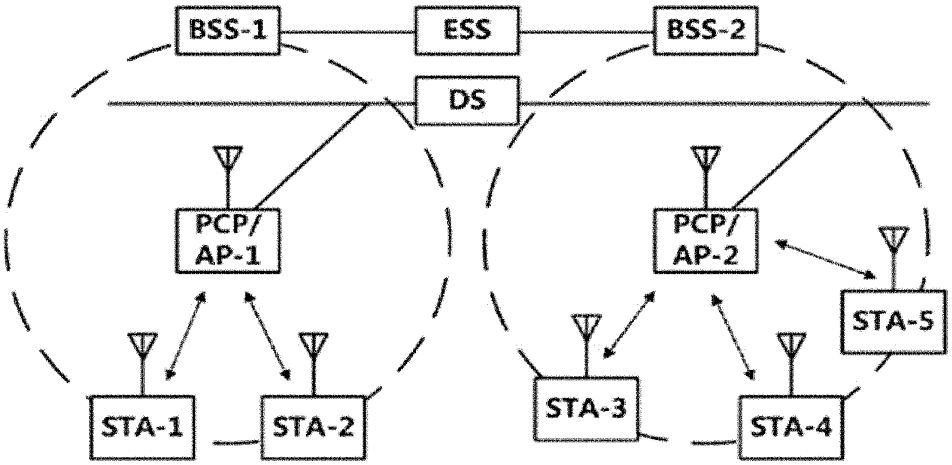
본 발명은 무선랜을 위한 장치, 시스템 및 방법에 관한 것으로, 본 발명의 실시예에 따르면, 무선랜 광대역 다중 사용자 상향 데이터 전송을 위한 group ACK 전송 및 padding 방법이 제공될 수 있다.

【대표도】

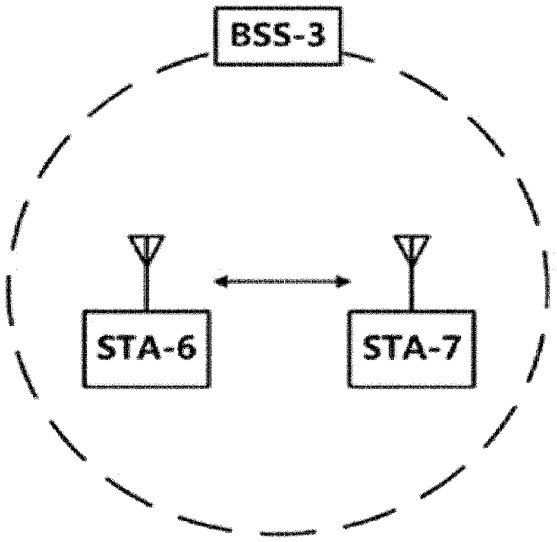
도 11

【도면】

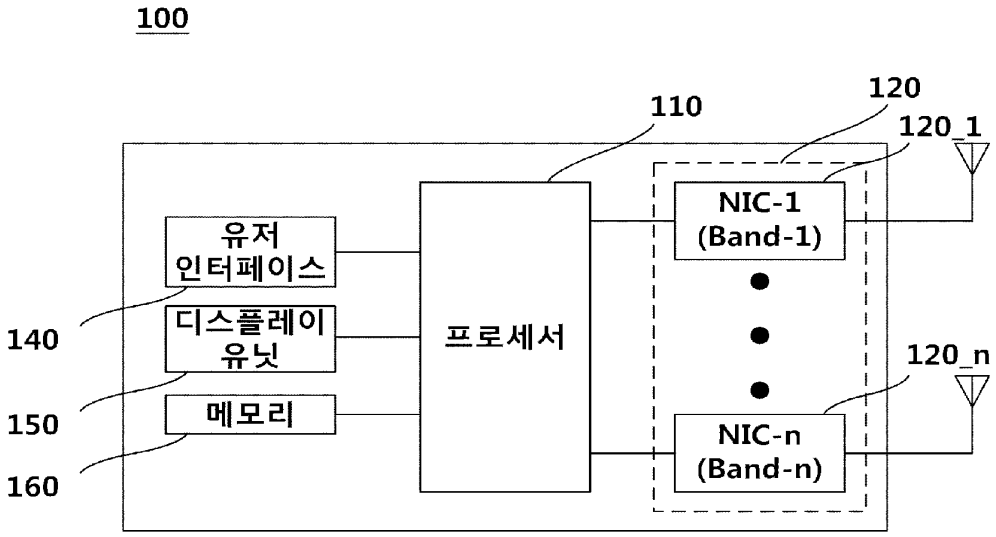
【도 1】



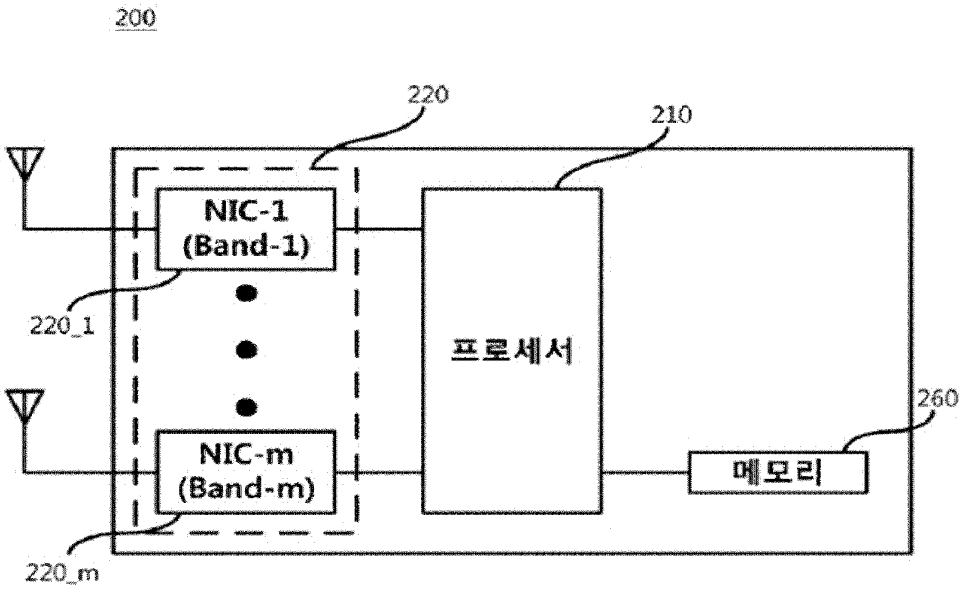
【도 2】



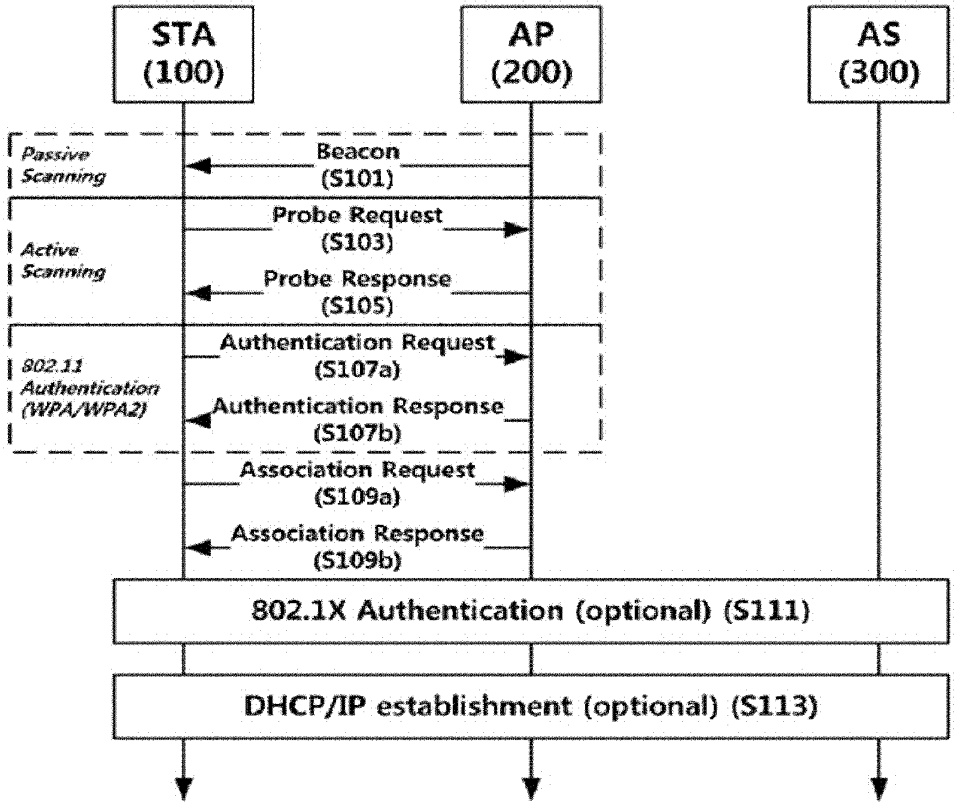
【도 3】


100
110
120
120_1
유저
인터페이스
디스플레이
유닛
메모리
140
150
160
프로세서
NIC-1
(Band-1)
NIC-n
(Band-n)
120_n

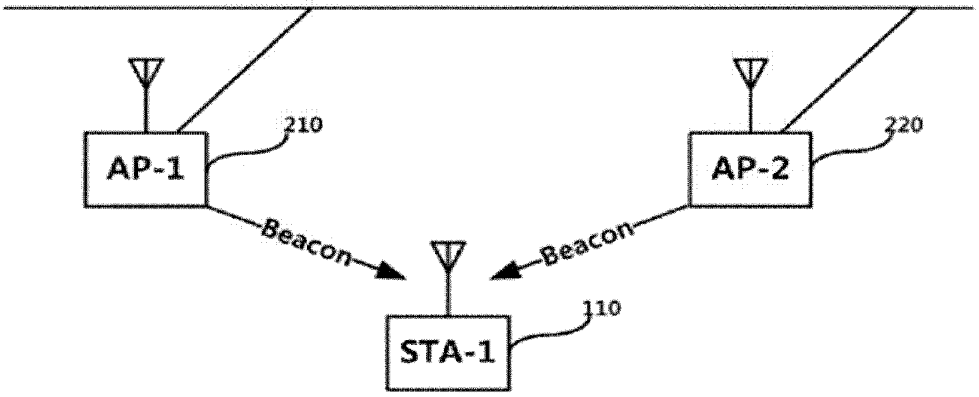
【도 4】



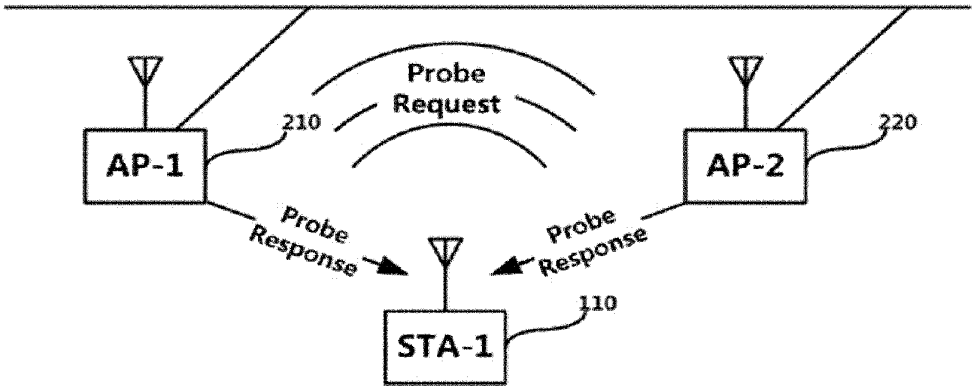
【도 5】


STA
(100)
AP
(200)
AS
(300)
Passive Scanning
Beacon
(S101)
Active Scanning
Probe Request
(S103)
Probe Response
(S105)
802.11 Authentication (WPA/WPA2)
Authentication Request
(S107a)
Authentication Response
(S107b)
Association Request
(S109a)
Association Response
(S109b)
802.1X Authentication (optional) (S111)
DHCP/IP establishment (optional) (S113)

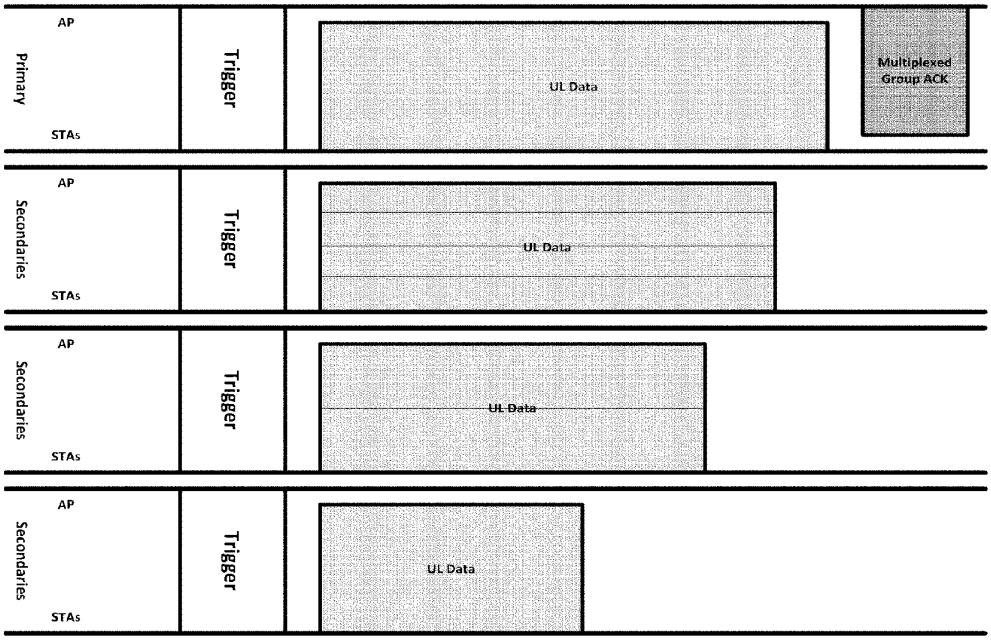
【도 6】


AP-1
210
AP-2
220
Beacon
Beacon
STA-1
110

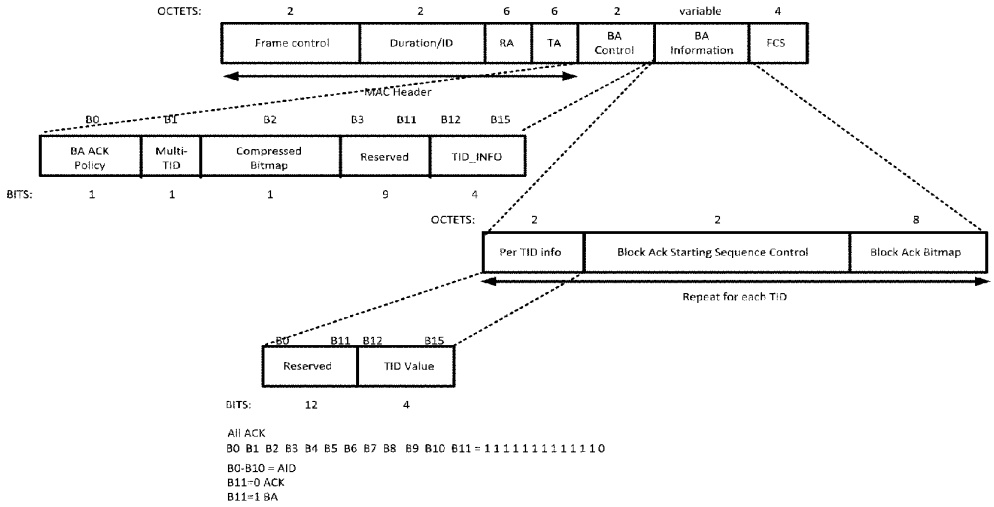
【도 7】


Probe
Request
AP-1
210
AP-2
220
Probe
Response
Probe
Response
STA-1
110

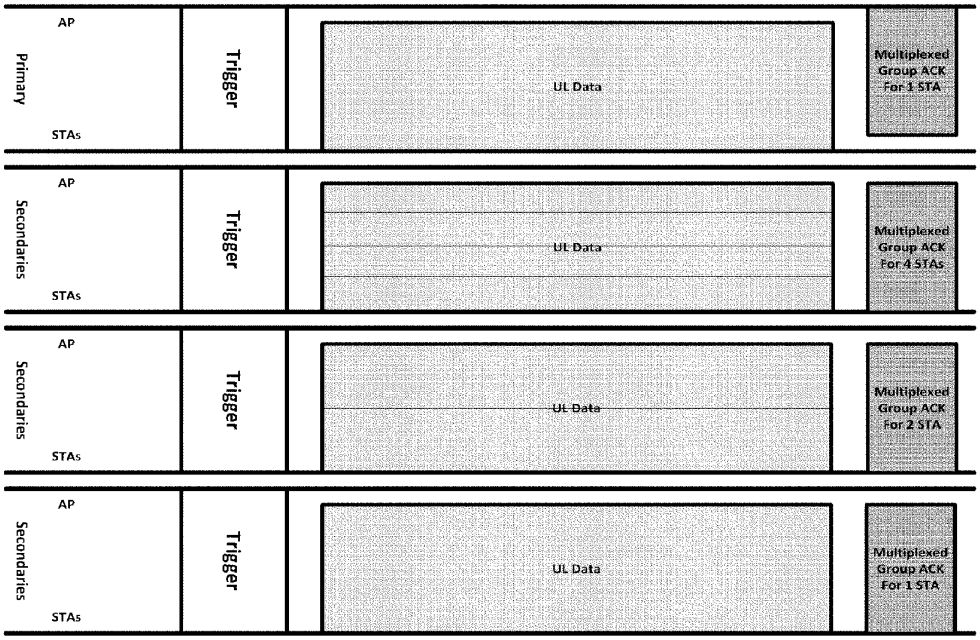
【도 8】


AP
Primary
STAs
Trigger
UL Data
Multiplexed Group ACK
AP
Secondaries
STAs
Trigger
UL Data
AP
Secondaries
STAs
Trigger
UL Data
AP
Secondaries
STAs
Trigger
UL Data

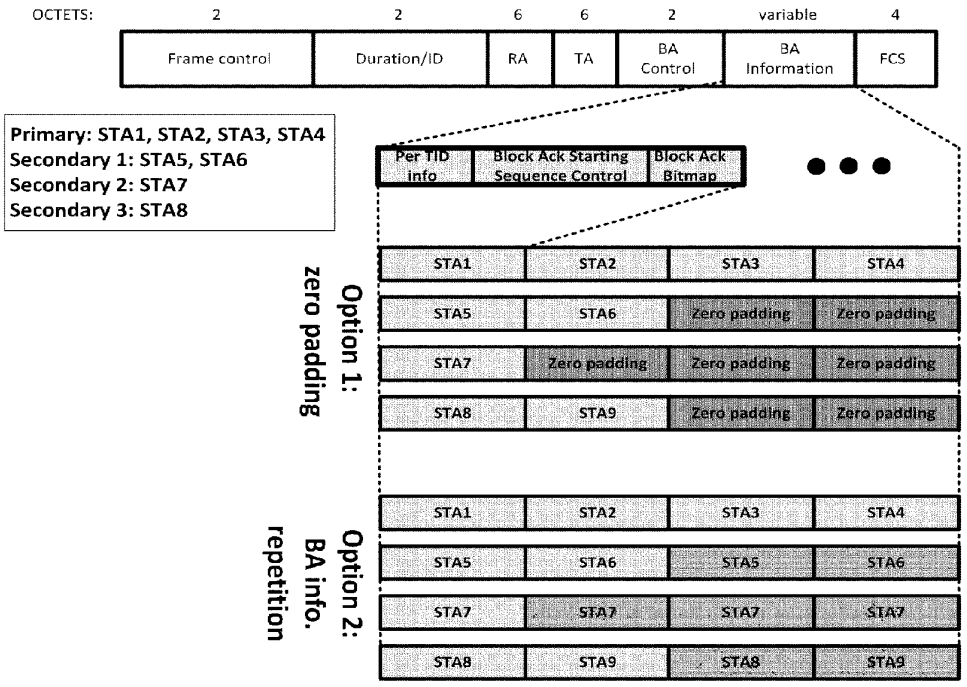
【도 9】


OCTETS:
2
2
6
6
2
variable
4
Frame control
Duration/ID
RA
TA
BA Control
BA Information
FCS
MAC Header
B0
B1
B2
B3
B11
B12
B15
BA ACK Policy
Multi-TID
Compressed Bitmap
Reserved
TID_INFO
BITS:
1
1
1
9
4
OCTETS:
2
2
8
Per TID info
Block Ack Starting Sequence Control
Block Ack Bitmap
Repeat for each TID
B0
B11
B12
B15
Reserved
TID Value
BITS:
12
4
All ACK
B0 B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 = 1 1 1 1 1 1 1 1 1 1 1 0
B0-B10 = AID
B11=0 ACK
B11=1 BA

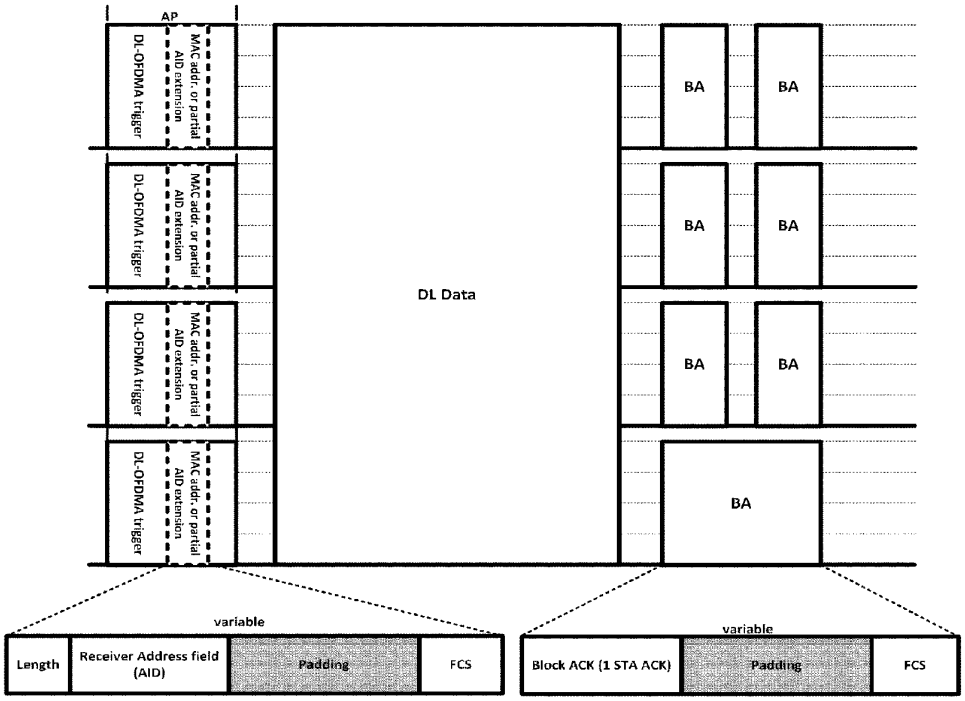
【도 10】


AP
Primary
STAs
Trigger
UL Data
Multiplexed Group ACK For 1 STA
AP
Secondaries
STAs
Trigger
UL Data
Multiplexed Group ACK For 4 STAs
AP
Secondaries
STAs
Trigger
UL Data
Multiplexed Group ACK For 2 STA
AP
Secondaries
STAs
Trigger
UL Data
Multiplexed Group ACK For 1 STA

【도 11】


OCTETS:
2
2
6
6
2
variable
4
Frame control
Duration/ID
RA
TA
BA Control
BA Information
FCS
Primary: STA1, STA2, STA3, STA4
Secondary 1: STA5, STA6
Secondary 2: STA7
Secondary 3: STA8
Per TID Info
Block Ack Starting Sequence Control
Block Ack Bitmap
Option 1: zero padding
STA1
STA2
STA3
STA4
STA5
STA6
Zero padding
STA7
STA8
STA9
Option 2: BA info. repetition

【도 12】


AP
DL-OFDMA trigger
MAC addr. or partial AID extension
DL Data
BA
variable
Length
Receiver Address field (AID)
Padding
FCS
Block ACK (1 STA ACK)

Digital Access Service
(DAS)

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Application Number

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Filing Date Mar. 04, 2015

출 원 인 : 주식회사 윌러스표준기술연구소

Applicant(s) WILUS Institute of Standards and Technology Inc.

2021년 03월 29일

특 허 청

COMMISSIONER

제출 일자 : 2015-03-04

【서지사항】

【서류명】	특허출원서
【참조번호】	WILP150022KR
【출원구분】	특허출원
【출원인】	
【명칭】	주식회사 윌러스표준기술연구소
【특허고객번호】	1-2013-022334-3
【대리인】	
【성명】	임국일
【대리인번호】	9-2014-000874-4
【포괄위임등록번호】	2014-036557-3
【발명의 국문명칭】	무선랜 광대역 다중 사용자 상향 데이터 전송을 위한 ACK 전송 및 FREQUENCY MASKING 방법
【발명의 영문명칭】	ACK TRANSMISSION AND FREQUENCY MASKING METHODS FOR WIDEBAND WILRELESS LAN MULTIPLE USER UPLINK DATA TRANSMISSION
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【성명의 영문표기】 Juhyung SON

【주민등록번호】 770724-1XXXXXX

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【국적】 KR

【출원언어】 국어

【이 발명을 지원한 국가연구개발사업】

【과제고유번호】 2014-PK10-18

【부처명】 미래창조과학부

【과제관리(전문)기관명】 한국정보통신기술협회

【연구사업명】 정보통신방송표준화사업

【연구과제명】 IEEE802.11 High Efficiency WLAN (HEW) 표준개발

【기여율】 1/1

【과제수행기관명】 (주)윌러스표준기술연구소

【연구기간】 2014.04.01 ~ 2017.02.28

【취지】 위와 같이 특허청장에게 제출합니다.

대리인 임국일 (서명 또는 인)

【수수료】

【출원료】	0 면	46,000 원
【가산출원료】	39 면	0 원
【우선권주장료】	0 건	0 원
【심사청구료】	0 항	0 원

【합계】 46,000 원

【감면사유】 소기업(70%감면)[1]

제출 일자 : 2015-03-04

【감면후 수수료】 13,800 원

제출 일자 : 2015-03-04

【발명의 설명】

【발명의 명칭】

무선랜 광대역 다중 사용자 상향 데이터 전송을 위한 ACK 전송 및 FREQUENCY MASKING 방법{ACK TRANSMISSION AND FREQUENCY MASKING METHODS FOR WIDEBAND WILRELESS LAN MULTIPLE USER UPLINK DATA TRANSMISSION}

【기술분야】

【0001】 본 발명은 무선랜 광대역 다중 사용자 상향 데이터 전송을 위한 ACK 전송 및 FREQUENCY MASKING 방법에 관한 것이다.

【발명의 배경이 되는 기술】

【0002】 최근 모바일 기기의 보급이 확대됨에 따라 이들에게 빠른 무선 인터넷 서비스를 제공할 수 있는 무선랜(Wireless LAN) 기술이 많은 각광을 받고 있다. 무선랜 기술은 근거리에서 무선 통신 기술을 바탕으로 스마트 폰, 스마트 패드, 랩탑 컴퓨터, 휴대형 멀티미디어 플레이어, 임베디드 기기 등과 같은 모바일 기기들이 무선으로 인터넷에 접속할 수 있도록 하는 기술이다.

【0003】 초기의 무선랜 기술은 IEEE(Institute of Electrical and Electronics Engineers) 802.11을 통해 2.4GHz 주파수를 사용하여 주파수 도약(hopping), 대역확산, 적외선 통신 등으로 1~2Mbps의 속도를 지원한 이래, 최근에는 OFDM(Orthogonal Frequency Division Multiplex)을 적용하여 최대 54Mbps의 속도를 지원할 수 있다. 이외에도 IEEE 802.11에서는 QoS(Quality for Service)의

향상, 액세스 포인트(Access Point, AP) 프로토콜 호환, 보안 강화(security enhancement), 무선 자원 측정(radio resource measurement), 차량 환경을 위한 무선 접속(wireless access vehicular environment), 빠른 로밍(fast roaming), 메쉬 네트워크(mesh network), 외부 네트워크와의 상호작용(interworking with external network), 무선 네트워크 관리(wireless network management) 등 다양한 기술의 표준을 실용화 또는 개발 중에 있다.

【0004】 IEEE 802.11 중에서 IEEE 802.11b는 2.4GHz 밴드의 주파수를 사용하면서 최고 11Mbps의 통신 속도를 지원한다. IEEE 802.11b 이후에 상용화된 IEEE 802.11a는 2.4GHz 밴드가 아닌 5GHz 밴드의 주파수를 사용함으로써 상당히 혼잡한 2.4GHz 밴드의 주파수에 비해 간섭에 대한 영향을 줄였으며, OFDM 기술을 사용하여 통신 속도를 최대 54Mbps까지 향상시켰다. 그러나 IEEE 802.11a는 IEEE 802.11b에 비해 통신 거리가 짧은 단점이 있다. 그리고 IEEE 802.11g는 IEEE 802.11b와 마찬가지로 2.4GHz 밴드의 주파수를 사용하여 최대 54Mbps의 통신속도를 구현하며, 하위 호환성(backward compatibility)을 만족하고 있어 상당한 주목을 받았는데, 통신 거리에 있어서도 IEEE 802.11a보다 우위에 있다.

【0005】 그리고, 무선랜에서 취약점으로 지적되어온 통신 속도에 대한 한계를 극복하기 위하여 제정된 기술 규격으로써 IEEE 802.11n이 있다. IEEE 802.11n은 네트워크의 속도와 신뢰성을 증가시키고, 무선 네트워크의 운영 거리를 확장하는데 목적을 두고 있다. 보다 구체적으로, IEEE 802.11n에서는 데이터 처리 속도가 최대 540Mbps 이상인 고처리율(High Throughput, HT)을 지원하며, 또한 전송 에

러를 최소화하고 데이터 속도를 최적화하기 위해 송신부와 수신부 양단 모두에 다중 안테나를 사용하는 MIMO(Multiple Inputs and Multiple Outputs) 기술에 기반을 두고 있다. 또한, 이 규격은 데이터 신뢰성을 높이기 위해 중복되는 사본을 여러 개 전송하는 코딩 방식을 사용할 뿐만 아니라, 속도를 증가시키기 위해 직교 주파수 분할 다중(Orthogonal Frequency Division Multiplex, OFDM)을 사용할 수도 있다.

【0006】무선랜의 보급이 활성화되고, 이를 이용한 어플리케이션이 다양화됨에 따라, 최근에는 IEEE 802.11n이 지원하는 데이터 처리 속도보다 더 높은 처리율(Very High Throughput, VHT)을 지원하기 위한 새로운 무선랜 시스템에 대한 필요성이 대두되고 있다. 이 중 IEEE 802.11ac는 5GHz 주파수에서 넓은 대역폭(80MHz~160MHz)을 지원한다. IEEE 802.11ac 표준은 5GHz 대역에서만 정의되어 있으나, 기존 2.4GHz 대역 제품들과의 하위 호환성을 위해 초기 11ac 칩셋들은 2.4GHz 대역에서의 동작도 지원할 것이다. 이때 802.11ac는 2.4GHz에서 최대 40MHz까지 대역폭을 지원한다. 이론적으로, 이 규격에 따르면 다중 단말의 무선랜 속도는 최소 1Gbps, 최대 단일 링크 속도는 최소 500Mbps까지 가능하게 된다. 이는 더 넓은 무선 주파수 대역폭(최대 160MHz), 더 많은 MIMO 공간적 스트림(최대 8개), 다중 사용자 MIMO, 그리고 높은 밀도의 변조(최대 256 QAM) 등 802.11n에서 받아들인 무선 인터페이스 개념을 확장하여 이루어진다. 또한, 기존 2.5GHz/5GHz 대신 60GHz 밴드를 사용해 데이터를 전송하는 방식으로 IEEE 802.11ad가 있다. IEEE 802.11ad는 빔포밍 기술을 이용하여 최대 7Gbps의 속도를 제공하는 전송규격

으로써, 대용량의 데이터나 무압축 HD 비디오 등 높은 비트레이트 동영상 스트리밍에 적합하다. 하지만 60GHz 주파수 밴드는 장애물 통과가 어려워 근거리 공간에서의 디바이스들 간에만 이용이 가능한 단점이 있다.

【0007】무선랜은 넓은 주파수 대역을 사용할 수 있다. 넓은 주파수 대역을 사용하기 위해 데이터를 전송하기 전에 일정 시간동안 가능한 대역이 있는지 살펴보고 데이터를 인접한 영역의 주파수 대역이 가용한지 여부에 따라 연접하여 주파수 대역을 사용한다. 예를 들어 20MHz 대역이 주 주파수 대역 (주 채널)이고 그 다음 20MHz가 사용가능하고 그 다음 20MHz가 사용 불가능 그 다음 20MHz가 사용 가능이라면 총 40MHz를 전송 대역으로 하여 데이터를 전송한다. 연접한 주파수 대역만을 데이터 전송 대역으로 사용하기 때문에 실제 가용한 주파수 대역이 있음에도 불구하고 사용하지 못하는 문제가 있다. 또한 종래의 무선 접속 기술은 동일한 Basic Service Set (BSS) 내에서 매 전송 시도마다 하나의 송신 단말 및 수신 단말의 일대일 접속만을 지원하기 때문에 단말들의 접속 환경이나 전송 데이터의 특성을 반영하지 못하여 비효율적이라는 문제를 지니고 있다.

【발명의 내용】

【해결하고자 하는 과제】

【0008】본 발명은 전술한 종래 기술의 문제점을 해결하기 위한 것으로서, 무선랜을 위한 다중채널 상향 패킷 전달 방법, 장치 및 시스템을 제공하기 위한 목적을 가지고 있다.

【과제의 해결 수단】

【0009】 이를 위해 본 발명은 경쟁 기반 채널 접근 시스템에서 다중 사용자 상향 전송 시의 ACK 처리 방법을 제안한다.

【발명의 효과】

【0010】 본 발명의 실시예에 따르면 multiplexed group ACK을 활용하여 불필요한 채널 점유를 줄임으로써 네트워크 전반의 spectral efficiency를 증가시킬 수 있는 효과가 있다.

【0011】 더욱 상세하게, 본 발명의 실시예에 따르면 multiplexed group ACK을 이용하여 OBSS의 primary channel의 점유 확률을 증가시킬 수 있으며, 과밀한 OBSS 환경에서 네트워크 전체의 spectral efficiency를 높일 수 있는 효과가 있다.

【0012】 또한, 본 발명의 실시예에 따르면 경쟁 기반 채널 접근 시스템에서 다중 사용자 상향 전송 시에 불필요한 채널 점유를 줄일 수 있는 효과가 있다.

【0013】 본 발명은 무선랜을 이용하는 스테이션 내지 액세스 포인트, 셀룰러 통신을 이용하는 스테이션 내지 기지국 등 다양한 통신 디바이스에 사용 가능하다.

【도면의 간단한 설명】

【0014】 도 1은 본 발명의 일 실시예에 따른 무선랜 시스템을 도시한 도면.

도 2는 본 발명의 다른 실시예에 따른 무선랜 시스템인 독립 BSS를 도시한 도면.

도 3은 본 발명의 일 실시예에 따른 스테이션의 구성을 나타낸 블록도.

도 4는 본 발명의 일 실시예에 따른 AP의 구성을 나타낸 블록도.

도 5는 본 발명의 일 실시 예에 관련된 STA이 AP와 링크를 설정하는 단계를 개략적으로 도시한 도면.

도 6은 본 발명의 일 실시 예에 관련된 STA의 패시브 스캐닝 방법을 도시한 도면.

도 7은 본 발명의 일 실시 예에 관련된 STA의 액티브 스캐닝 방법을 도시한 도면.

도 8은 본 발명의 일 실시예에 관련된 무선랜 네트워크 구성을 나타낸 도면.

도 9는 기본적인 다중 사용자 상향 데이터 전송 과정의 예시를 나타낸 도면.

도 10은 본 발명의 실시예에 따른 다중 사용자 상향 데이터 전송을 위한 ACK 전송 방법을 도시한 도면.

도 11는 본 발명의 실시예에 따른 NAV 설정방법을 도시한 도면.

도 12는 본 발명의 다른 실시예에 따른 guard band 설정 방법을 도시한 도면.

도 13은 본 발명의 실시예에 따른 다중 사용자 상향 데이터 전송 과정에서의 preamble 처리 방법을 도시한 도면.

도 14는 본 발명의 실시예에 따른 HE preamble의 구성 방법을 도시한 도면.

【발명을 실시하기 위한 구체적인 내용】

【0015】 아래에서는 첨부한 도면을 참조하여 본 발명이 속하는 기술 분야에서 통상의 지식을 가진 자가 용이하게 실시할 수 있도록 본 발명의 실시예를 상세히 설명한다. 그러나 본 발명은 여러 가지 상이한 형태로 구현될 수 있으며 여기에서 설명하는 실시예에 한정되지 않는다. 그리고 도면에서 본 발명을 명확하게 설명하기 위해서 설명과 관계없는 부분은 생략하였으며, 명세서 전체를 통하여 유사한 부분에 대해서는 유사한 도면 부호를 붙였다.

【0016】 명세서 전체에서, 어떤 부분이 다른 부분과 "연결"되어 있다고 할 때, 이는 "직접적으로 연결"되어 있는 경우뿐 아니라, 그 중간에 다른 소자를 사이에 두고 "전기적으로 연결"되어 있는 경우도 포함한다. 또한 어떤 부분이 어떤 구성요소를 "포함"한다고 할 때, 이는 특별히 반대되는 기재가 없는 한 다른 구성요소를 제외하는 것이 아니라 다른 구성요소를 더 포함할 수 있는 것을 의미한다.

【0017】 무선랜 시스템의 구조

【0018】 도 1은 본 발명의 일 실시예에 따른 무선랜 시스템을 도시하고 있다.

【0019】 무선랜 시스템은 하나 또는 그 이상의 기본 서비스 세트(Basic Service Set, BSS)를 포함하는데, BSS는 성공적으로 동기화를 이루어서 서로 통신할 수 있는 기기들의 집합을 나타낸다. 일반적으로 BSS는 인프라스트럭처 BSS(infrastructure BSS)와 독립 BSS(Independent BSS, IBSS)로 구분될 수 있으며, 도 1은 이 중 인프라스트럭처 BSS를 나타내고 있다.

【0020】도 1에 도시된 바와 같이 인프라스트럭쳐 BSS(BSS1, BSS2)는 하나 또는 그 이상의 스테이션(STA-1, STA-2, STA-3, STA-4, STA-5), 분배 서비스(Distribution Service)를 제공하는 스테이션인 액세스 포인트(PCP/AP-1, PCP/AP-2), 및 다수의 액세스 포인트(PCP/AP-1, PCP/AP-2)를 연결시키는 분배 시스템(Distribution System, DS)을 포함한다.

【0021】스테이션(Station, STA)은 IEEE 802.11 표준의 규정을 따르는 매체 접속 제어(Medium Access Control, MAC)와 무선 매체에 대한 물리층(Physical Layer) 인터페이스를 포함하는 임의의 디바이스로서, 광의로는 액세스 포인트(AP)와 비 액세스 포인트 STA(Non-AP Station)를 모두 포함한다. 무선 통신을 위한 스테이션은 프로세서(Processor)와 트랜시버(transceiver)를 포함하고, 실시예에 따라 사용자 인터페이스부와 디스플레이 유닛 등을 더 포함할 수 있다. 프로세서는 무선 네트워크를 통해 전송할 프레임을 생성하거나 또는 상기 무선 네트워크를 통해 수신된 프레임을 처리하며, 그 밖에 스테이션을 제어하기 위한 다양한 처리를 수행한다. 그리고, 트랜시버는 프로세서와 기능적으로 연결되어 있으며, 스테이션을 위하여 무선 네트워크를 통해 프레임을 송수신한다.

【0022】액세스 포인트(Access Point, AP)는 자신에게 결합된 스테이션을 위하여 무선 매체를 경유하여 분배시스템(DS)에 대한 접속을 제공하는 개체이다. 인프라스트럭쳐 BSS에서 AP와 접속되지 않은 STA들 사이의 통신은 AP를 경유하여 이루어지는 것이 원칙이지만, 다이렉트 링크가 설정된 경우에는 AP와 접속되지 않은 STA들 사이에서도 직접 통신이 가능하다. 한편, 본 발명에서 AP는 PCP(Personal

BSS Coordination Point)를 포함하는 개념으로 사용되며, 광의적으로는 집중 제어기, 기지국(Base Station, BS), 노드-B, BTS(Base Transceiver System), 또는 사이트 제어기 등의 개념을 모두 포함할 수 있다.

【0023】 복수의 인프라스트럭쳐 BSS는 분배 시스템(DS)을 통해 상호 연결될 수 있다. 이때, DS를 통하여 연결된 복수의 BSS를 확장 서비스 세트(Extended Service Set, ESS)라 한다. ESS에 포함되는 STA들은 서로 통신할 수 있으며, 동일한 ESS 내에서 AP와 접속되지 않은 STA들은 끊김 없이 통신하면서 하나의 BSS에서 다른 BSS로 이동할 수 있다.

【0024】 도 2는 본 발명의 다른 실시예에 따른 무선랜 시스템인 독립 BSS를 도시하고 있다. 도 2의 실시예에서 도 1의 실시예와 동일하거나 상응하는 부분은 중복적인 설명을 생략하도록 한다.

【0025】 도 2에 도시된 BSS-3는 독립 BSS이며 AP를 포함하지 않기 때문에, 모든 스테이션(STA-6, STA-7)이 AP와 접속되지 않은 상태이다. 독립 BSS는 DS로의 접속이 허용되지 않으며, 자기 완비적 네트워크(self-contained network)를 이룬다. 독립 BSS에서 각각의 스테이션들(STA-6, STA-7)은 다이렉트로 서로 연결될 수 있다.

【0026】 STA(스테이션)의 구성

【0027】 도 3은 본 발명의 일 실시예에 따른 스테이션의 구성을 나타낸 블록도이다.

【0028】 도시된 바와 같이, 본 발명의 실시예에 따른 STA(100)은 프로세서(110), 하나 이상의 네트워크 인터페이스 카드(NIC, Network Interface Card, 120), 유저 인터페이스부(140), 디스플레이 유닛(150) 및 메모리(160)를 포함할 수 있다.

【0029】 먼저, 네트워크 인터페이스 카드(120)는 무선랜 접속을 수행하기 위한 모듈로서, STA(100)에 내장되거나 외장으로 구비될 수 있다. 본 발명의 실시예에 따르면, 네트워크 인터페이스 카드 (120)는 서로 다른 주파수 밴드를 이용하는 복수의 네트워크 인터페이스 카드 모듈(120_1~120_n)을 포함할 수 있다. 이를 테면, 네트워크 인터페이스 카드 모듈(120_1~120_n)은 2.4GHz, 5GHz 및 60GHz 등의 서로 다른 주파수 밴드의 네트워크 인터페이스 카드 모듈을 포함할 수 있다. 본 발명의 실시예에 따르면, STA(100)은 6GHz 이상의 주파수 밴드를 이용하는 적어도 하나의 네트워크 인터페이스 카드 모듈과, 6GHz 이하의 주파수 밴드를 이용하는 적어도 하나의 네트워크 인터페이스 카드 모듈을 구비할 수 있다. 각각의 네트워크 인터페이스 카드 모듈(120_1~120_n)은 해당 네트워크 인터페이스 카드 모듈(120_1~120_n)이 지원하는 주파수 밴드의 무선랜 규격에 따라 AP 또는 외부 STA과 무선 통신을 수행할 수 있다. 네트워크 인터페이스 카드(120)는 STA(100)의 성능 및 요구 사항에 따라 한 번에 하나의 네트워크 인터페이스 카드 모듈(120_1~120_n)만을 동작시키거나 동시에 다수의 네트워크 인터페이스 카드 모듈(120_1~120_n)을 함께 동작시킬 수 있다.

【0030】 한편, 도 3의 블록도에서 STA(100)의 복수의 네트워크 인터페이스 카드 모듈(120_1~120_n)은 서로 분리되어 도시되어 있으며, 각각의 네트워크 인터페이스 카드 모듈(120_1~120_n)의 MAC/PHY 계층이 서로 독립적으로 운영된다. 다만, 본 발명은 이에 한정하지 않으며, 복수의 서로 다른 주파수 밴드의 네트워크 인터페이스 카드 모듈이 하나의 칩으로 통합된 상태로 STA(100)에 구비될 수도 있다.

【0031】 다음으로, 유저 인터페이스부(140)는 STA(100)에 구비된 다양한 형태의 입/출력 수단을 포함한다. 즉, 유저 인터페이스부(140)는 다양한 입력 수단을 이용하여 유저의 입력을 수신할 수 있으며, 프로세서(110)는 수신된 유저 입력에 기초하여 STA(100)을 제어할 수 있다. 또한, 유저 인터페이스부(140)는 다양한 출력 수단을 이용하여 프로세서(110)의 명령에 기초한 출력을 수행할 수 있다.

【0032】 다음으로, 디스플레이 유닛(150)은 디스플레이 화면에 이미지를 출력한다. 상기 디스플레이 유닛(150)은 프로세서(110)에 의해 실행되는 컨텐츠 또는 프로세서(110)의 제어 명령에 기초한 유저 인터페이스 등의 다양한 디스플레이 오브젝트를 출력할 수 있다. 또한, 메모리(160)는 STA(100)에서 사용되는 제어 프로그램 및 그에 따른 각종 데이터를 저장한다. 이러한 제어 프로그램에는 STA(100)이 AP 또는 외부 STA와 접속을 수행하는데 필요한 접속 프로그램이 포함될 수 있다.

【0033】 본 발명의 프로세서(110)는 다양한 명령 또는 프로그램을 실행하고, STA(100) 내부의 데이터를 프로세싱 할 수 있다. 또한, 프로세서(110)는 상술한

STA(100)의 각 유닛들을 제어하며, 유닛들 간의 데이터 송수신을 제어할 수 있다. 본 발명의 실시예에 따르면, 프로세서(110)는 STA(100)의 섹터 스윕 신호 전송/수신 및 이에 대응하는 피드백 신호 전송/수신 등의 커뮤니케이션 동작을 제어한다.

【0034】 또한, 프로세서(110)는 메모리(160)에 저장된 AP와의 접속을 실행하는 프로그램을 실행하여, AP가 전송한 통신 설정 메시지를 수신하고, 통신 설정 메시지에 포함된 STA(100)의 우선 조건에 대한 정보를 독출하고, STA(100)n의 우선 조건에 대한 정보에 따라 AP에 대한 접속을 요청한다. 이에 대한 구체적인 설명은 추후 기술하기로 한다.

【0035】 도 3에 도시된 STA(100)는 본 발명의 일 실시예에 따른 블록도로서, 분리하여 표시한 블록들은 디바이스의 엘리먼트들을 논리적으로 구별하여 도시한 것이다. 따라서 상술한 디바이스의 엘리먼트들은 디바이스의 설계에 따라 하나의 칩으로 또는 복수의 칩으로 장착될 수 있다. 또한, 본 발명의 실시예에서 STA(100)의 일부 구성들, 이를 테면 이동통신 모듈(130), 유저 인터페이스부(140) 및 디스플레이 유닛(150) 등은 STA(100)에 선택적으로 구비될 수 있다.

【0036】 AP(액세스 포인트)의 구성

【0037】 도 4는 본 발명의 일 실시예에 따른 AP의 구성을 나타낸 블록도이다.

【0038】 도시된 바와 같이, 본 발명의 실시예에 따른 AP(200)는 프로세서(210), NIC(Network Interface Card, 220) 및 메모리(160)를 포함할 수 있다. 도

4에서 AP(200)의 구성 중 도 3의 STA(100)의 구성과 동일하거나 상응하는 부분에 대해서는 중복적인 설명을 생략하도록 한다.

【0039】 도 4를 참조하면, 본 발명에 따른 AP(200)는 적어도 하나의 주파수 밴드에서 BSS를 운영하기 위한 네트워크 인터페이스 카드(220)를 구비한다. 도 3의 실시예에서 전술한 바와 같이, AP(200)의 네트워크 인터페이스 카드 (220) 또한 서로 다른 주파수 밴드를 이용하는 복수의 네트워크 인터페이스 카드 모듈(220_1~220_m)을 포함할 수 있다. 즉, 본 발명의 실시예에 따른 AP(200)는 서로 다른 주파수 밴드, 이를 테면 2.4GHz, 5GHz, 60GHz 중 두 개 이상의 네트워크 인터페이스 카드 모듈을 함께 구비할 수 있다. 바람직하게는, AP(200)는 6GHz 이상의 주파수 밴드를 이용하는 적어도 하나의 네트워크 인터페이스 카드 모듈과, 6GHz 이하의 주파수 밴드를 이용하는 적어도 하나의 네트워크 인터페이스 카드 모듈을 구비할 수 있다. 각각의 네트워크 인터페이스 카드 모듈(220_1~220_m)은 해당 네트워크 인터페이스 카드 모듈(220_1~220_m)이 지원하는 주파수 밴드의 무선랜 규격에 따라 STA과 무선 통신을 수행할 수 있다. 네트워크 인터페이스 카드 (220)는 AP(200)의 성능 및 요구 사항에 따라 한 번에 하나의 네트워크 인터페이스 카드 모듈(220_1~220_m)만을 동작시키거나 동시에 다수의 네트워크 인터페이스 카드 모듈(220_1~220_m)을 함께 동작시킬 수 있다.

【0040】 다음으로, 메모리(260)는 AP(200)에서 사용되는 제어 프로그램 및 그에 따른 각종 데이터를 저장한다. 이러한 제어 프로그램에는 STA의 접속을 관리하는 접속 프로그램이 포함될 수 있다. 또한, 프로세서(210)는 AP(200)의 각 유닛

들을 제어하며, 유닛들 간의 데이터 송수신을 제어할 수 있다.

【0041】 또한, 프로세서(210)는 메모리(260)에 저장된 스테이션과의 접속을 실행하는 프로그램을 실행하여, 하나 이상의 STA(100)에 대하여 통신 설정 메시지를 전송하고, STA(100)의 접속 요청에 따라 접속 설정을 수행하되, 통신 설정 메시지는 각 스테이션의 접속 우선 조건에 대한 정보를 포함한다. 이에 대한 구체적인 설명은 추후 기술하기로 한다.

【0042】 링크 설정 단계

【0043】 도 5는 본 발명의 일 실시 예에 관련된 STA이 AP와 링크를 설정하는 단계를 개략적으로 도시한 것이다.

【0044】 도 5를 참조하면, 본 발명에 따른 STA(100)가 AP(200)에 접속하는 단계는 크게 스캐닝(Scanning), 인증(Authentication) 및 결합(Association)의 3단계로 구분된다. 스캐닝단계는 STA(100)가 AP(200)가 운영하는 BSS의 접속 정보를 획득하는 단계이다. 스캐닝을 수행하기 위한 방법으로는 AP가 주기적으로 전송하는 비콘(Beacon) 메시지만을 활용하여 정보를 획득하는 패시브 스캐닝(Passive Scanning) 기법(S101)과 STA가 AP에 프로브 요청(Probe Request)을 전송하고(S103), AP로부터 프로브 응답(Probe Response)을 수신하여(S105) 접속 정보를 획득하는 액티브 스캐닝(Active Scanning)기법이 있다.

【0045】 스캐닝 단계에서 성공적으로 무선 접속 정보를 수신한 STA(100)는 인증 요청(Authentication Request)을 송신(S107a)하고, 인증 응답(Authentication

Response)을 수신(S107b)하여 인증 절차를 수행한다.

【0046】 성공적인 IEEE 802.11 계층에서의 인증 절차를 수행 후, 결합 단계(S109a, S109b)를 수행하고, 추가적으로 802.1X 기반의 인증(S111) 및 DHCP를 통한 IP 주소 획득(S113) 단계를 수행할 수 있다. AS(300)는 Authentication Server로서 STA(100)과 802.1X 기반의 인증을 처리하는 서버로서 AP(200)에 물리적으로 결합되어 존재하거나 별도의 서버로서 존재할 수 있다.

【0047】 도 6은 본 발명의 일 실시 예에 관련된 STA의 패시브 스캐닝 방법을 도시한 것이다.

【0048】 도 6을 참조하면, 본 발명에 따른 제1 STA(110)는 주변에 위치한 제 1 AP(210)와 제 2 AP(220)에서 주기적으로 송신하는 비콘 메시지를 수신하여 각각 AP들의 무선 접속 정보를 획득한다.

【0049】 도 7은 본 발명의 일 실시 예에 관련된 STA의 액티브 스캐닝 방법을 도시한 것이다.

【0050】 도 7을 참조하면, 본 발명에 따른 제 1 STA(110)는 주변에 위치한 AP의 정보를 획득하기 위해 프로브 요청 메시지를 송신하고, 이에 대응하는 프로브 응답 메시지를 각각 제 1 AP(210)와 제 2 AP(220)로부터 수신하여 각각 AP들의 무선 접속 정보를 획득한다.

【0051】 다중 사용자 상향 전송

【0052】 도 8은 본 발명의 일 실시예에 관련된 무선랜 네트워크 구성을 나타내고 있다.

【0053】 종래의 무선랜에서는 기본적으로 BSS 내에서 일대일로 통신하는 것을 원칙으로 하지만, 추가적인 채널과 OFDM 기술 혹은 추가적인 RF 모듈을 이용하게 되면 동시에 다수의 단말이 통신을 할 수 있는 환경이 조성된다. 그러나 일반적인 무선랜 환경에서는 하나의 AP가 다수의 단말과 통신을 주고 받기 때문에 상향전송을 가정할 경우, 다수의 단말이 동시에 AP에게 데이터를 전송하게 된다. 따라서 단말간에 대역 및 시간적으로 조정이 되어있어야 정상적인 데이터 전송이 가능하게 되고, 이러한 조정 과정의 효율에 따라 다중 사용자 상향 접속의 성능이 결정될 수 있다. 또한 여러 BSS가 인접해 있는 무선랜 환경이라면 각 BSS들이 점유하고 있는 채널 상황이 서로 다르게 나타나기 때문에, 도 8과 같이 같은 BSS내 단말인 경우에도 각자 인접한 BSS의 영향에 따라 접속 가능한 채널 역시 다르게 나타날 수 있다. 따라서 서로 다른 채널 상황 역시 다중 사용자 상향 접속을 지원하기 위한 고려사항이 될 수 있다.

【0054】 도 9는 기본적인 다중 사용자 상향 데이터 전송 과정의 예시를 나타내고 있다. 다중 사용자 상향 전송의 경우 하향 전송과는 다르게 다수의 단말이 동시에 데이터를 전송해야 하기 때문에 BSS 내의 모든 단말과 통신을 수행할 수 있는 AP가 전송 과정을 관리하는 방법이 유력하다. 따라서 AP는 자원 할당과 데이터 전송의 충돌을 방지하기 위하여 실질적인 데이터 전송이 시작되는 이전 시점에 BSS 내 무선 단말들의 버퍼 내 상향 전송 데이터 존재 유무 및 TXOP 등의 정보를 알아

야 하며, 또한 정확한 전송시점에 대한 정보를 단말들에게 전달해주어야 한다. 이러한 과정들은 다중 사용자 상향 데이터 전송을 위한 Initiation 과정 (S901) 및 scheduling 과정(S902)으로 나눌 수 있다. 사전에 미리 scheduiling에 관련된 정보를 수집한 뒤에 특정 조건을 만족 했을 시에 Initiation을 수행할 수도 있으며, 혹은 시간적인 조건에 따라 initiation을 수행한 뒤에 scheduling을 위한 정보를 그 즉시 수행하는 방법 역시 가능하다. Initiation 및 scheduling에는 AP와 무선 단말이 전송에 이용가능한 channel에 대한 정보를 서로 주고 받는 과정이 포함되며, 따라서 먼저 AP가 이용가능한 channel을 한정한 뒤에, 무선 단말들이 해당 channel들 중에서 이용가능한 모든 channel 정보를 피드백 해야하는 방식으로 진행될 수 있다. 본 발명에서는 initiation 및 scheduling의 상세한 구조 및 방법은 다루지 않는다.

【0055】 Initiation 과 scheduling 과정이 모두 마치면 AP가 정해준 시점에 AP로부터 할당받은 subcarrier를 통하여 다수의 단말이 동시에 데이터를 전송하며 (S903), 데이터 전송 후에는 AP가 상향 데이터 전송에 참여한 모든 단말에게 데이터 수신 여부를 알리는 ACK을 전송해야 한다 (S904). 802.11ax 표준에서는 20MHz 단위의 channel에 2.5/5/10 MHz의 subchannel 단위로 자원을 할당하는 방안을 고려하고 있기 때문에 하나의 channel에 다수의 단말이 전송에 참여할 수 있고, 따라서 AP는 각각의 channel에 group ACK의 형태로 각각의 channel에 전송한 단말들에 대한 ACK을 전송해야 한다.

【0056】다중 사용자 상향 데이터 전송에서 과밀한 BSS 배치 환경으로 인하여 다수의 OBSS의 영향을 받게되면 무선 단말의 지리적인 위치에 따라 이용 가능한 채널이 각기 다르게 나타나게 되고, 이런 경우 각 채널에 전송 가능한 단말의 수가 각기 다르게 나타날 수 있다. 따라서 단계 S903과 같이 실질적인 상향 데이터 전송에 관여된 air time이 각 채널별로 각기 다르게 나타날 수 있다. 그러나 AP가 송신과 수신을 동시에 수행할 수 있는 기능이 없는 경우, air time이 긴 channel에서 수신을 하는 동안 상향 데이터 전송을 마친 channel에 대한 ACK을 송신할 수 없기 때문에 무선 단말들은 air time이 가장 긴 channel의 데이터 수신이 종료되는 시점까지 zero padding (S905) 등과 같은 방법으로 대기한 후에 ACK을 전송받을 수 있다. 이와 같이 padding으로 대기하는 경우 데이터 전송과 관련없이 해당 channel을 점유하게 되어 전반적인 spectral efficiency가 감소하게 되며, 특히 해당 channel을 primary channel로 사용하는 OBSS의 경우 padding 기간 동안 어떠한 동작도 할 수 없기 때문에 직접적인 성능 감소를 겪게 된다. 따라서 본 발명에서는 상기한 문제점을 해결하기 위한 다중 사용자 상향 데이터 전송을 위한 ACK 전송 방법을 제안한다.

【0057】도 10은 본 발명의 실시예에 따른 다중 사용자 상향 데이터 전송을 위한 ACK 전송 방법을 도시하고 있다.

【0058】본 발명에서는 기존 802.11의 철학에 따라 모든 무선 단말이 primary channel을 통하여 UL-OFDMA initiation을 최초로 전송받고, 이후에 이용 가능한 secondary channel을 feedback 하는 것을 가정하기 때문에 primary channel

을 이용할 수 없는 무선 단말은 다중 사용자 상향 전송에 참여할 수 없으며, 따라서 primary channel에 항상 가장 많은 무선 단말이 할당될 수 있다.

【0059】 도10의 예시와 같이 각 채널에 할당된 air time이 각기 다르게 나타나는 경우 각 channel 별로 ACK을 전송하지 않고 다중 사용자 상향 데이터 전송에 사용된 모든 channel의 ACK을 가장 긴 air time을 갖는 primary channel에 multiplexing 하여 전송할 수 있다(S1002). 따라서 secondary channel에 할당된 무선 단말들은 각 channel의 상향 전송 air time이 종료되는 시점부터 ACK 수신을 위한 timer를 설정하여 primary channel의 ACK 전송 시점까지 대기한 후에 ACK을 수신한다(S1002). 이를 위해서는 모든 channel이 multiplexed group ACK의 전송 시점을 인지하고 있어야하며 이러한 정보는 initiation/scheduling 과정에서 개별적으로 전송할 수 있다. 상기 ACK 수신을 위한 timer가 만료되기 까지 단말은 전원절약 모드 (sleep)로 천이하여 전원을 절약할 수도 있다.

【0060】 Multiplexed group ACK을 이용하는 경우, secondary channel들은 상향 데이터 전송 air time이 끝난 시점에 바로 channel을 반환할 수 있기 때문에 해당 channel을 primary channel로 사용하는 OBSS가 더 이른 시점에 channel에 접속하는 것이 가능하다. 따라서 네트워크 전반의 spectral efficiency의 향상을 기대할 수 있다.

【0061】 도 11는 본 발명의 실시예에 따른 NAV 설정방법을 도시하고 있다.

【0062】다중 사용자 상향 데이터 전송에서는 무선 단말들의 채널 상황 feedback과 자원할당이 완료하는 시점까지는 정확한 전송 완료 시점을 알 수 없기 때문에 AP가 UL-OFDMA 과정을 시작하는 시점에CTS-to-self 나?CTS-to-group를 전송하여Initiation 과 Scheduling 시점까지의 NAV를 우선적으로 설정한다 (S1101). 이후에 scheduling 과정에서 자원할당을 마치게 되면 각 channel에 할당된 전송 air time이 산출되고 따라서Initiation 및 Scheduling의 마지막 시점에 AP와 각 channel에 할당된 무선 단말들이 동시에 identical waveform으로 common CTS를 전송하는 과정을 통해 각 channel에 요구되는 NAV를 설정할 수 있다 (S1102). 따라서 secondary channel의 NAV를 들은 OBSS는 해당 NAV가 완료되는 시점에 바로 channel에 접속하는 것이 가능하다. Secondary channel로 상향 데이터를 전송한 STA들은 데이터를 전송한 channel과 ACK을 전송받는 channel이 서로 다르게 된다. 만약 해당 STA들이 상향 데이터를 전송하는 secondary channel에 대해서만 NAV를 설정할 경우 secondary channel의 데이터 전송에 대한 protection은 이루어지지만, primary channel에 대해서는 NAV가 설정되어 있지 않기 때문에 secondary 상향 전송 STA의 인접 AP 혹은 STA들은 primary channel에 대해서는 idle 하다고 간주하여 primary channel에 대한 접속을 시도할 수 있다. 이런 경우 secondary channel의 상향 전송 STA는 AP의 ACK을 수신할 수 없기 때문에 불필요한 재전송 과정을 거치게 된다. 따라서 본 발명에서는 secondary channel을 통해 데이터를 전송하는 STA들이 multiplexed group ACK이 전송되는 primary channel에 대한 protection을 추가적으로 수행할 수 있도록 S1102의 common CTS를 primary와 secondary channel에

전송해야 한다. 이 때 primary channel에 전송하는 common CTS의 duration은 primary channel의 multiplexed group ACK이 완료되는 시점을 가리켜야 한다. Primary channel에 상향 데이터를 전송하는 STA들은 secondary channel에 대한 추가적인 common CTS 전송이 요구되지 않는다.

【0063】 도 12는 본 발명의 다른 실시예에 따른 guard band 설정 방법을 도시하고 있다.

【0064】 802.11에서는 서로 다른 단말들이 인접한 channel을 통해 통신하는 경우 상호간에 간섭의 영향을 최소화하기 위하여 channel의 경계의 주파수에는 의도적으로 파워를 줄이는 frequency masking 기법을 이용한다. Frequency masking은 현재 이용 중인 전체 대역의 최소, 최대 주파수 일부의 파워를 줄여 guard frequency 를 구성하는 식으로 이루어지기 때문에 40MHz 단위로 전송하는 frequency masking과 (S1201), 인접한 두 20MHz channel에서 독립적인 두개의 전송이 이루어지는 경우의 frequency masking (S1202)의 경우 중앙 주파수 부분의 guard frequency(S1203)의 유무에 따라 frequency masking의 형태가 다르게 나타난다. 따라서 본 발명에서 S1204와 같이 특정 STA가 40MHz의 단위로 전송을 시작한 뒤에 scheduling 및 자원할당 결과에 따라 특정 20MHz의 전송만 없어지고 전송이 계속 되는 경우 RF chain의 frequency masking은 최초의 형태 그대로 유지될 수 있기 때문에 guard frequency가 없는 형태의 20MHz 전송이 될 가능성이 있다. 이 경우, OBSS에서 비어있는 20MHz의 대역에 대하여 전송을 시도하게되면 guard frequency의 부재에 따라 상호간의 간섭이 발생할 수 있다. 따라서 본 발명에서는

다중 사용자 상향 데이터 전송시이 이루어 질 시에는 S1205와 같이 20MHz 단위의 guard frequency가 항시 형성될 수 있도록 하기 위하여 단일 단말의 20MHz 이상의 자원 할당이 되지 않도록하거나, frequency masking에 상관없이 guard frequency에 해당하는 주파수 성분에는 nulling을 하여 OBSS와의 간섭이 발생하지 않도록 한다.

【0065】 도 13은 본 발명의 실시예에 따른 다중 사용자 상향 데이터 전송 과정에서의 preamble 처리 방법을 도시하고 있다.

【0066】 802.11ax에서는 ax 지원 단말을 위한 HE preamble과 backward compatibility를 위한 legacy preamble을 PSDU 전반부에 삽입하여 함께 전송한다. 기존의 802.11에서는 64 FFT size만을 지원하였으나 802.11ax 표준 이후부터는 그 이상의 256 FFT까지 지원될 계획이므로 HE preamble 역시 256 FFT size로 각 상향 전송 단말이 각자 할당된 sub-channel에 자신의 common control information을 삽입하여 전송한다. 그러나 legacy preamble의 경우는 20MHz의 단위로 전송되기 때문에 sub-channel 단위로 자원을 할당받은 상향 데이터 전송 단말들이 할당 받은 sub-channel에 대하여 부분적으로 legacy preamble을 전송하는 것이 불가능하다. 따라서 본 발명에서는 다중 사용자 상향 데이터 전송에 참여하는 단말들이 legacy preamble을 전송하기 위한 방법으로 두 가지를 제안한다. 첫 번째로 특정 기준에 의하여 선정된 하나의 단말이 같은 20MHz channel에 할당된 단말들의 대표로서 단독으로 legacy preamble을 전송할 수 있다. 단말을 선정하기 위한 기준으로는 RSSI가 가장 높은 단말이 전송하거나 혹은 sub-channel 단위로 가장 상위의 sub-channel에 할당된 단말이 전송하도록 하는 방법 등이 있다. 따라서 선정된 단말은

20MHz 단위로 legacy preamble을 전송하고 바로 이어서 256 FFT size의 HE preamble을 자신이 할당된 sub-channel에 전송하고, 나머지 단말들은 선정된 단말의 legacy preamble이 전송된 이후에 같은 시점에 각자 할당된 sub-channel 단위로 HE preamble을 전송한다. 두 번째 방법으로는 같은 20MHz에 할당된 모든 단말이 동일한 common control information으로 identical waveform의 형태로 동시에 legacy preamble을 전송하는 것이다. 따라서 동일한 legacy preamble을 전송한 뒤에 이어서 각자 할당된 sub-channel에서의 HE preamble을 전송하게 된다. 위와 같은 방식으로 preamble을 전송하기 위해서는 scheduling 과정 등에서 legacy preamble에 해당하는 값들을 사전에 AP가 전달해 주는 방식 등으로 동시 전송하는 단말들이 모두 공유해야 한다.

【0067】 도 14는 본 발명의 실시예에 따른 HE preamble의 구성 방법을 도시하고 있다.

【0068】 802.11ax의 표준에서는 legacy preamble 이후에 ax 단말간의 동작 및 컨트롤을 위한 HE preamble을 이어서 전송할 것을 명시하고 있다. 그 중 ax 단말의 common control information을 담고 있는 HE-SIG A는 legacy preamble과 같은 64 FFT size로 이루어질 것이 유력하다. 따라서 HE-SIG A는 다중 사용자 상향 데이터 전송에 참여하는 모든 단말이 20MHz의 단위로 같은 common control information을 전송하도록 구성이 될 수 있으며, 혹은 64 FFT를 각 단말에게 할당된 sub-channel의 최소 단위별로 독립적으로 구성하여 각각 다른 정보를 전송하도록 할 수도 있다. 따라서 sub-channel 최소단위의 한 개 이상의 sub-channel을 할당 받은

단말은 할당 받은 모든 sub-channel에 같은 HE-SIG A를 복사하여 전송하여야 한다. 또한 HE-SIG A에는 컨트롤 메시지, 데이터, ACK 등의 상향 혹은 하향 중 어떠한 데이터 전송인지를 다른 단말들에게 알릴 수 있게 하기 위하여 상향/하향을 표시하는 indication bit가 포함될 수 있다.

【0069】 상기와 같이 무선랜 통신을 예로 들어 본 발명을 설명하였지만, 본 발명은 이에 한정하지 않으며 셀룰러 통신 등 다른 통신 시스템에서도 동일하게 적용될 수 있다. 또한 본 발명의 방법, 장치 및 시스템은 특정 실시예와 관련하여 설명되었지만, 본 발명의 구성 요소, 동작의 일부 또는 전부는 범용 하드웨어 아키텍쳐를 갖는 컴퓨터 시스템을 사용하여 구현될 수 있다.

【0070】 전술한 본 발명의 설명은 예시를 위한 것이며, 본 발명이 속하는 기술분야의 통상의 지식을 가진 자는 본 발명의 기술적 사상이나 필수적인 특징을 변경하지 않고서 다른 구체적인 형태로 쉽게 변형이 가능하다는 것을 이해할 수 있을 것이다. 그러므로 이상에서 기술한 실시예들은 모든 면에서 예시적인 것이며 한정적인 것이 아닌 것으로 해석해야 한다. 예를 들어, 단일형으로 설명되어 있는 각 구성 요소는 분산되어 실시될 수도 있으며, 마찬가지로 분산된 것으로 설명되어 있는 구성 요소들도 결합된 형태로 실시될 수 있다.

【0071】 본 발명의 범위는 상기 상세한 설명보다는 후술하는 특허청구범위에 의하여 나타내어지며, 특허청구범위의 의미 및 범위 그리고 그 균등 개념으로부터 도출되는 모든 변경 또는 변형된 형태가 본 발명의 범위에 포함되는 것으로 해석되어야 한다.

【부호의 설명】

【0072】 100: 스테이션

200: 액세스 포인트

【특허청구범위】

【청구항 1】

무선랜을 위한 방법, 장치 및 시스템

제출 일자 : 2015-03-04

【요약서】

【요약】

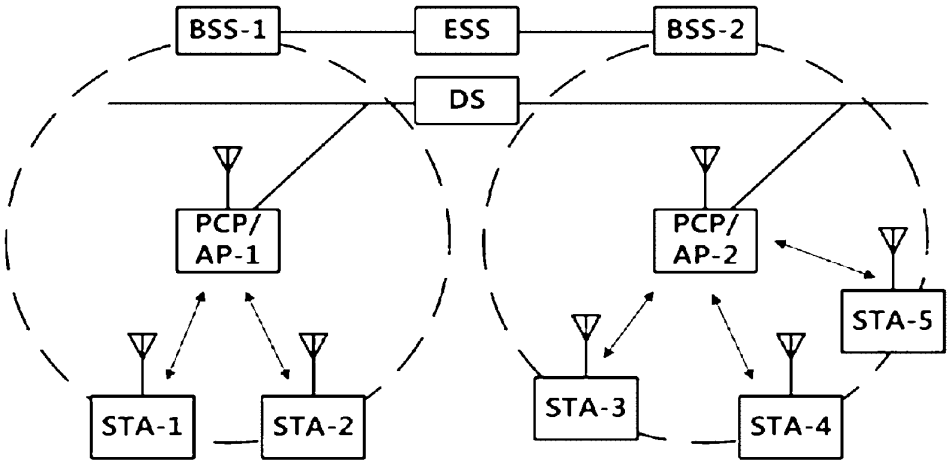
본 발명은 무선랜 광대역 다중 사용자 상향 데이터 전송을 위한 ACK 전송 및 FREQUENCY MASKING 방법에 관한 것이다. 이를 위해 본 발명은 경쟁 기반 채널 접근 시스템에서 다중 사용자 상향 전송 시의 ACK 처리 방법을 제안한다.

【대표도】

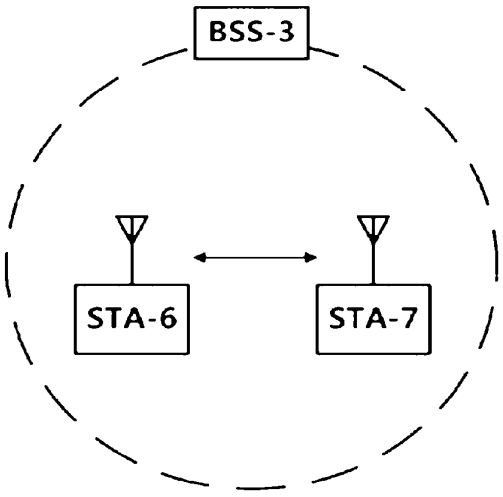
도 10

【도면】

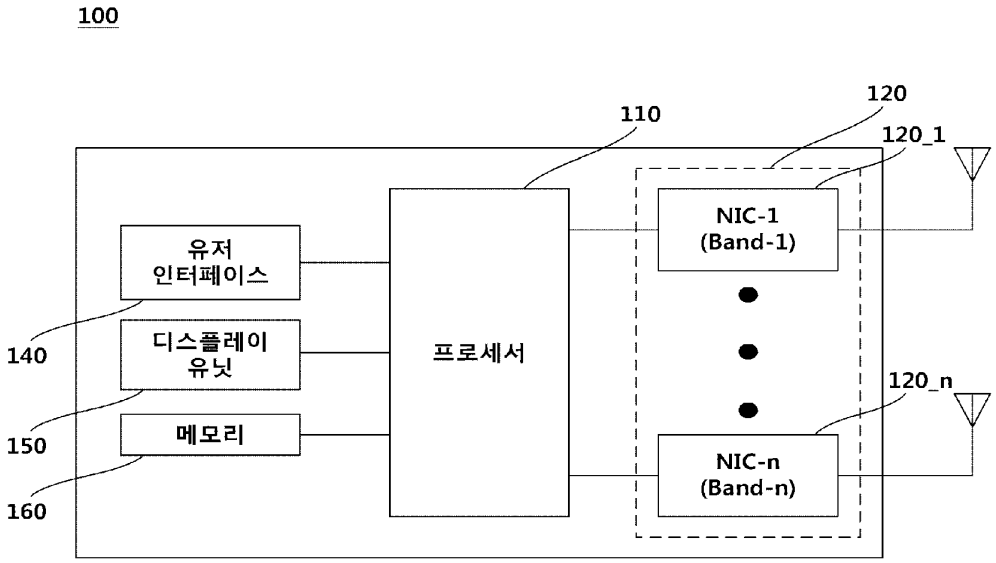
【도 1】



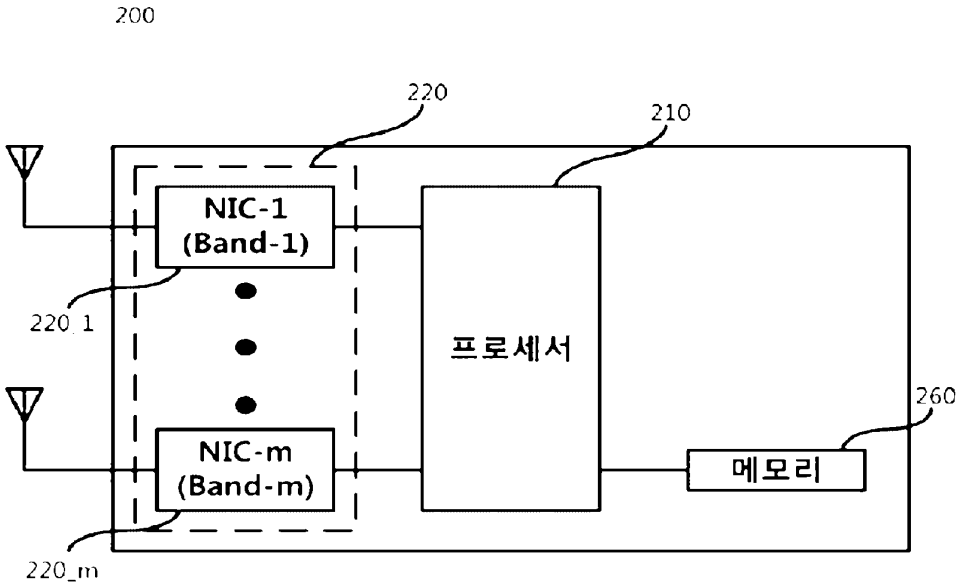
【도 2】



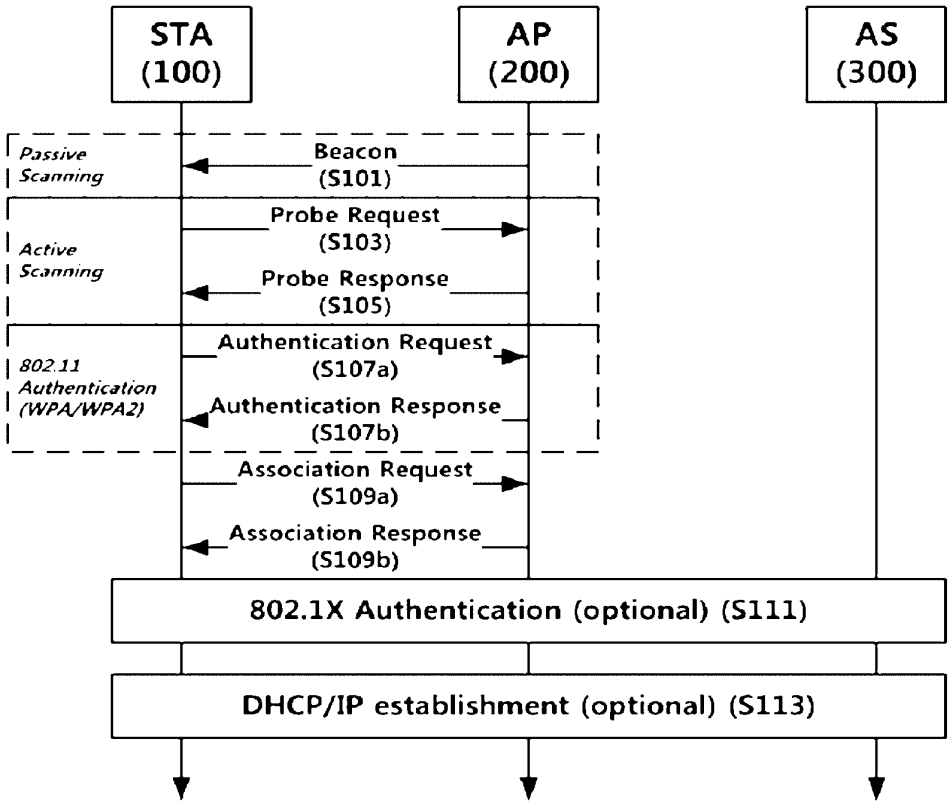
【도 3】


100
110
120
120_1
120_n
유저
인터페이스
디스플레이
유닛
메모리
프로세서
NIC-1
(Band-1)
NIC-n
(Band-n)
140
150
160

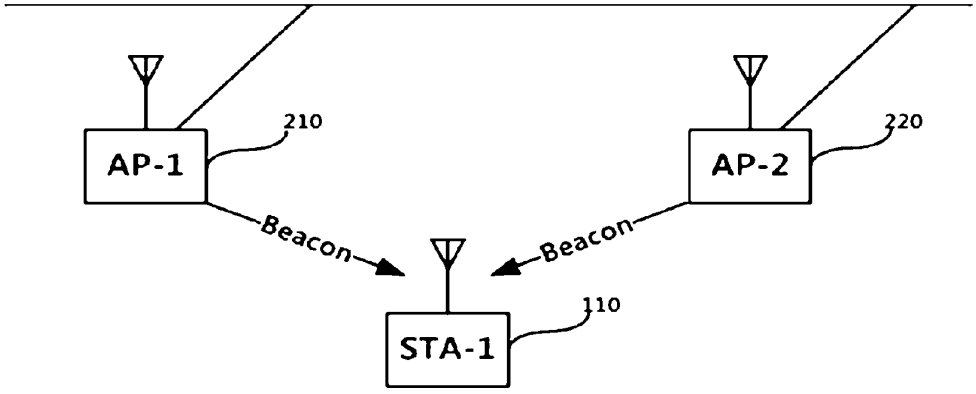
【도 4】



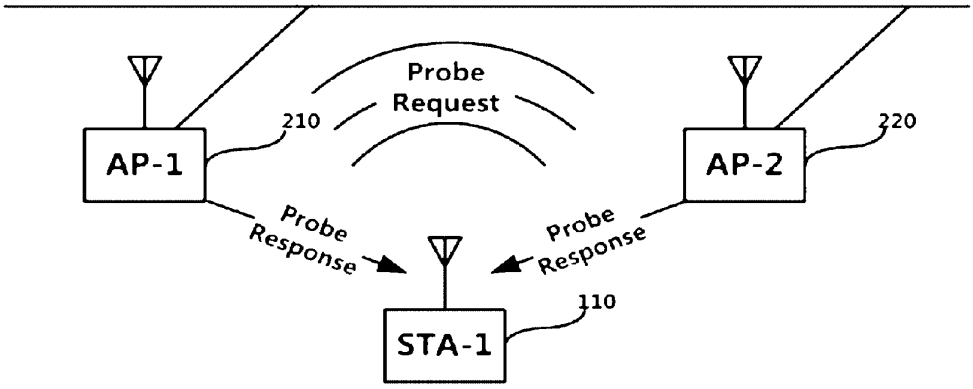
【도 5】


STA
(100)
AP
(200)
AS
(300)
Passive Scanning
Beacon
(S101)
Active Scanning
Probe Request
(S103)
Probe Response
(S105)
802.11 Authentication (WPA/WPA2)
Authentication Request
(S107a)
Authentication Response
(S107b)
Association Request
(S109a)
Association Response
(S109b)
802.1X Authentication (optional) (S111)
DHCP/IP establishment (optional) (S113)

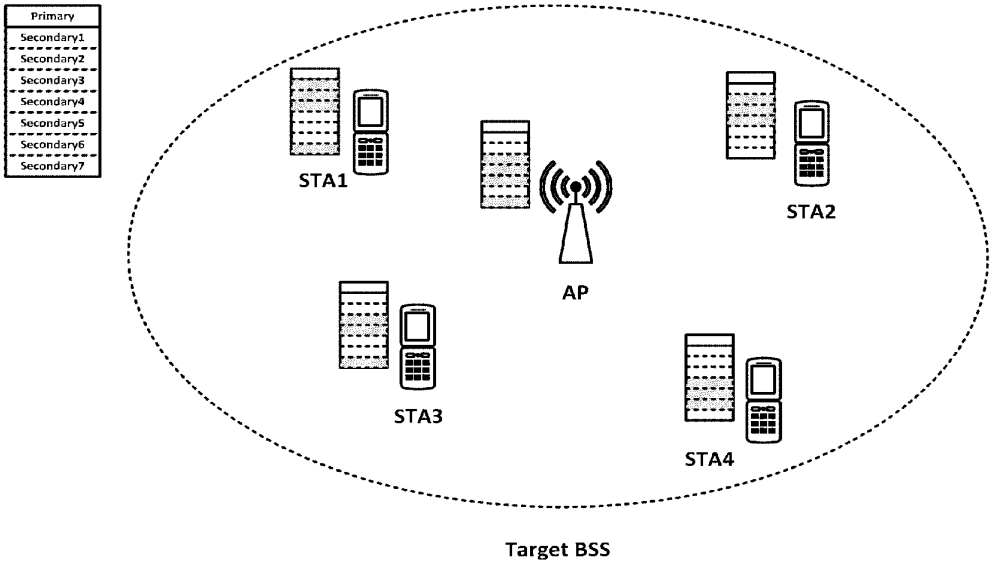
【도 6】


AP-1
210
AP-2
220
Beacon
Beacon
STA-1
110

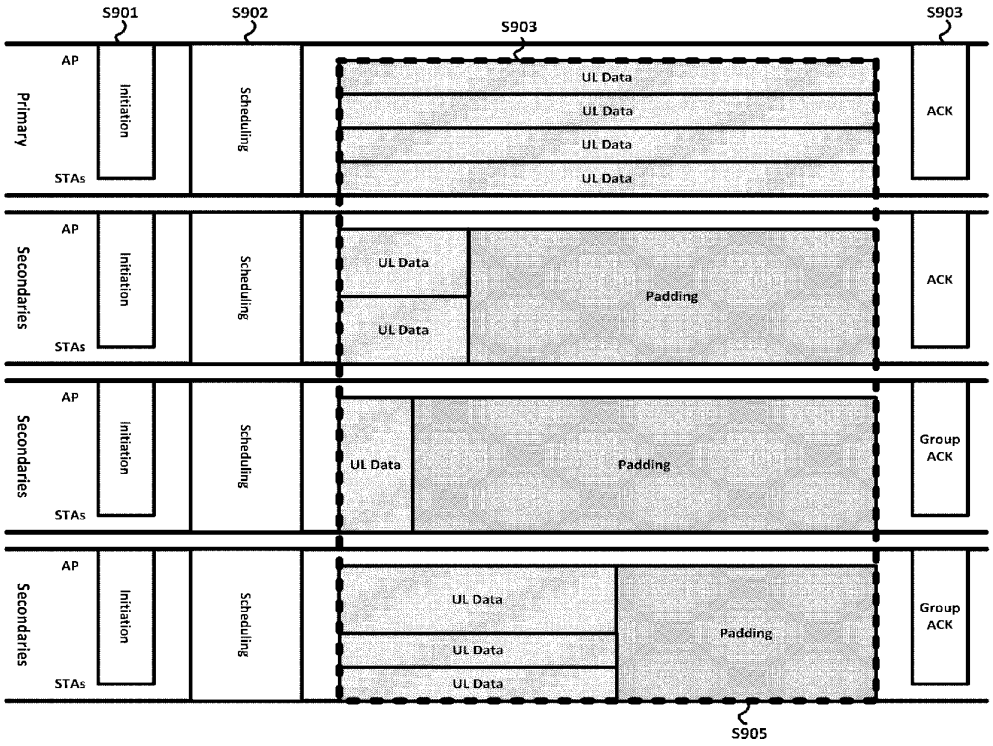
【도 7】


Probe
Request
AP-1
210
AP-2
220
Probe
Response
Probe
Response
STA-1
110

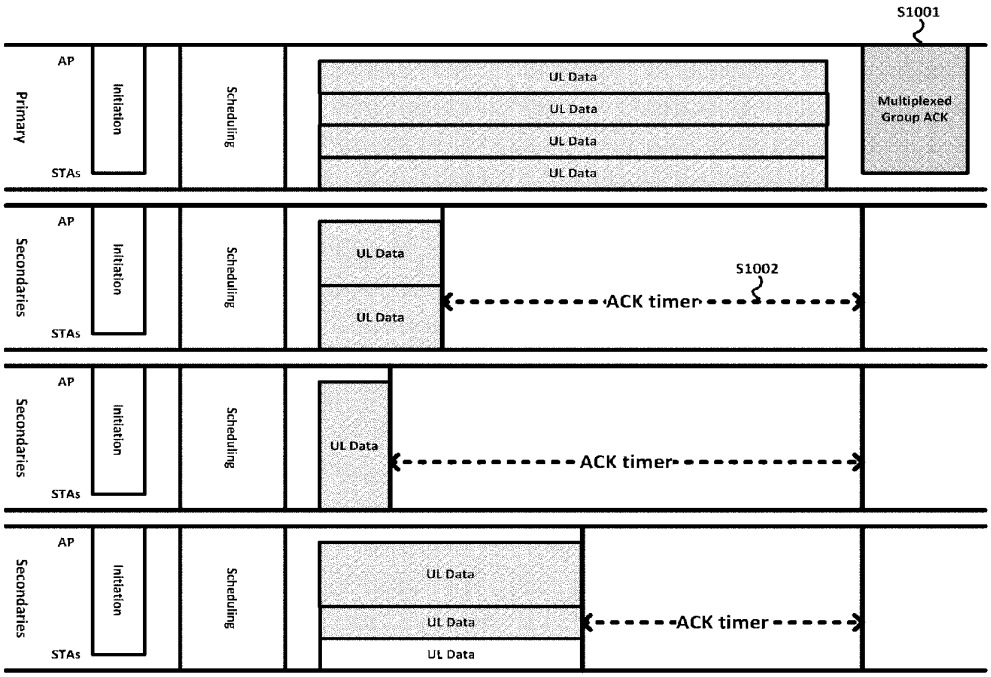
【도 8】


Primary
Secondary1
Secondary2
Secondary3
Secondary4
Secondary5
Secondary6
Secondary7
STA1
AP
STA2
STA3
STA4
Target BSS

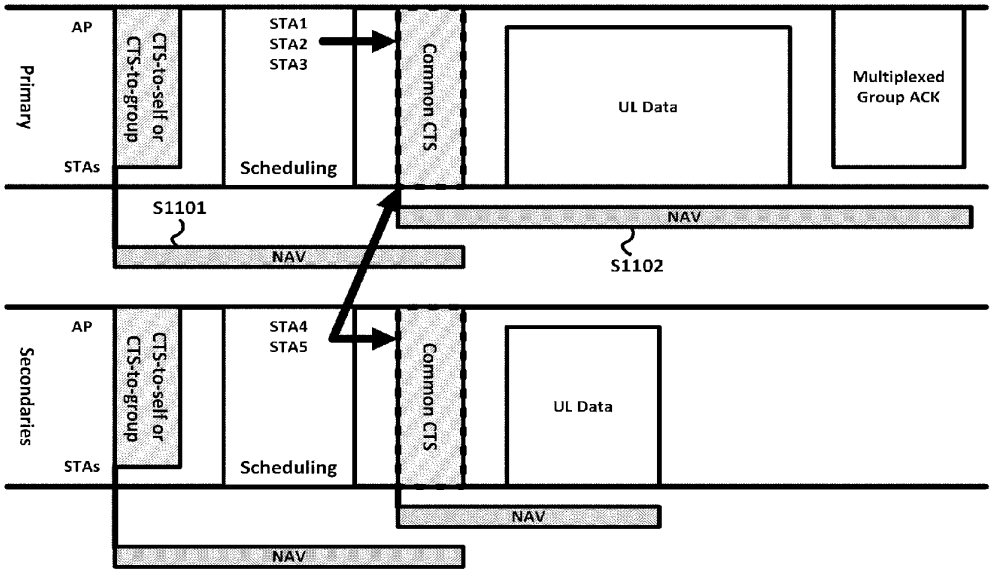
【도 9】


S901
S902
S903
S903
Primary
AP
STAs
Initiation
Scheduling
UL Data
UL Data
UL Data
UL Data
ACK
Secondaries
AP
STAs
Initiation
Scheduling
UL Data
UL Data
Padding
ACK
Secondaries
AP
STAs
Initiation
Scheduling
UL Data
Padding
Group ACK
Secondaries
AP
STAs
Initiation
Scheduling
UL Data
UL Data
UL Data
Padding
Group ACK
S905

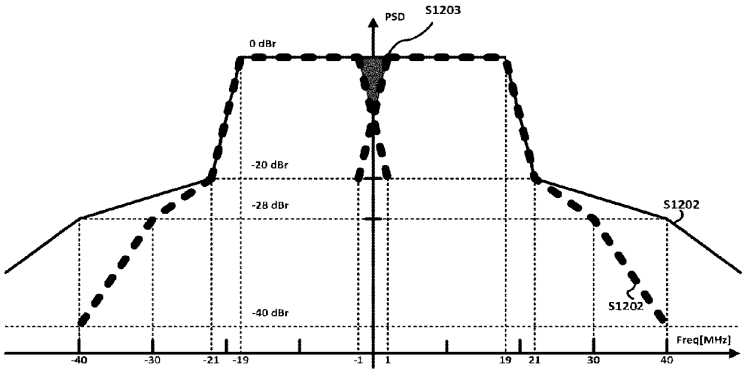
【도 10】

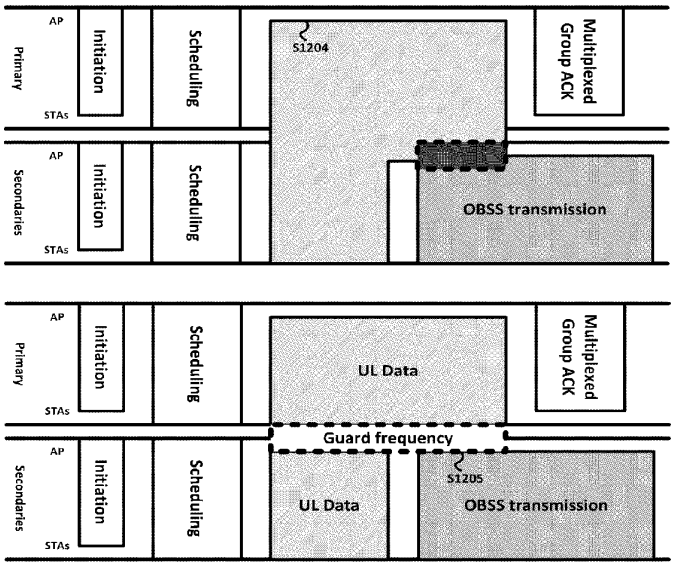

S1001
AP
Primary
STAs
Initiation
Scheduling
UL Data
UL Data
UL Data
UL Data
Multiplexed Group ACK
AP
Secondaries
STAs
Initiation
Scheduling
UL Data
UL Data
S1002
ACK timer
AP
Secondaries
STAs
Initiation
Scheduling
UL Data
ACK timer
AP
Secondaries
STAs
Initiation
Scheduling
UL Data
UL Data
UL Data
ACK timer

【도 11】


Primary
AP
STAs
CTS-to-self or CTS-to-group
STA1
STA2
STA3
Scheduling
Common CTS
UL Data
Multiplexed Group ACK
S1101
NAV
NAV
S1102
Secondaries
AP
STAs
CTS-to-self or CTS-to-group
STA4
STA5
Scheduling
Common CTS
UL Data
NAV
NAV

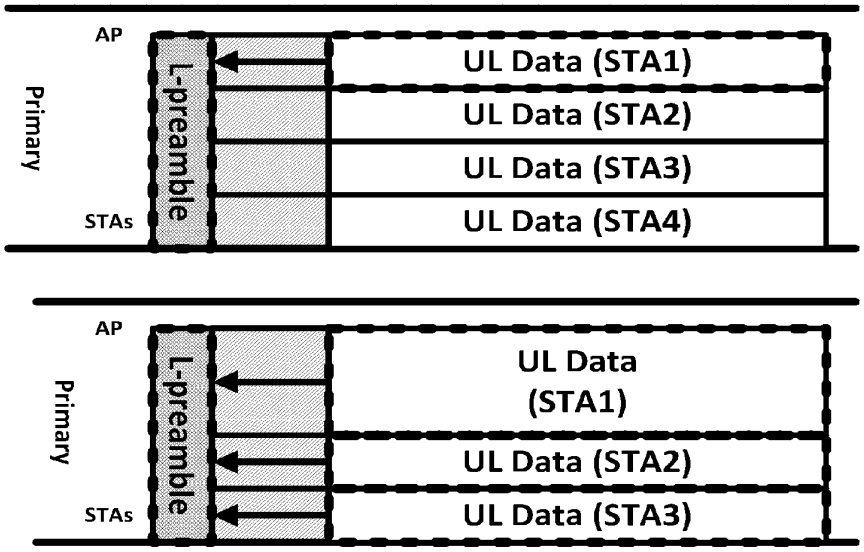
【도 12】


PSD
S1203
0 dBr
-20 dBr
-28 dBr
-40 dBr
S1202
S1202
Freq[MHz]
-40
-30
-21
-19
-1
1
19
21
30
40

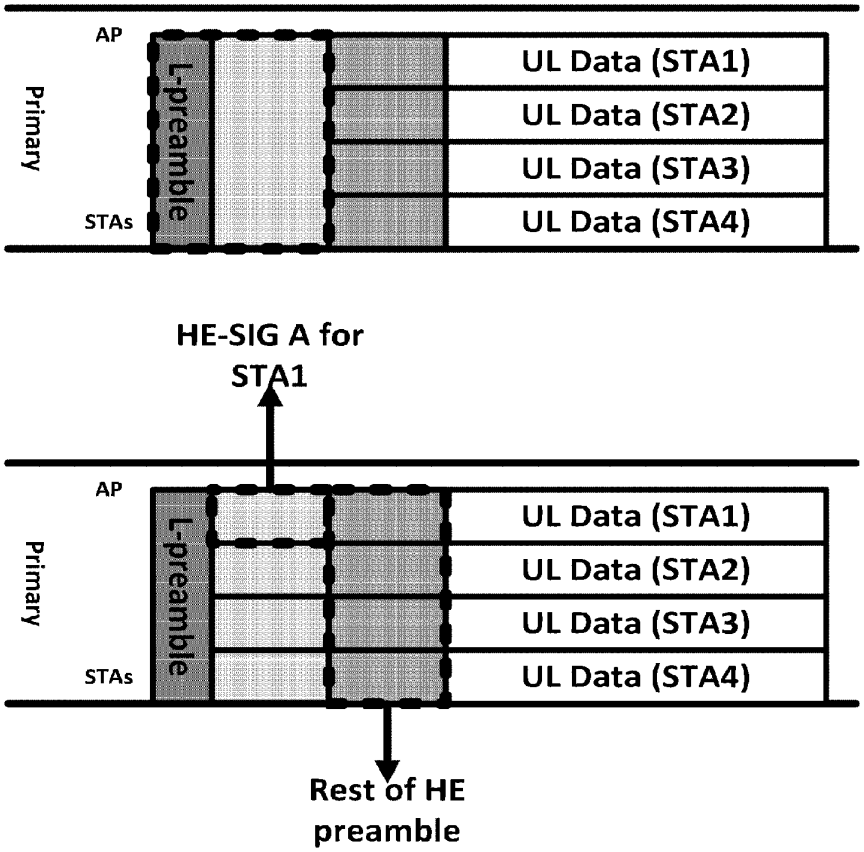

AP
Primary
STAs
Initiation
Scheduling
S1204
Multiplexed Group ACK
AP
Secondaries
STAs
Initiation
Scheduling
OBSS transmission
AP
Primary
STAs
Initiation
Scheduling
UL Data
Multiplexed Group ACK
Guard frequency
AP
Secondaries
STAs
Initiation
Scheduling
S1205
UL Data
OBSS transmission

UL Data

【도 13】


AP
Primary
STAs
L-preamble
UL Data (STA1)
UL Data (STA2)
UL Data (STA3)
UL Data (STA4)
AP
Primary
STAs
L-preamble
UL Data
(STA1)
UL Data (STA2)
UL Data (STA3)

【도 14】


AP
Primary
STAs
L-preamble
UL Data (STA1)
UL Data (STA2)
UL Data (STA3)
UL Data (STA4)
HE-SIG A for STA1
AP
Primary
STAs
L-preamble
UL Data (STA1)
UL Data (STA2)
UL Data (STA3)
UL Data (STA4)
Rest of HE preamble

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출 원 번 호 : 10-2015-0066670
Application Number

출 원 년 월 일 : 2015년 05월 13일
Filing Date May. 13, 2015

출 원 인 : 주식회사 윌러스표준기술연구소

Applicant(s) WILUS Institute of Standards and Technology Inc.

2021년 03월 29일

특 허 청
COMMISSIONER

제출 일자 : 2015-05-13

【서지사항】

【서류명】 특허출원서

【참조번호】 150049HEW

【출원구분】 특허출원

【출원인】

【명칭】 주식회사 윌러스표준기술연구소

【특허고객번호】 1-2013-022334-3

【대리인】

【성명】 임국일

【대리인번호】 9-2014-000874-4

【포괄위임등록번호】 2014-036557-3

【발명의 국문명칭】 무선랜 광대역 다중 사용자 상향 데이터 전송을 위한 group ACK 전송 및 padding 방법

【발명의 영문명칭】 GROUP ACK TRANSMISSION AND PADDING METHODS FOR WIDEBAND WIRELESS LAN MULTIPLE USER UPLINK DATA TRANSMISSION

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【우편번호】 122-957

【주소】 서울특별시 은평구 서오릉로13길 18-1

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【발명자】

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【국적】 KR

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【주민등록번호】 740908-1XXXXXX

【우편번호】 437-810

【주소】 경기도 의왕시 내손중앙로 11 의왕내손이편한세상 1113동1704호

【국적】 KR

【발명자】

【성명】 손주형

【성명의 영문표기】 Juhyung SON

【주민등록번호】 770724-1XXXXXX

【우편번호】 437-810

【주소】 경기도 의왕시 내손중앙로 11 의왕내손이편한세상 1114동 302호

【국적】 KR

제출 일자 : 2015-05-13

【출원언어】 국어

【이 발명을 지원한 국가연구개발사업】

【과제고유번호】 R0166-15-1030

【부처명】 미래창조과학부

【과제관리(전문)기관명】 정보통신기술연구진흥센터

【연구사업명】 정보통신방송표준개발지원

【연구과제명】 IEEE802.11 High Efficiency WLAN (HEW) 표준개발

【기여율】 1/1

【과제수행기관명】 (주)윌러스표준기술연구소

【연구기간】 2014.04.01 ~ 2017.02.28

【취지】 위와 같이 특허청장에게 제출합니다.

대리인 임국일 (서명 또는 인)

【수수료】

【출원료】 0 면 46,000 원

【가산출원료】 26 면 0 원

【우선권주장료】 0 건 0 원

【심사청구료】 0 항 0 원

【합계】 46,000 원

【감면사유】 소기업(70%감면)[1]

【감면후 수수료】 13,800 원

제출 일자 : 2015-05-13

【발명의 설명】

【발명의 명칭】

무선랜 광대역 다중 사용자 상향 데이터 전송을 위한 group ACK 전송 및 padding 방법{GROUP ACK TRANSMISSION AND PADDING METHODS FOR WIDEBAND WIRELESS LAN MULTIPLE USER UPLINK DATA TRANSMISSION}

【기술분야】

【0001】 본 발명은 무선랜을 위한 장치, 시스템 및 무선랜 통신 방법에 관한 것으로, 무선랜 광대역 다중 사용자 상향 데이터 전송을 위한 group ACK 전송 및 padding 방법에 관한 기술이다.

【발명의 배경이 되는 기술】

【0002】 최근 모바일 기기의 보급이 확대됨에 따라 이들에게 빠른 무선 인터넷 서비스를 제공할 수 있는 무선랜(Wireless LAN) 기술이 많은 각광을 받고 있다. 무선랜 기술은 근거리에서 무선 통신 기술을 바탕으로 스마트 폰, 스마트 패드, 랩탑 컴퓨터, 휴대형 멀티미디어 플레이어, 임베디드 기기 등과 같은 모바일 기기들이 무선으로 인터넷에 접속할 수 있도록 하는 기술이다.

【0003】 초기의 무선랜 기술은 IEEE(Institute of Electrical and Electronics Engineers) 802.11을 통해 2.4GHz 주파수를 사용하여 주파수 도약(hopping), 대역확산, 적외선 통신 등으로 1~2Mbps의 속도를 지원한 이래, 최근에는 OFDM(Orthogonal Frequency Division Multiplex)을 적용하여 최대 54Mbps의 속

도를 지원할 수 있다. 이외에도 IEEE 802.11에서는 QoS(Quality for Service)의 향상, 액세스 포인트(Access Point, AP) 프로토콜 호환, 보안 강화(security enhancement), 무선 자원 측정(radio resource measurement), 차량 환경을 위한 무선 접속(wireless access vehicular environment), 빠른 로밍(fast roaming), 메쉬 네트워크(mesh network), 외부 네트워크와의 상호작용(interworking with external network), 무선 네트워크 관리(wireless network management) 등 다양한 기술의 표준을 실용화 또는 개발 중에 있다.

【0004】 IEEE 802.11 중에서 IEEE 802.11b는 2.4GHz 밴드의 주파수를 사용하면서 최고 11Mbps의 통신 속도를 지원한다. IEEE 802.11b 이후에 상용화된 IEEE 802.11a는 2.4GHz 밴드가 아닌 5GHz 밴드의 주파수를 사용함으로써 상당히 혼잡한 2.4GHz 밴드의 주파수에 비해 간섭에 대한 영향을 줄였으며, OFDM 기술을 사용하여 통신 속도를 최대 54Mbps까지 향상시켰다. 그러나 IEEE 802.11a는 IEEE 802.11b에 비해 통신 거리가 짧은 단점이 있다. 그리고 IEEE 802.11g는 IEEE 802.11b와 마찬가지로 2.4GHz 밴드의 주파수를 사용하여 최대 54Mbps의 통신속도를 구현하며, 하위 호환성(backward compatibility)을 만족하고 있어 상당한 주목을 받았는데, 통신 거리에 있어서도 IEEE 802.11a보다 우위에 있다.

【0005】 그리고, 무선랜에서 취약점으로 지적되어온 통신 속도에 대한 한계를 극복하기 위하여 제정된 기술 규격으로써 IEEE 802.11n이 있다. IEEE 802.11n은 네트워크의 속도와 신뢰성을 증가시키고, 무선 네트워크의 운영 거리를 확장하는데 목적을 두고 있다. 보다 구체적으로, IEEE 802.11n에서는 데이터 처리 속도가 최대

540Mbps 이상인 고처리율(High Throughput, HT)을 지원하며, 또한 전송 에러를 최소화하고 데이터 속도를 최적화하기 위해 송신부와 수신부 양단 모두에 다중 안테나를 사용하는 MIMO(Multiple Inputs and Multiple Outputs) 기술에 기반을 두고 있다. 또한, 이 규격은 데이터 신뢰성을 높이기 위해 중복되는 사본을 여러 개 전송하는 코딩 방식을 사용할 뿐만 아니라, 속도를 증가시키기 위해 직교 주파수 분할 다중(Orthogonal Frequency Division Multiplex, OFDM)을 사용할 수도 있다.

【0006】무선랜의 보급이 활성화되고, 이를 이용한 어플리케이션이 다양화됨에 따라, 최근에는 IEEE 802.11n이 지원하는 데이터 처리 속도보다 더 높은 처리율(Very High Throughput, VHT)을 지원하기 위한 새로운 무선랜 시스템에 대한 필요성이 대두되고 있다. 이 중 IEEE 802.11ac는 5GHz 주파수에서 넓은 대역폭(80MHz~160MHz)을 지원한다. IEEE 802.11ac 표준은 5GHz 대역에서만 정의되어 있으나, 기존 2.4GHz 대역 제품들과의 하위 호환성을 위해 초기 11ac 칩셋들은 2.4GHz 대역에서의 동작도 지원할 것이다. 이때 802.11ac는 2.4GHz에서 최대 40MHz까지 대역폭을 지원한다. 이론적으로, 이 규격에 따르면 다중 단말의 무선랜 속도는 최소 1Gbps, 최대 단일 링크 속도는 최소 500Mbps까지 가능하게 된다. 이는 더 넓은 무선 주파수 대역폭(최대 160MHz), 더 많은 MIMO 공간적 스트림(최대 8개), 다중 사용자 MIMO, 그리고 높은 밀도의 변조(최대 256 QAM) 등 802.11n에서 받아들인 무선 인터페이스 개념을 확장하여 이루어진다. 또한, 기존 2.5GHz/5GHz 대신 60GHz 밴드를 사용해 데이터를 전송하는 방식으로 IEEE 802.11ad가 있다. IEEE 802.11ad는 빔포밍 기술을 이용하여 최대 7Gbps의 속도를 제공하는 전송규격으로써, 대용량의 데

이터나 무압축 HD 비디오 등 높은 비트레이트 동영상 스트리밍에 적합하다. 하지만 60GHz 주파수 밴드는 장애물 통과가 어려워 근거리 공간에서의 디바이스들 간에만 이용이 가능한 단점이 있다.

【0007】무선랜은 넓은 주파수 대역을 사용할 수 있다. 넓은 주파수 대역을 사용하기 위해 데이터를 전송하기 전에 일정 시간동안 가능한 대역이 있는지 살펴보고 데이터를 인접한 영역의 주파수 대역이 가용한지 여부에 따라 연접하여 주파수 대역을 사용한다. 예를 들어 20MHz 대역이 주 주파수 대역 (주 채널)이고 그 다음 20MHz가 사용가능하고 그 다음 20MHz가 사용 불가능 그 다음 20MHz가 사용 가능이라면 총 40MHz를 전송 대역으로 하여 데이터를 전송한다. 연접한 주파수 대역만을 데이터 전송 대역으로 사용하기 때문에 실제 가용한 주파수 대역이 있음에도 불구하고 사용하지 못하는 문제가 있다. 또한 종래의 무선 접속 기술은 동일한 Basic Service Set (BSS) 내에서 매 전송 시도마다 하나의 송신 단말 및 수신 단말의 일대일 접속만을 지원하기 때문에 단말들의 접속 환경이나 전송 데이터의 특성을 반영하지 못하여 비효율적이라는 문제를 지니고 있다.

【발명의 내용】

【해결하고자 하는 과제】

【0008】본 발명은 전술한 종래 기술의 문제점을 해결하기 위한 것으로서, 무선랜을 위한 다중채널 상향 패킷 전달 방법, 장치 및 시스템을 제공한다.

【0009】 상술한 본 발명의 실시예에 따르면 경쟁 기반 채널 접근 시스템에서 다중 사용자 상향 전송 시의 ACK 처리 방법을 제안한다.

【과제의 해결 수단】

【0010】 본 발명의 실시예에 따르면, 무선랜을 위한 장치, 시스템 및 무선랜 통신 방법이 제공될 수 있다.

【발명의 효과】

【0011】 상술한 본 발명의 실시예에 따르면 다수 채널의 서로 다른 길이의 multiplexed block ACK의 길이에 따른 무선랜 네트워크의 오작동을 방지할 수 있으며 동시에 AP의 기타 control frame의 전송을 위한 시간을 확보할 수 있다.

【0012】 본 발명은 무선랜을 이용하는 스테이션 내지 액세스 포인트, 셀룰러 통신을 이용하는 스테이션 내지 기지국 등 다양한 통신 디바이스에 사용 가능하다.

【도면의 간단한 설명】

【0013】 도 1은 본 발명의 일 실시예에 따른 무선랜 시스템을 도시하고 있다.

도 2는 본 발명의 다른 실시예에 따른 무선랜 시스템인 독립 BSS를 도시하고 있다.

도 3은 본 발명의 일 실시예에 따른 스테이션의 구성을 나타낸 블록도이다.

도 4는 본 발명의 일 실시예에 따른 AP의 구성을 나타낸 블록도이다.

도 5는 본 발명의 일 실시 예에 관련된 STA이 AP와 링크를 설정하는 단계를

개략적으로 도시한 것이다.

도 6은 본 발명의 일 실시 예에 관련된 STA의 패시브 스캐닝 방법을 도시한 것이다.

도 7은 본 발명의 일 실시 예에 관련된 STA의 액티브 스캐닝 방법을 도시한 것이다.

도 8은 본 발명의 실시예에 따른 multiplexed block ACK의 구조를 도시하고 있다.

도 9는 본 발명의 실시예에 따른 다수의 20MHz 전송 상황에서의 M-BA 전송방법을 도시하고 있다.

【발명을 실시하기 위한 구체적인 내용】

【0014】 아래에서는 첨부한 도면을 참조하여 본 발명이 속하는 기술 분야에서 통상의 지식을 가진 자가 용이하게 실시할 수 있도록 본 발명의 실시예를 상세히 설명한다. 그러나 본 발명은 여러 가지 상이한 형태로 구현될 수 있으며 여기에서 설명하는 실시예에 한정되지 않는다. 그리고 도면에서 본 발명을 명확하게 설명하기 위해서 설명과 관계없는 부분은 생략하였으며, 명세서 전체를 통하여 유사한 부분에 대해서는 유사한 도면 부호를 붙였다.

【0015】 명세서 전체에서, 어떤 부분이 다른 부분과 "연결"되어 있다고 할 때, 이는 "직접적으로 연결"되어 있는 경우뿐 아니라, 그 중간에 다른 소자를 사이에 두고 "전기적으로 연결"되어 있는 경우도 포함한다. 또한 어떤 부분이 어떤 구

성요소를 "포함"한다고 할 때, 이는 특별히 반대되는 기재가 없는 한 다른 구성요소를 제외하는 것이 아니라 다른 구성요소를 더 포함할 수 있는 것을 의미한다.

【0017】 무선랜 시스템의 구조

【0018】 도 1은 본 발명의 일 실시예에 따른 무선랜 시스템을 도시하고 있다.

【0019】 무선랜 시스템은 하나 또는 그 이상의 기본 서비스 세트(Basic Service Set, BSS)를 포함하는데, BSS는 성공적으로 동기화를 이루어서 서로 통신할 수 있는 기기들의 집합을 나타낸다. 일반적으로 BSS는 인프라스트럭쳐 BSS(infrastructure BSS)와 독립 BSS(Independent BSS, IBSS)로 구분될 수 있으며, 도 1은 이 중 인프라스트럭쳐 BSS를 나타내고 있다.

【0020】 도 1에 도시된 바와 같이 인프라스트럭쳐 BSS(BSS1, BSS2)는 하나 또는 그 이상의 스테이션(STA-1, STA-2, STA-3, STA-4, STA-5), 분배 서비스(Distribution Service)를 제공하는 스테이션인 액세스 포인트(PCP/AP-1, PCP/AP-2), 및 다수의 액세스 포인트(PCP/AP-1, PCP/AP-2)를 연결시키는 분배 시스템(Distribution System, DS)을 포함한다.

【0021】 스테이션(Station, STA)은 IEEE 802.11 표준의 규정을 따르는 매체 접속 제어(Medium Access Control, MAC)와 무선 매체에 대한 물리층(Physical Layer) 인터페이스를 포함하는 임의의 디바이스로서, 광의로는 액세스 포인트(AP)

와 비 액세스 포인트 STA(Non-AP Station)를 모두 포함한다. 무선 통신을 위한 스테이션은 프로세서(Processor)와 트랜시버(transceiver)를 포함하고, 실시예에 따라 사용자 인터페이스부와 디스플레이 유닛 등을 더 포함할 수 있다. 프로세서는 무선 네트워크를 통해 전송할 프레임을 생성하거나 또는 상기 무선 네트워크를 통해 수신된 프레임을 처리하며, 그 밖에 스테이션을 제어하기 위한 다양한 처리를 수행한다. 그리고, 트랜시버는 프로세서와 기능적으로 연결되어 있으며, 스테이션을 위하여 무선 네트워크를 통해 프레임을 송수신한다.

【0022】 액세스 포인트(Access Point, AP)는 자신에게 결합된 스테이션을 위하여 무선 매체를 경유하여 분배시스템(DS)에 대한 접속을 제공하는 개체이다. 인프라스트럭쳐 BSS에서 AP와 접속되지 않은 STA들 사이의 통신은 AP를 경유하여 이루어지는 것이 원칙이지만, 다이렉트 링크가 설정된 경우에는 AP와 접속되지 않은 STA들 사이에서도 직접 통신이 가능하다. 한편, 본 발명에서 AP는 PCP(Personal BSS Coordination Point)를 포함하는 개념으로 사용되며, 광의적으로는 집중 제어기, 기지국(Base Station, BS), 노드-B, BTS(Base Transceiver System), 또는 사이트 제어기 등의 개념을 모두 포함할 수 있다.

【0023】 복수의 인프라스트럭쳐 BSS는 분배 시스템(DS)을 통해 상호 연결될 수 있다. 이때, DS를 통하여 연결된 복수의 BSS를 확장 서비스 세트(Extended Service Set, ESS)라 한다. ESS에 포함되는 STA들은 서로 통신할 수 있으며, 동일한 ESS 내에서 AP와 접속되지 않은 STA들은 끊김 없이 통신하면서 하나의 BSS에서 다른 BSS로 이동할 수 있다.

【0024】 도 2는 본 발명의 다른 실시예에 따른 무선랜 시스템인 독립 BSS를 도시하고 있다. 도 2의 실시예에서 도 1의 실시예와 동일하거나 상응하는 부분은 중복적인 설명을 생략하도록 한다.

【0025】 도 2에 도시된 BSS-3는 독립 BSS이며 AP를 포함하지 않기 때문에, 모든 스테이션(STA-6, STA-7)이 AP와 접속되지 않은 상태이다. 독립 BSS는 DS로의 접속이 허용되지 않으며, 자기 완비적 네트워크(self-contained network)를 이룬다. 독립 BSS에서 각각의 스테이션들(STA-6, STA-7)은 다이렉트로 서로 연결될 수 있다.

【0027】 STA(스테이션)의 구성

【0028】 도 3은 본 발명의 일 실시예에 따른 스테이션의 구성을 나타낸 블록도이다.

【0029】 도시된 바와 같이, 본 발명의 실시예에 따른 STA(100)은 프로세서(110), 하나 이상의 네트워크 인터페이스 카드(NIC, Network Interface Card, 120), 유저 인터페이스부(140), 디스플레이 유닛(150) 및 메모리(160)를 포함할 수 있다.

【0030】 먼저, 네트워크 인터페이스 카드(120)는 무선랜 접속을 수행하기 위한 모듈로서, STA(100)에 내장되거나 외장으로 구비될 수 있다. 본 발명의 실시예에 따르면, 네트워크 인터페이스 카드 (120)는 서로 다른 주파수 밴드를 이용하는

복수의 네트워크 인터페이스 카드 모듈(120_1~120_n)을 포함할 수 있다. 이를 테면, 네트워크 인터페이스 카드 모듈(120_1~120_n)은 2.4GHz, 5GHz 및 60GHz 등의 서로 다른 주파수 밴드의 네트워크 인터페이스 카드 모듈을 포함할 수 있다. 본 발명의 실시예에 따르면, STA(100)은 6GHz 이상의 주파수 밴드를 이용하는 적어도 하나의 네트워크 인터페이스 카드 모듈과, 6GHz 이하의 주파수 밴드를 이용하는 적어도 하나의 네트워크 인터페이스 카드 모듈을 구비할 수 있다. 각각의 네트워크 인터페이스 카드 모듈(120_1~120_n)은 해당 네트워크 인터페이스 카드 모듈(120_1~120_n)이 지원하는 주파수 밴드의 무선랜 규격에 따라 AP 또는 외부 STA과 무선 통신을 수행할 수 있다. 네트워크 인터페이스 카드(120)는 STA(100)의 성능 및 요구 사항에 따라 한 번에 하나의 네트워크 인터페이스 카드 모듈(120_1~120_n)만을 동작시키거나 동시에 다수의 네트워크 인터페이스 카드 모듈(120_1~120_n)을 함께 동작시킬 수 있다.

【0031】 한편, 도 3의 블록도에서 STA(100)의 복수의 네트워크 인터페이스 카드 모듈(120_1~120_n)은 서로 분리되어 도시되어 있으며, 각각의 네트워크 인터페이스 카드 모듈(120_1~120_n)의 MAC/PHY 계층이 서로 독립적으로 운영된다. 다만, 본 발명은 이에 한정하지 않으며, 복수의 서로 다른 주파수 밴드의 네트워크 인터페이스 카드 모듈이 하나의 칩으로 통합된 상태로 STA(100)에 구비될 수도 있다.

【0032】 다음으로, 유저 인터페이스부(140)는 STA(100)에 구비된 다양한 형태의 입/출력 수단을 포함한다. 즉, 유저 인터페이스부(140)는 다양한 입력 수단을

이용하여 유저의 입력을 수신할 수 있으며, 프로세서(110)는 수신된 유저 입력에 기초하여 STA(100)을 제어할 수 있다. 또한, 유저 인터페이스부(140)는 다양한 출력 수단을 이용하여 프로세서(110)의 명령에 기초한 출력을 수행할 수 있다.

【0033】 다음으로, 디스플레이 유닛(150)은 디스플레이 화면에 이미지를 출력한다. 상기 디스플레이 유닛(150)은 프로세서(110)에 의해 실행되는 컨텐츠 또는 프로세서(110)의 제어 명령에 기초한 유저 인터페이스 등의 다양한 디스플레이 오브젝트를 출력할 수 있다. 또한, 메모리(160)는 STA(100)에서 사용되는 제어 프로그램 및 그에 따른 각종 데이터를 저장한다. 이러한 제어 프로그램에는 STA(100)이 AP 또는 외부 STA와 접속을 수행하는데 필요한 접속 프로그램이 포함될 수 있다.

【0034】 본 발명의 프로세서(110)는 다양한 명령 또는 프로그램을 실행하고, STA(100) 내부의 데이터를 프로세싱 할 수 있다. 또한, 프로세서(110)는 상술한 STA(100)의 각 유닛들을 제어하며, 유닛들 간의 데이터 송수신을 제어할 수 있다. 본 발명의 실시예에 따르면, 프로세서(110)는 STA(100)의 섹터 스윕 신호 전송/수신 및 이에 대응하는 피드백 신호 전송/수신 등의 커뮤니케이션 동작을 제어한다.

【0035】 또한, 프로세서(110)는 메모리(160)에 저장된 AP와의 접속을 실행하는 프로그램을 실행하여, AP가 전송한 통신 설정 메시지를 수신하고, 통신 설정 메시지에 포함된 STA(100)의 우선 조건에 대한 정보를 독출하고, STA(100)n의 우선 조건에 대한 정보에 따라 AP에 대한 접속을 요청한다. 이에 대한 구체적인 설명은 추후 기술하기로 한다.

【0036】 도 3에 도시된 STA(100)는 본 발명의 일 실시예에 따른 블록도로서,

분리하여 표시한 블록들은 디바이스의 엘리먼트들을 논리적으로 구별하여 도시한 것이다. 따라서 상술한 디바이스의 엘리먼트들은 디바이스의 설계에 따라 하나의 칩으로 또는 복수의 칩으로 장착될 수 있다. 또한, 본 발명의 실시예에서 STA(100)의 일부 구성들, 이를 테면 이동통신 모듈(130), 유저 인터페이스부(140) 및 디스플레이 유닛(150) 등은 STA(100)에 선택적으로 구비될 수 있다.

【0038】 AP(액세스 포인트)의 구성

【0039】 도 4는 본 발명의 일 실시예에 따른 AP의 구성을 나타낸 블록도이다.

【0040】 도시된 바와 같이, 본 발명의 실시예에 따른 AP(200)는 프로세서(210), NIC(Network Interface Card, 220) 및 메모리(160)를 포함할 수 있다. 도 4에서 AP(200)의 구성 중 도 3의 STA(100)의 구성과 동일하거나 상응하는 부분에 대해서는 중복적인 설명을 생략하도록 한다.

【0041】 도 4를 참조하면, 본 발명에 따른 AP(200)는 적어도 하나의 주파수 밴드에서 BSS를 운영하기 위한 네트워크 인터페이스 카드(220)를 구비한다. 도 3의 실시예에서 전술한 바와 같이, AP(200)의 네트워크 인터페이스 카드 (220) 또한 서로 다른 주파수 밴드를 이용하는 복수의 네트워크 인터페이스 카드 모듈(220_1~220_m)을 포함할 수 있다. 즉, 본 발명의 실시예에 따른 AP(200)는 서로 다른 주파수 밴드, 이를 테면 2.4GHz, 5GHz, 60GHz 중 두 개 이상의 네트워크 인터페

이스 카드 모듈을 함께 구비할 수 있다. 바람직하게는, AP(200)는 6GHz 이상의 주파수 밴드를 이용하는 적어도 하나의 네트워크 인터페이스 카드 모듈과, 6GHz 이하의 주파수 밴드를 이용하는 적어도 하나의 네트워크 인터페이스 카드 모듈을 구비할 수 있다. 각각의 네트워크 인터페이스 카드 모듈(220_1~220_m)은 해당 네트워크 인터페이스 카드 모듈(220_1~220_m)이 지원하는 주파수 밴드의 무선랜 규격에 따라 STA과 무선 통신을 수행할 수 있다. 네트워크 인터페이스 카드 (220)는 AP(200)의 성능 및 요구 사항에 따라 한 번에 하나의 네트워크 인터페이스 카드 모듈(220_1~220_m)만을 동작시키거나 동시에 다수의 네트워크 인터페이스 카드 모듈(220_1~220_m)을 함께 동작시킬 수 있다.

【0042】 다음으로, 메모리(260)는 AP(200)에서 사용되는 제어 프로그램 및 그에 따른 각종 데이터를 저장한다. 이러한 제어 프로그램에는 STA의 접속을 관리하는 접속 프로그램이 포함될 수 있다. 또한, 프로세서(210)는 AP(200)의 각 유닛들을 제어하며, 유닛들 간의 데이터 송수신을 제어할 수 있다.

【0043】 또한, 프로세서(210)는 메모리(260)에 저장된 스테이션과의 접속을 실행하는 프로그램을 실행하여, 하나 이상의 STA(100)에 대하여 통신 설정 메시지를 전송하고, STA(100)의 접속 요청에 따라 접속 설정을 수행하되, 통신 설정 메시지는 각 스테이션의 접속 우선 조건에 대한 정보를 포함한다. 이에 대한 구체적인 설명은 추후 기술하기로 한다.

【0045】 링크 설정 단계

【0046】 도 5는 본 발명의 일 실시 예에 관련된 STA이 AP와 링크를 설정하는 단계를 개략적으로 도시한 것이다.

【0047】 도 5를 참조하면, 본 발명에 따른 STA(100)가 AP(200)에 접속하는 단계는 크게 스캐닝(Scanning), 인증(Authentication) 및 결합(Association)의 3단계로 구분된다. 스캐닝단계는 STA(100)가 AP(200)가 운영하는 BSS의 접속 정보를 획득하는 단계이다. 스캐닝을 수행하기 위한 방법으로는 AP가 주기적으로 전송하는 비콘(Beacon) 메시지만을 활용하여 정보를 획득하는 패시브 스캐닝(Passive Scanning) 기법(S101)과 STA가 AP에 프로브 요청(Probe Request)을 전송하고(S103), AP로부터 프로브 응답(Probe Response)을 수신하여(S105) 접속 정보를 획득하는 액티브 스캐닝(Active Scanning)기법이 있다.

【0048】 스캐닝 단계에서 성공적으로 무선 접속 정보를 수신한 STA(100)는 인증 요청(Authentication Request)을 송신(S107a)하고, 인증 응답(Authentication Response)을 수신(S107b)하여 인증 절차를 수행한다.

【0049】 성공적인 IEEE 802.11 계층에서의 인증 절차를 수행 후, 결합 단계(S109a, S109b)를 수행하고, 추가적으로 802.1X 기반의 인증(S111) 및 DHCP를 통한 IP 주소 획득(S113) 단계를 수행할 수 있다. AS(300)는 Authentication Server로서 STA(100)과 802.1X 기반의 인증을 처리하는 서버로서 AP(200)에 물리적으로 결합되어 존재하거나 별도의 서버로서 존재할 수 있다.

【0050】 도 6은 본 발명의 일 실시 예에 관련된 STA의 패시브 스캐닝 방법을 도시한 것이다.

【0051】 도 6을 참조하면, 본 발명에 따른 제1 STA(110)는 주변에 위치한 제 1 AP(210)와 제 2 AP(220)에서 주기적으로 송신하는 비콘 메시지를 수신하여 각각 AP들의 무선 접속 정보를 획득한다.

【0052】 도 7은 본 발명의 일 실시 예에 관련된 STA의 액티브 스캐닝 방법을 도시한 것이다.

【0053】 도 7을 참조하면, 본 발명에 따른 제 1 STA(110)는 주변에 위치한 AP의 정보를 획득하기 위해 프로브 요청 메시지를 송신하고, 이에 대응하는 프로브 응답 메시지를 각각 제 1 AP(210)와 제 2 AP(220)로부터 수신하여 각각 AP들의 무선 접속 정보를 획득한다.

【0055】 다중 사용자 상향 전송

【0056】 다중 사용자 상향 전송의 경우 하향 전송과는 다르게 다수의 단말이 동시에 데이터를 전송해야 하기 때문에 BSS 내의 모든 단말과 통신을 수행할 수 있는 AP가 전송 과정을 관리하는 방법이 유력하다. 802.11ax에서는 AP가 trigger frame을 전송하는 것으로 UL-OFDMA를 시작한다. UL 단말들은 trigger frame 이후에 잠시의 IFS 시간이 지난 뒤에 즉시 UL data를 전송해야 하므로, trigger frame은 UL 단말에게 전송 시작시점을 알려주는 역할을 하며, 또한 각 UL 단말에게 할당된

channel정보를 알려주는 역할을 한다. AP가 Trigger를 전송하면 AP가 정해준 시점에 AP로부터 할당받은 subcarrier를 통하여 다수의 단말이 동시에 데이터를 전송하며, 데이터 전송 후에는 AP가 상향 데이터 전송에 참여한 모든 단말에게 데이터 수신 여부를 알리는 ACK을 전송해야 한다. 이 때 AP는 다수의 단말에 대한 ACK을 multiplexed block ACK의 형태로 전송할 수 있다.

【0057】 도 8은 본 발명의 실시예에 따른 multiplexed block ACK의 구조를 도시하고 있다.

【0058】 Multiplexed block ACK(M-BA)은 기존의 Block ACK(BA)의 구조를 이용하여 구현할 수 있다. BA format의 BA control 내부 값들의 활성화 여부에 따라 BA information 부분이 가변적인 크기로 추가될 수 있다. 이 때 BA information 필드 내부의 Per TID info 부분에 reserved bit가 12개 존재하며 이 정보를 ACK 전송을 위한 단말의 AID 값으로 설정할 수 있다. 따라서 11bit로 구성되어 있는 B0~B10을 AID로 설정하고 B11 값은 해당 ACK이 일반 ACK의 형태인지 BA의 형태인지를 알려주는 indication bit로 활용할 수 있다. 따라서 B11이 도 9의 예시와 같이 ACK으로 설정된 경우는 뒤따라 전송되는 Block ACK start sequence control 및 Block ACK bitmap이 필요없기 때문에 해당 필드는 자동적으로 삭제될 수 있다. BA information 은 크기는 가변적이므로 해당 다중 사용자 상향 전송에 참여한 모든 단말에 대해 AID를 삽입할 수 있다. 즉, AID와 관련 block ack sequence control과 blockack bitmap을 단말당 반복하여 삽입하여 전송하는 것이다. B11이 ACK을 지시하는 경우는 block ack sequence control과 blockack bitmap은 생략되고 AID만 반

복된다. AP는 각 UL 단말이 A-MPDU를 전송하여 그에 대한 block ACK을 전송해야하는 상황에서도 모든 A-MPDU가 정상적으로 전송이 된 경우에 한하여 B11을 활성화시킬 수 있다. 이 때의 B11은 모든 A-MPDU에 대한 ACK을 한번에 처리함을 의미하므로 이후의block ack sequence control과 blockack bitmap은 생략된다.

【0059】 도 9는 본 발명의 실시예에 따른 다수의 20MHz 전송 상황에서의 M-BA 전송방법을 도시하고 있다.

【0060】 다수의 20MHz channel이 전송에 사용되는 경우에는 M-BA의 길이가 지나치게 길어지는 것을 방지하기 위하여 각 20MHz에 할당된 UL 단말에 한하여 M-BA를 전송하는 방법이 유력하다.

【0061】 M-BA는 20MHz 단위의 channel에 할당된 단말 수와 다수 단말의 상향 데이터의 수신 상태에 따라 길이가 가변적일 수 있다. AP는 trigger frame을 전송하여 UL-OFDMA를 전송하는 시점에 ACK의 실질적인 길이를 예측할 수 없으므로, 가장 많은 수의 단말이 설정된 channel에서 모든 단말이 block ACK 옵션을 이용하는 가장 긴 ACK을 포함한 시간까지를 전체 TXOP으로 설정하여 trigger frame을 전송한다. 따라서모든 단말의 상향 전송이 마친 후에 수신 결과에 따라 실제 ACK 길이는 짧아질 수 있으며 channel 마다 다른 길이의 ACK이 전송될 수 있다. 도면과 같이 primary의 ACK이 가장 짧게 설정된 경우에는 AP의 다른 채널에 대한 ACK 전송이 마치기 전에 BSS 내의 다른 단말들이 DIFS의 시간이 지난뒤에 접속을 시도할 수 있다. 그러나 AP는 다른 채널에서 ACK 송신을 완료하는 시점까지는 상태전환을 하는 것이 불가능하므로 다른 무선 단말의 전송시도가 무시되거나 AP의 접속 시도 경

쟁에 불이익을 초래할 수 있다. 따라서 본 발명에서는 데이터 수신 이후에 결정된 가장 긴 ACK의 길이를 기준으로 모든 채널의 ACK 전송길이를 맞추어 전송하는 기법을 제안한다. ACK 전송 길이를 맞추기 위한 방법으로는 실제 ACK 내용 뒤에 zero padding을 하거나 ACK contents를 반복하는 것이 가능하며 기존의 802.11ac의 padding 방법을 이용하는 방법 역시 가능하다. 가장 긴 ACK의 전송시간에 모든 채널의 ACK 길이를 맞춘다 하더라도 trigger frame에서 최초로 설정한 TXOP길이보다 이전 시간에 모든 ACK의 전송이 마칠수 있는데 이 경우에는 AP가 TXOP을 반납하는 것도 가능하지만, 기타 control frame 전송 등과 같이 다른 용도로의 이용을 위해 TXOP을 유지시키는 방법 역시 가능하다.

【부호의 설명】

【특허청구범위】

【청구항 1】

무선랜을 위한 장치, 시스템 및 무선랜 통신 방법.

제출 일자 : 2015-05-13

【요약서】

【요약】

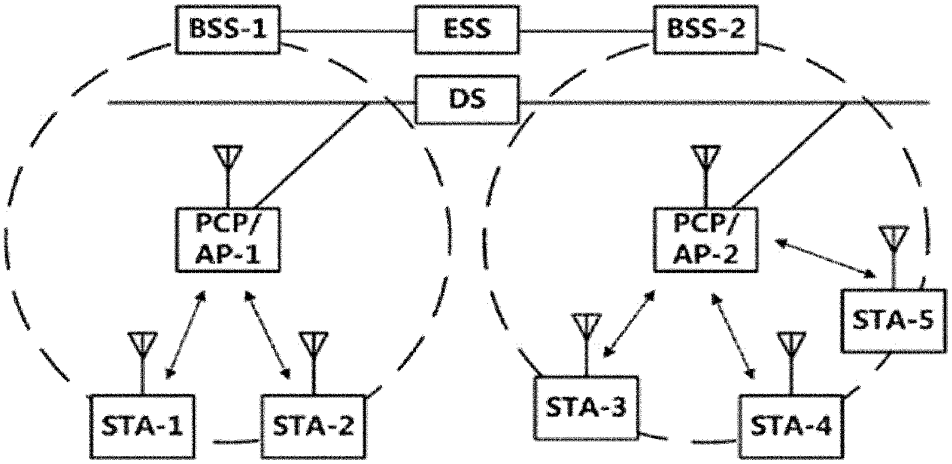
본 발명은 무선랜을 위한 장치, 시스템 및 무선랜 통신 방법에 관한 것으로, 본 발명의 실시예에 따르면, 무선랜 광대역 다중 사용자 상향 데이터 전송을 위한 group ACK 전송 및 padding 방법이 제공될 수 있다.

【대표도】

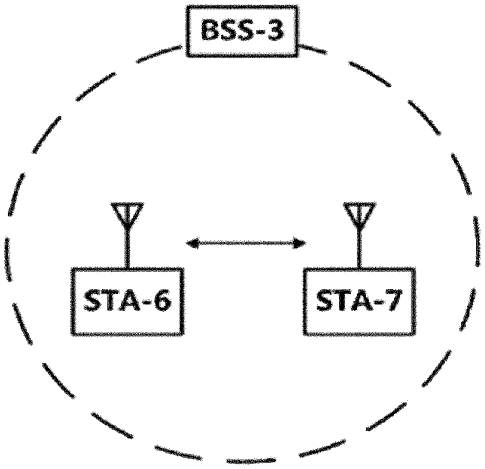
도 9

【도면】

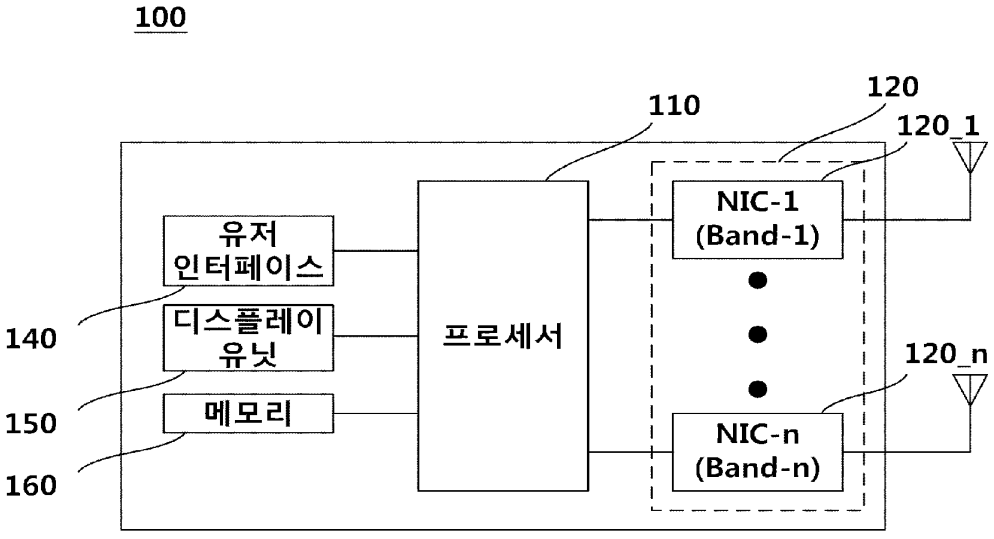
【도 1】



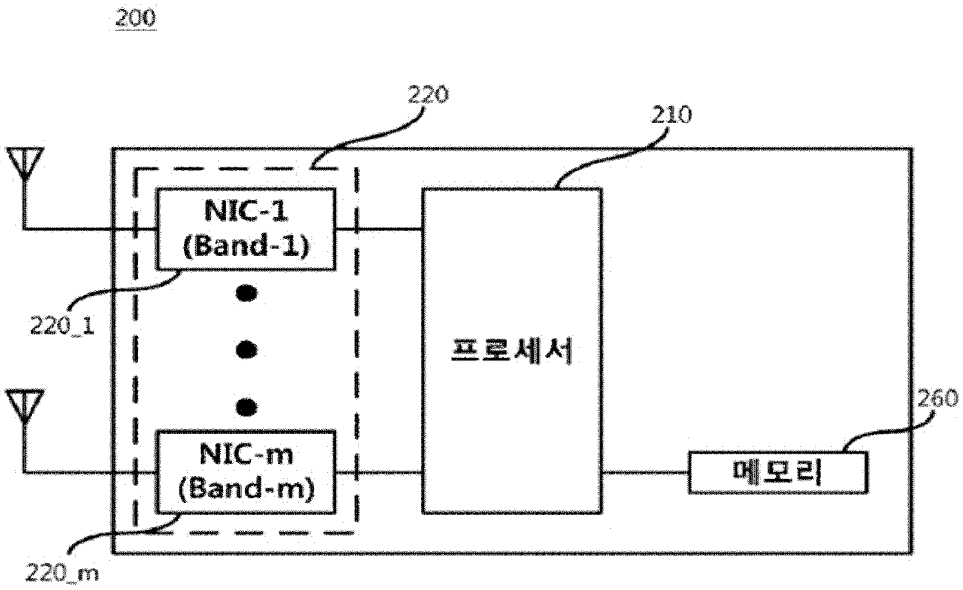
【도 2】


BSS-3
STA-6
STA-7

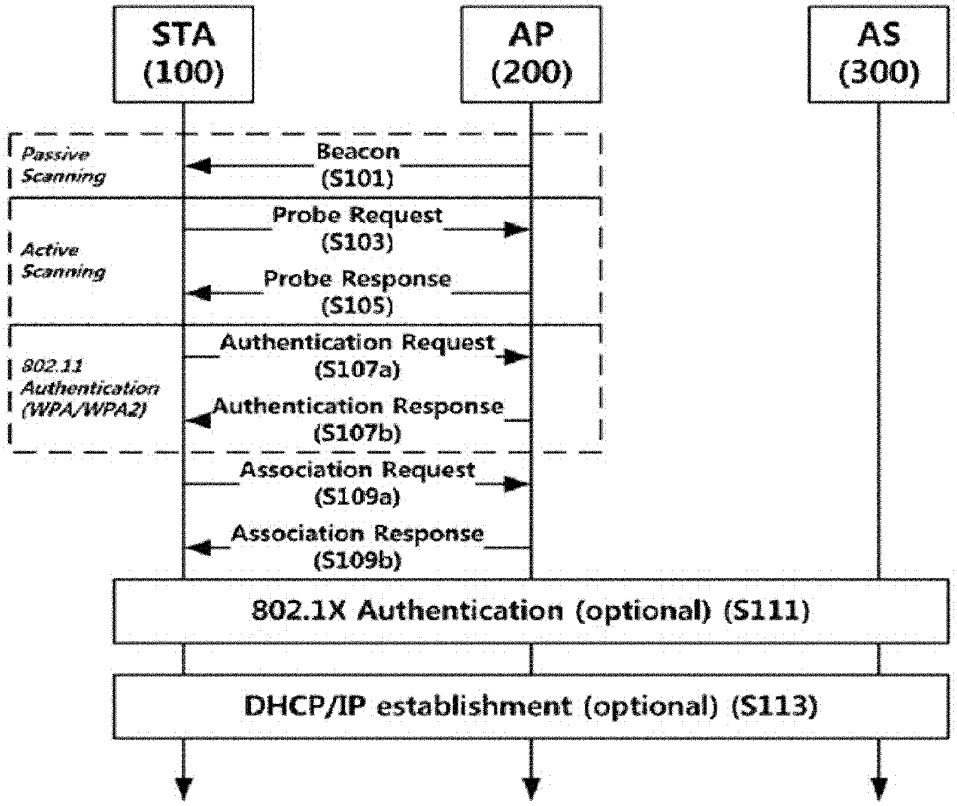
【도 3】


100
110
120
120_1
120_n
유저 인터페이스
디스플레이 유닛
메모리
프로세서
NIC-1 (Band-1)
NIC-n (Band-n)
140
150
160

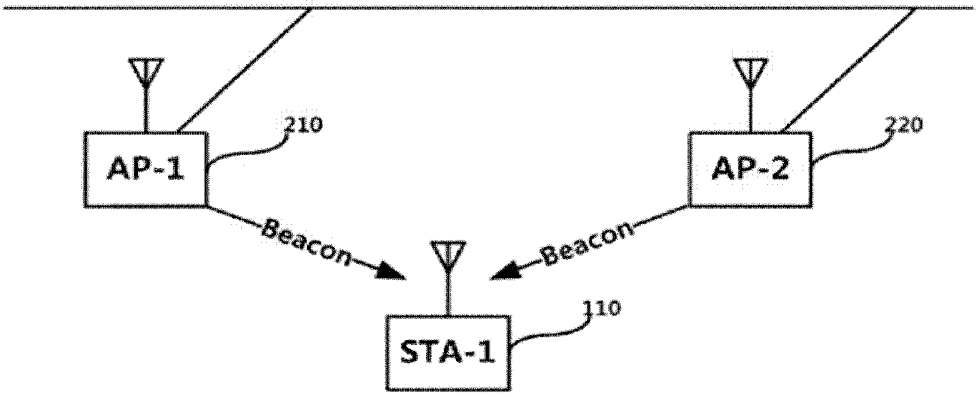
【도 4】



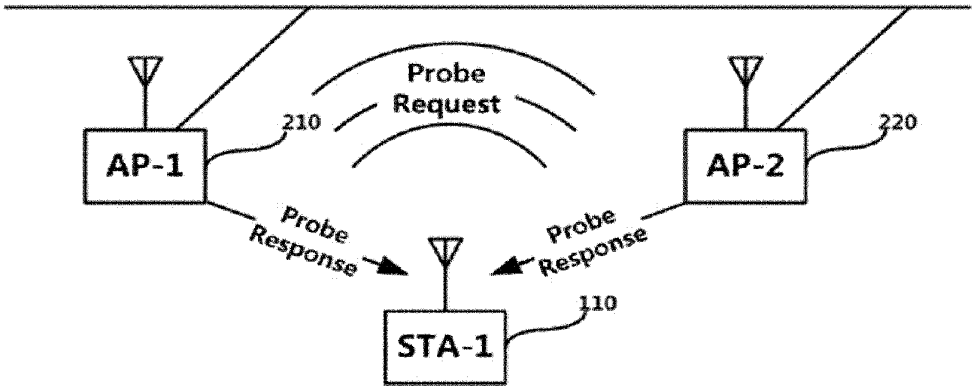
【도 5】


STA
(100)
AP
(200)
AS
(300)
Passive Scanning
Beacon
(S101)
Active Scanning
Probe Request
(S103)
Probe Response
(S105)
802.11 Authentication (WPA/WPA2)
Authentication Request
(S107a)
Authentication Response
(S107b)
Association Request
(S109a)
Association Response
(S109b)
802.1X Authentication (optional) (S111)
DHCP/IP establishment (optional) (S113)

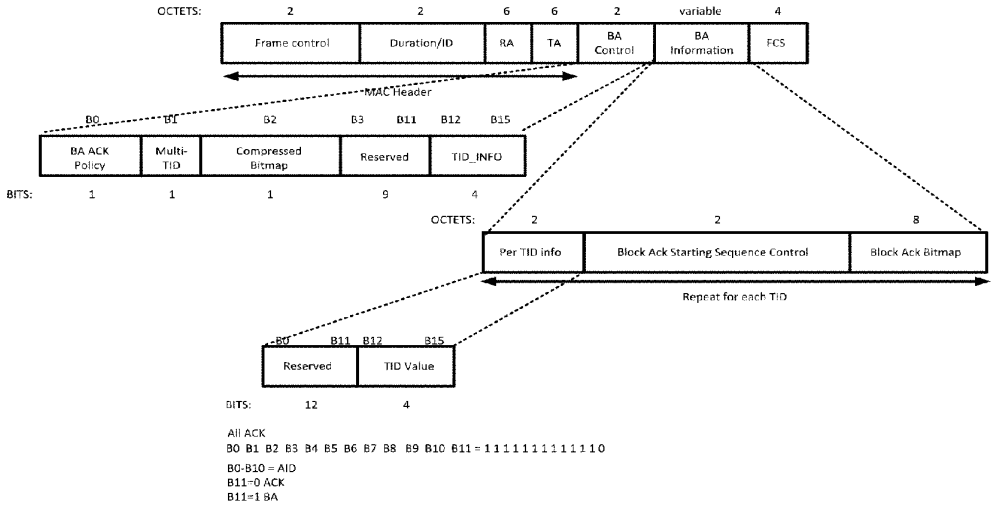
【도 6】


AP-1
210
AP-2
220
Beacon
Beacon
STA-1
110

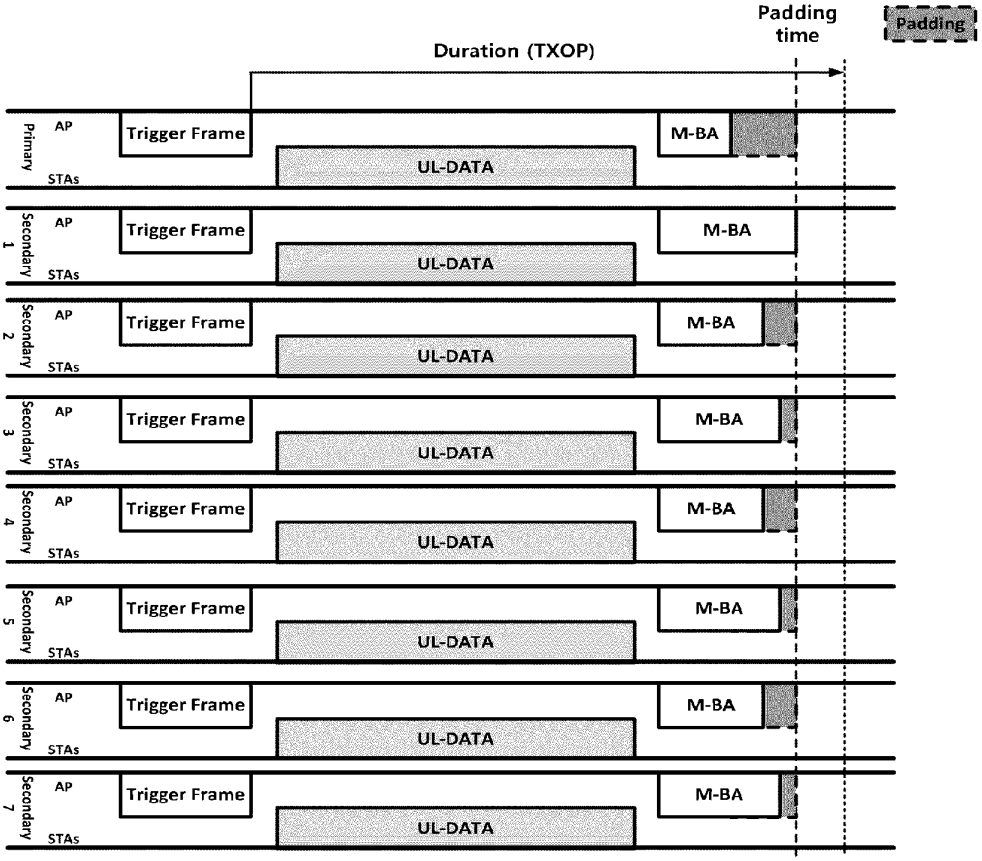
【도 7】


Probe
Request
AP-1
210
AP-2
220
Probe
Response
Probe
Response
STA-1
110

【도 8】


OCTETS:
2
2
6
6
2
variable
4
Frame control
Duration/ID
RA
TA
BA Control
BA Information
FCS
MAC Header
B0
B1
B2
B3
B11
B12
B15
BA ACK Policy
Multi-TID
Compressed Bitmap
Reserved
TID_INFO
BITS:
1
1
1
9
4
OCTETS:
2
2
8
Per TID info
Block Ack Starting Sequence Control
Block Ack Bitmap
Repeat for each TID
B0
B11
B12
B15
Reserved
TID Value
BITS:
12
4
All ACK
B0 B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 = 1 1 1 1 1 1 1 1 1 1 1 0
B0-B10 = AID
B11=0 ACK
B11=1 BA

【도 9】


Padding time
Padding
Duration (TXOP)
Primary
Secondary 1
Secondary 2
Secondary 3
Secondary 4
Secondary 5
Secondary 6
Secondary 7
AP
STAs
Trigger Frame
UL-DATA
M-BA

Electronic Acknowledgement Receipt

EFS ID:	42277920
Application Number:	17145670
International Application Number:	
Confirmation Number:	9828
Title of Invention:	WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION
First Named Inventor/Applicant Name:	Woojin AHN
Customer Number:	34610
Filer:	Daniel Y.J. Kim/Kathy Humphries
Filer Authorized By:	Daniel Y.J. Kim
Attorney Docket Number:	QUS-0003.01
Receipt Date:	25-MAR-2021
Filing Date:	11-JAN-2021
Time Stamp:	10:18:00
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	Applicant Response to Pre-Exam Formalities Notice	Reply-NCAP.pdf	2224686 447470758c4f57bf5d1793ab6234459ec03c3d65	no	12

Warnings:

Information:	
Total Files Size (in bytes):	2224686

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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.

Docket No.: **QUS-0003.01** PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	Confirmation No.: **9828**
Woojin AHN; Yongho KIM; Jinsam KWAK; and Juhyung SON	Group Art Unit: **2642**
Serial No.: **17/145,670**	Examiner: **To Be Assigned**
Filed: **January 11, 2021**	Customer No.: **34610**

For: **WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION**

REPLY TO NOTICE TO FILE CORRECTED APPLICATION PAPERS
FILING DATE GRANTED

U.S. Patent and Trademark Office
Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Sir:

In reply to the Notice to File Corrected Application Papers dated **January 25, 2021**, submitted herewith are the following documents for filing in the above-referenced application:

☒ Substitute drawings in compliance with 37 CFR §1.84. Submitted herewith are nine (9) Replacement Sheets of drawings (FIGs. 7, 9-12 and 16-20).

☒ Copy of Notice to File Corrected Application Papers.

It is requested that an Official Filing Receipt showing the data contained herewith now be issued.

Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
KED & ASSOCIATES, LLP

/David C. Oren/

David C. Oren
Registration No. 38,694

Correspondence Address:
P.O. Box 8638
Reston, VA 20195
703 766-3777 (Main)
703 766-3756 (Direct) DCO/kah

Please direct all correspondence to Customer Number 34610

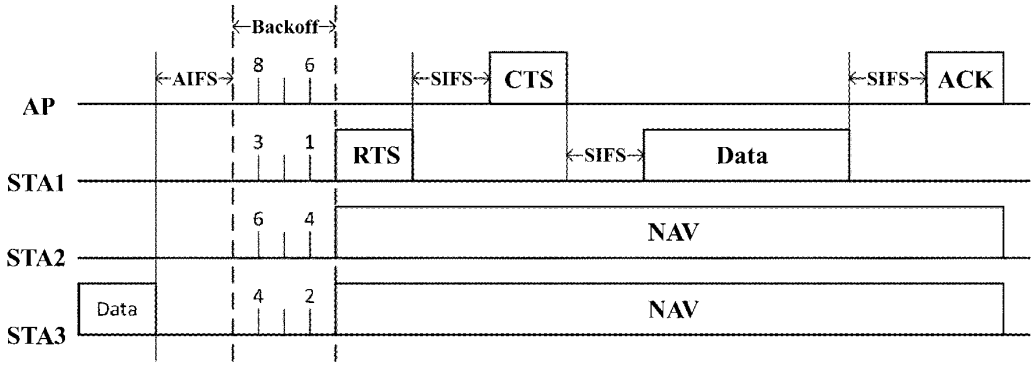

Backoff
AIFS
8
6
SIFS
CTS
SIFS
ACK
AP
3
1
RTS
SIFS
Data
STA1
6
4
NAV
STA2
Data
4
2
NAV
STA3

FIG. 7

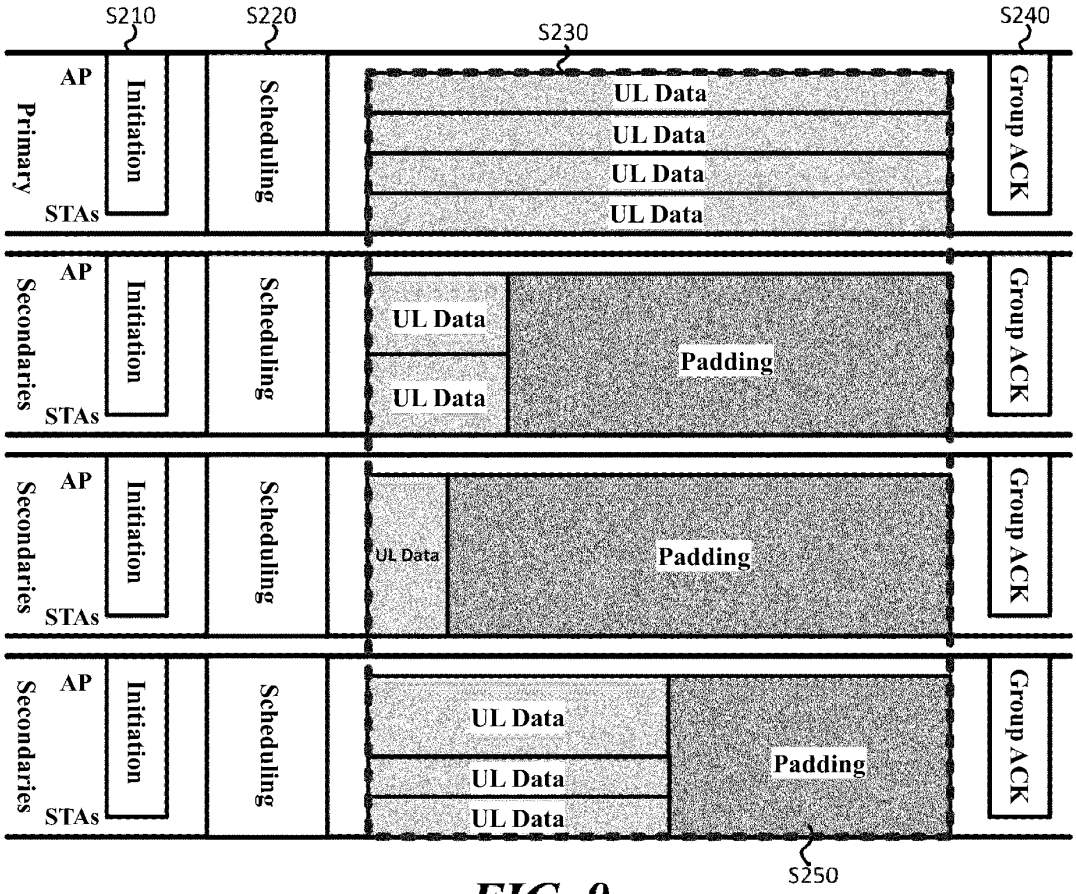

S210
S220
S230
S240
Primary
AP
STAs
Initiation
Scheduling
UL Data
UL Data
UL Data
UL Data
Group ACK
Secondaries
AP
STAs
Initiation
Scheduling
UL Data
UL Data
Padding
Group ACK
Secondaries
AP
STAs
Initiation
Scheduling
UL Data
Padding
Group ACK
Secondaries
AP
STAs
Initiation
Scheduling
UL Data
UL Data
UL Data
Padding
Group ACK
S250

FIG. 9

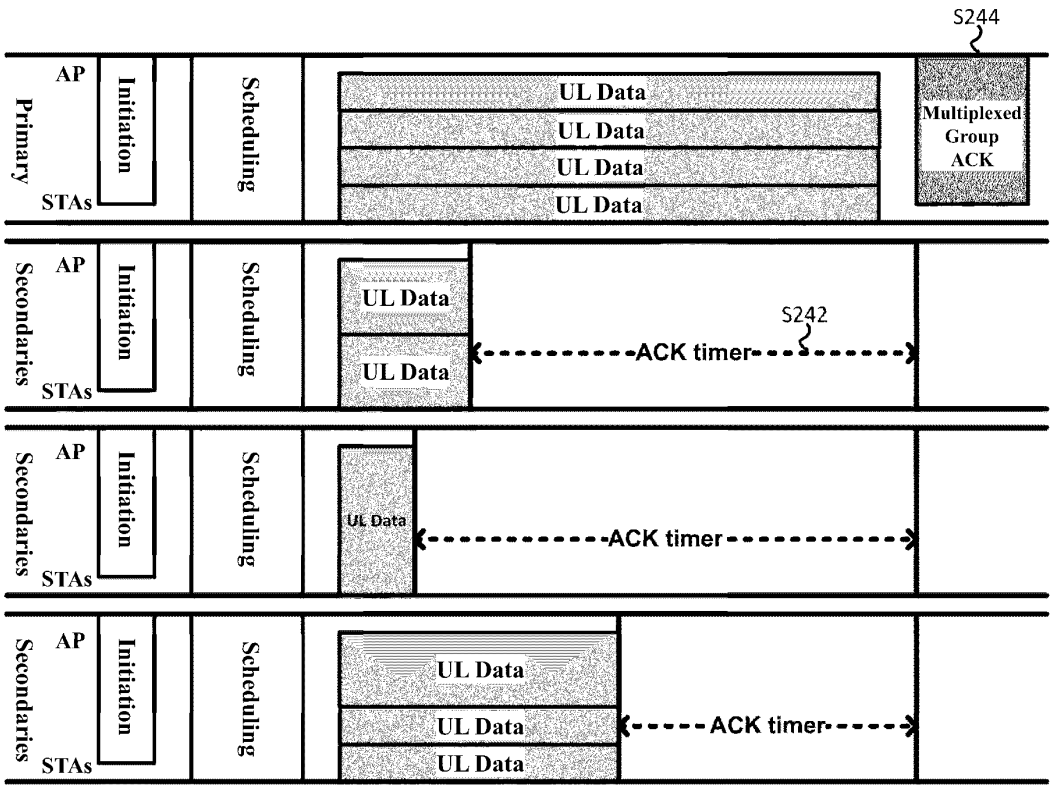

S244
Primary
AP
STAs
Initiation
Scheduling
UL Data
UL Data
UL Data
UL Data
Multiplexed Group ACK
Secondaries
AP
STAs
Initiation
Scheduling
UL Data
UL Data
S242
ACK timer
Secondaries
AP
STAs
Initiation
Scheduling
UL Data
ACK timer
Secondaries
AP
STAs
Initiation
Scheduling
UL Data
UL Data
UL Data
ACK timer

FIG. 10

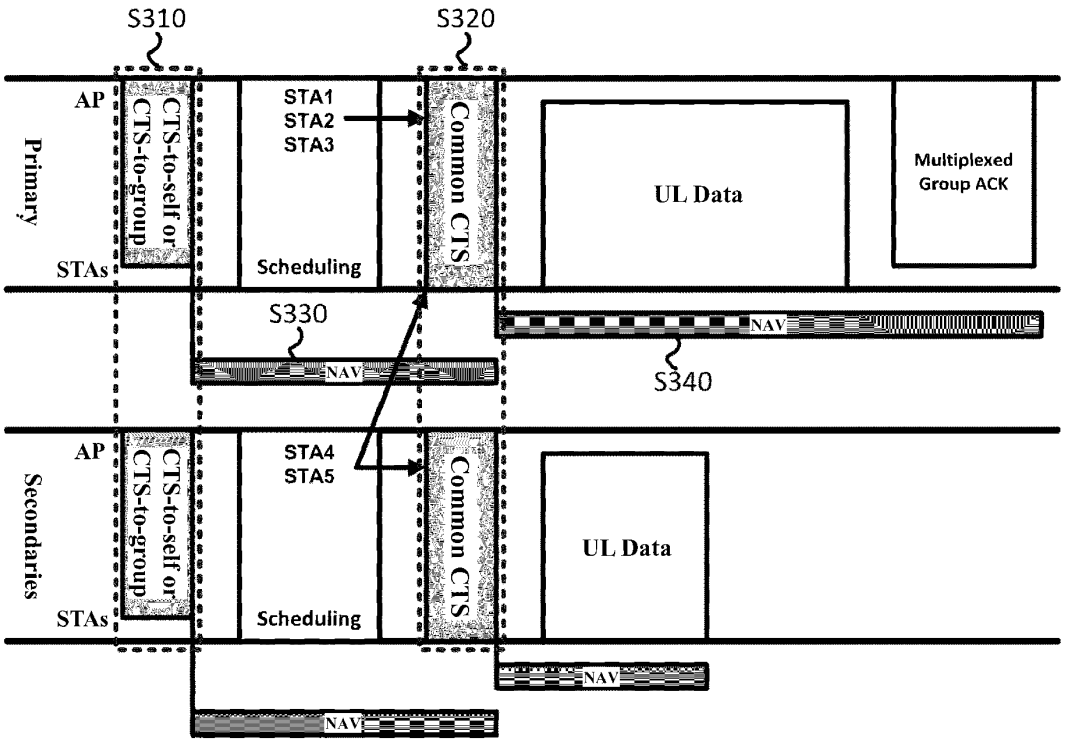

S310
S320
AP
Primary
STAs
CTS-to-self or
CTS-to-group
STA1
STA2
STA3
Scheduling
Common CTS
UL Data
Multiplexed
Group ACK
S330
NAV
NAV
S340
AP
Secondaries
STAs
CTS-to-self or
CTS-to-group
STA4
STA5
Scheduling
Common CTS
UL Data
NAV
NAV

FIG. 11

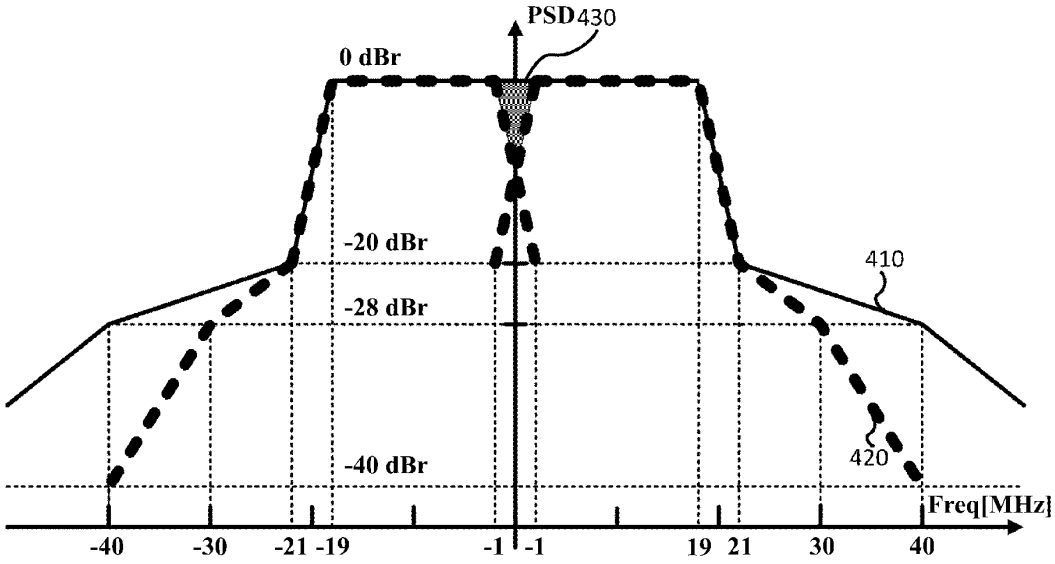

PSD
430
0 dBr
-20 dBr
-28 dBr
-40 dBr
410
420
Freq[MHz]
-40
-30
-21
-19
-1
-1
19
21
30
40

FIG. 12

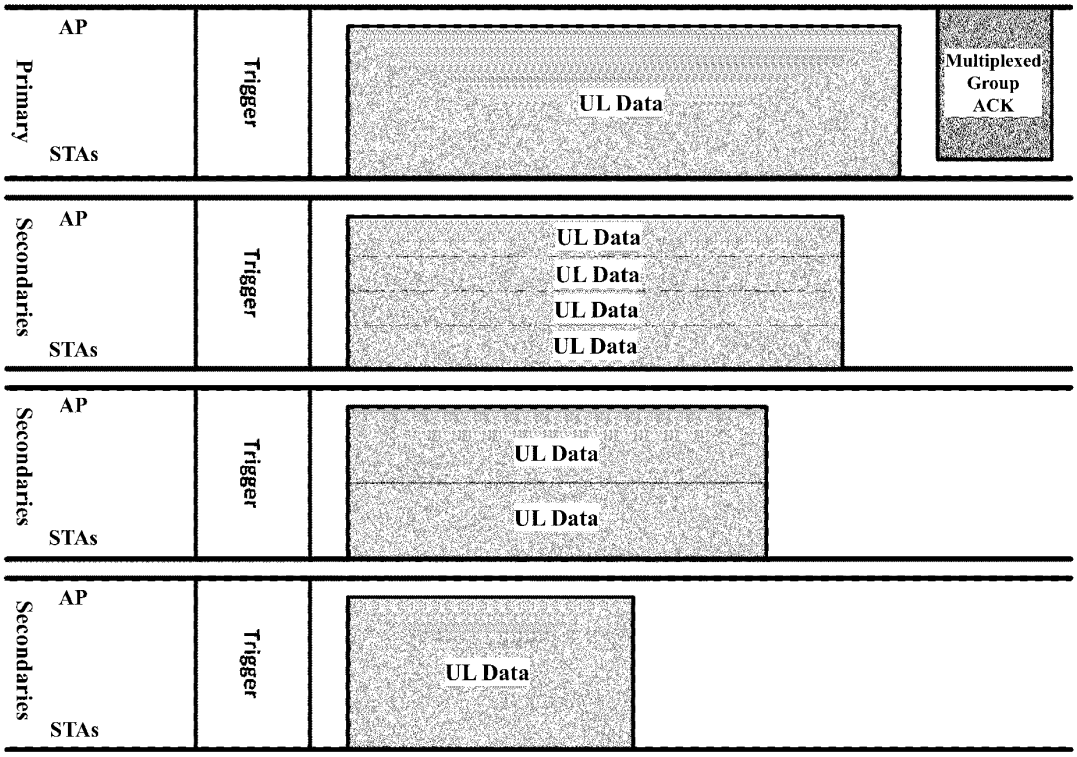

Primary
AP
STAs
Trigger
UL Data
Multiplexed Group ACK
Secondaries
AP
STAs
Trigger
UL Data
UL Data
UL Data
UL Data
Secondaries
AP
STAs
Trigger
UL Data
UL Data
Secondaries
AP
STAs
Trigger
UL Data

FIG. 16

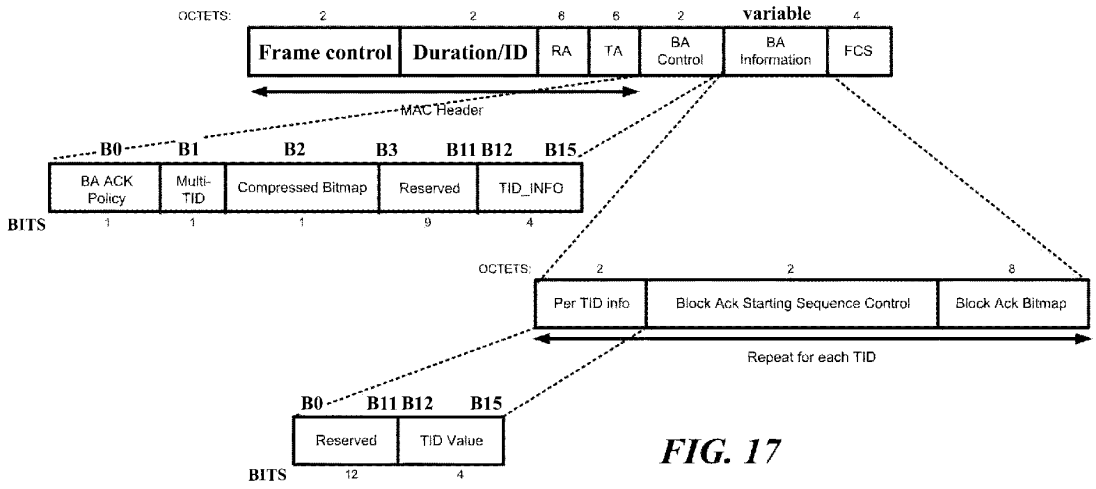

OCTETS:
2
2
6
6
2
variable
4
Frame control
Duration/ID
RA
TA
BA Control
BA Information
FCS
MAC Header
B0
B1
B2
B3
B11 B12
B15
BA ACK Policy
Multi-TID
Compressed Bitmap
Reserved
TID_INFO
BITS
1
1
1
9
4
OCTETS:
2
2
8
Per TID info
Block Ack Starting Sequence Control
Block Ack Bitmap
Repeat for each TID
B0
B11 B12
B15
Reserved
TID Value
BITS
12
4

FIG. 17

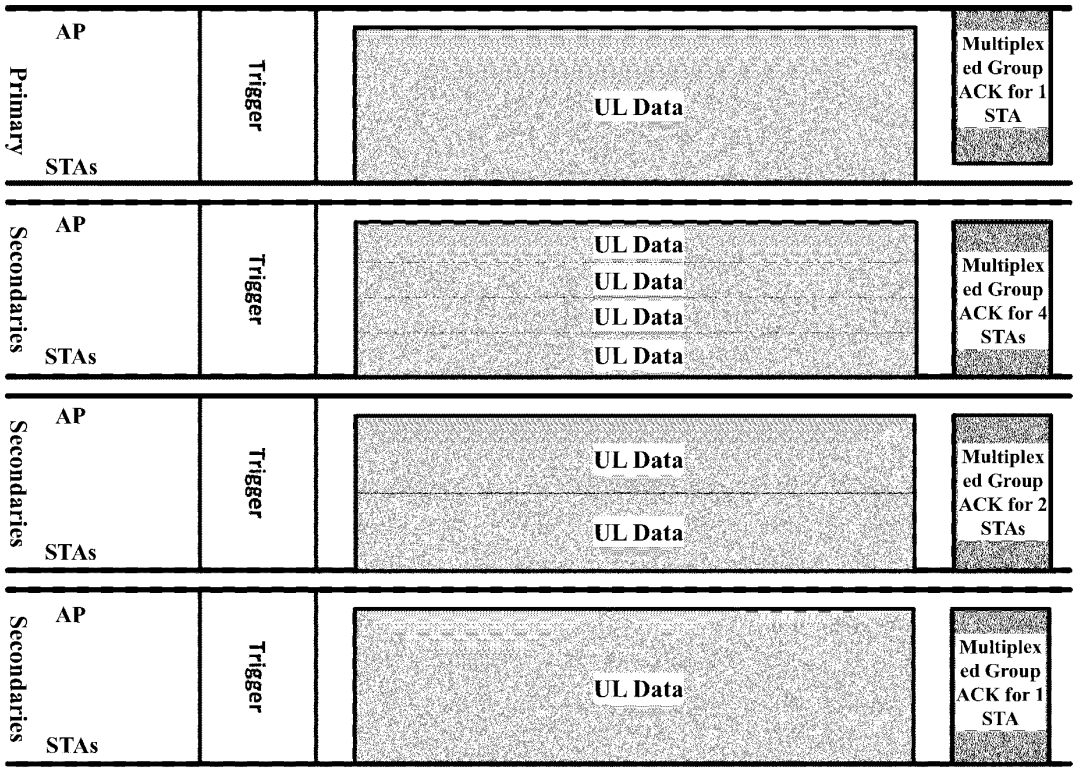

Primary
AP
STAs
Trigger
UL Data
Multiplexed Group ACK for 1 STA
Secondaries
AP
STAs
Trigger
UL Data
UL Data
UL Data
UL Data
Multiplexed Group ACK for 4 STAs
Secondaries
AP
STAs
Trigger
UL Data
UL Data
Multiplexed Group ACK for 2 STAs
Secondaries
AP
STAs
Trigger
UL Data
Multiplexed Group ACK for 1 STA

FIG. 18

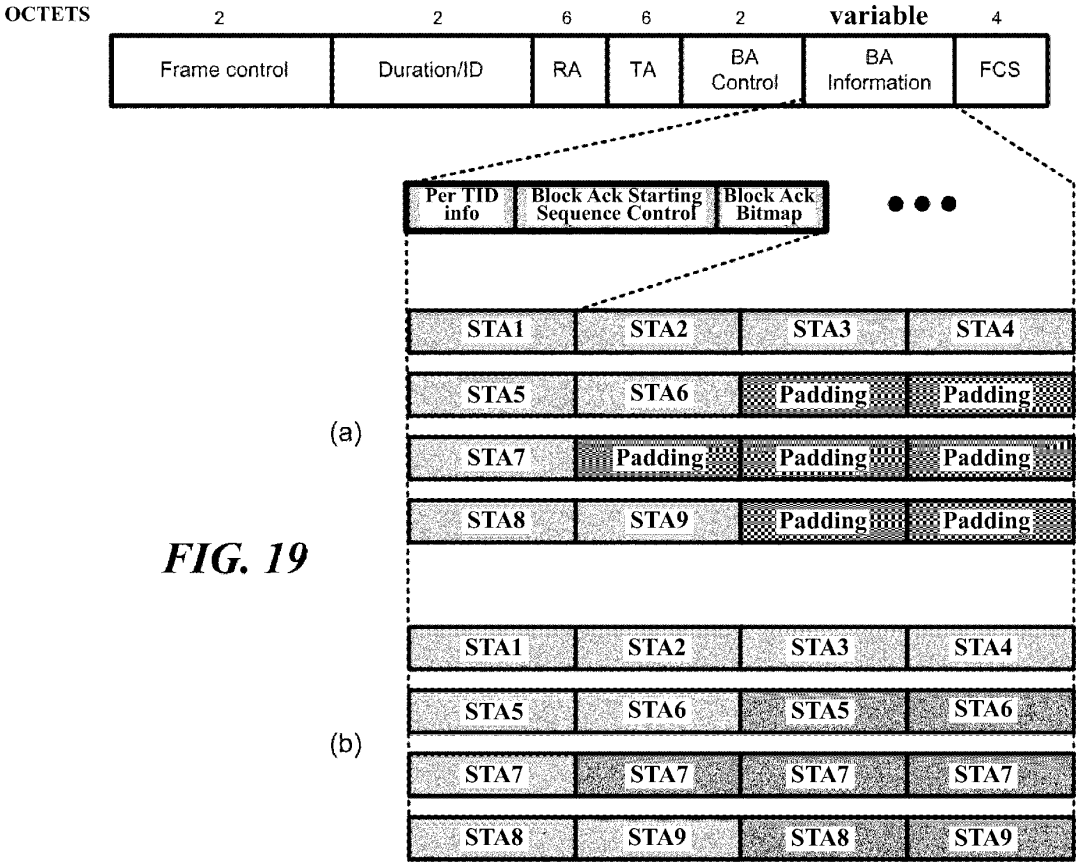

OCTETS
2
2
6
6
2
variable
4
Frame control
Duration/ID
RA
TA
BA Control
BA Information
FCS
Per TID info
Block Ack Starting Sequence Control
Block Ack Bitmap
(a)
STA1
STA2
STA3
STA4
STA5
STA6
Padding
Padding
STA7
Padding
Padding
Padding
STA8
STA9
Padding
Padding
(b)
STA1
STA2
STA3
STA4
STA5
STA6
STA5
STA6
STA7
STA7
STA7
STA7
STA8
STA9
STA8
STA9

FIG. 19

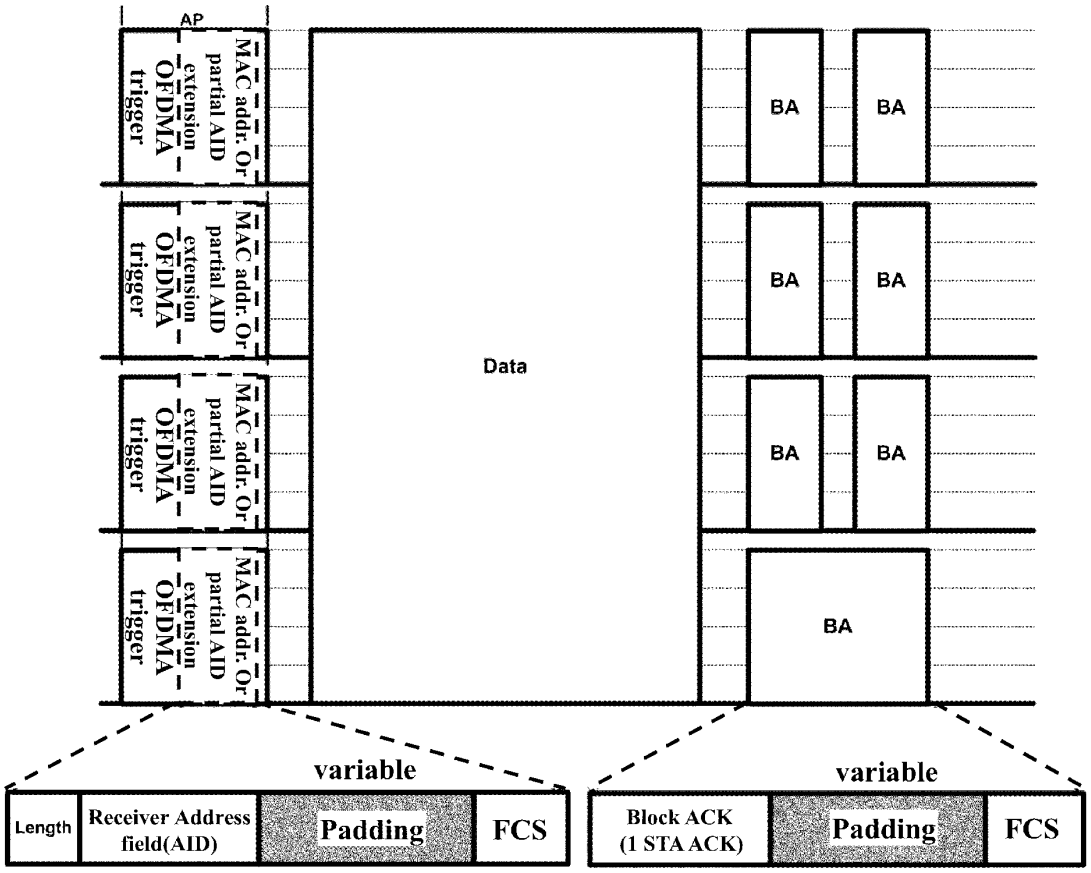

AP
MAC addr. Or
partial AID
extension
OFDMA
trigger
Data
BA
variable
Length
Receiver Address field(AID)
Padding
FCS
Block ACK (1 STA ACK)

FIG. 20

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
17/145,670	01/11/2021	Woojin AHN	QUS-0003.01

CONFIRMATION NO. 9828

34610
KED & ASSOCIATES, LLP
P.O. Box 8638
Reston, VA 20195

FORMALITIES LETTER

OC000000122856000

Date Mailed: 01/25/2021

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given **TWO MONTHS** from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
  - Numbers, letters, and reference characters on the drawings must measure at least 0.32 cm (1/8 inch) in height. See Figure(s) 9, 10, 12, 16-20.
  - The drawings submitted to the Office are not electronically reproducible because portions of figures 7, 11, 19, 20 are missing and/or blurry.

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
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P.O. Box 1450
Alexandria VA 22313-1450

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For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

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/cma/

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 17/145,670

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))	14 minus 20 =	*			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 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 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	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 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	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.

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
17/145,670	01/11/2021	Woojin AHN	QUS-0003.01

CONFIRMATION NO. 9828

34610
KED & ASSOCIATES, LLP
P.O. Box 8638
Reston, VA 20195

FORMALITIES LETTER

OC000000122856000

Date Mailed: 01/25/2021

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given **TWO MONTHS** from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
  - Numbers, letters, and reference characters on the drawings must measure at least 0.32 cm (1/8 inch) in height. See Figure(s) 9, 10, 12, 16-20.
  - The drawings submitted to the Office are not electronically reproducible because portions of figures 7, 11, 19, 20 are missing and/or blurry.

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

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For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

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**.

/cma/

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
17/145,670	01/11/2021	2642	1820	QUS-0003.01	14	2

CONFIRMATION NO. 9828

34610
KED & ASSOCIATES, LLP
P.O. Box 8638
Reston, VA 20195

FILING RECEIPT

OC000000122855999

Date Mailed: 01/25/2021

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)

Woojin AHN, Seoul, KOREA, REPUBLIC OF;
Yongho KIM, Incheon, KOREA, REPUBLIC OF;
Jinsam KWAK, Gyeonggi-do, KOREA, REPUBLIC OF;
Juhyung SON, Gyeonggi-do, KOREA, REPUBLIC OF;

Applicant(s)

WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC., Seoul, KOREA, REPUBLIC OF;
SK TELECOM CO. LTD., Seoul, KOREA, REPUBLIC OF;

Power of Attorney: The patent practitioners associated with Customer Number 34610

Domestic Priority data as claimed by applicant

This application is a CON of 16/377,829 04/08/2019 PAT 10911186
which is a CON of 15/555,075 01/02/2018 PAT 10305638
which is a 371 of PCT/KR2016/002199 03/04/2016

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
REPUBLIC OF KOREA 10-2015-0030369 03/04/2015 Access Code Provided
REPUBLIC OF KOREA 10-2015-0036754 03/17/2015 Access Code Provided
REPUBLIC OF KOREA 10-2015-0066670 05/13/2015 Access Code Provided

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.

Request to Retrieve - This application either claims priority to one or more applications filed in an intellectual property Office that participates in the Priority Document Exchange (PDX) program or contains a proper **Request to Retrieve Electronic Priority Application(s)** (PTO/SB/38 or its equivalent). Consequently, the USPTO will attempt to electronically retrieve these priority documents.

If Required, Foreign Filing License Granted: 01/22/2021

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 17/145,670**

Projected Publication Date: To Be Determined - pending completion of Corrected Papers

Non-Publication Request: No

Early Publication Request: No

Title

WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION

Preliminary Class

455

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.

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.

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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LIST OF ART CITED BY APPLICANT (PTO-1449)	ATTORNEY. DOCKET NO.	APPLICATION SERIAL NO.
	QUS-0003.01	Continuation of U.S. Patent Application Serial No. 16/377,829
	APPLICANT(S)	
	Woojin AHN; Yongho KIM; Jinsam KWAK; and Juhyung SON	
	FILING DATE	GROUP
	January 11, 2021	2467

U.S. PATENT DOCUMENTS

EXAMINER'S INITIALS	*PATENT NO.	*ISSUE DATE	*INVENTOR NAME	CLASS	SUBCLASS	FILING DATE

U.S. PATENT APPLICATION PUBLICATIONS

EXAMINER'S INITIALS	*APPLICATION PUBLICATION NO.	*PUBLICATION DATE	*INVENTOR	CLASS	SUBCLASS	FILING DATE
	2017/0373813	12/2017	ASTERJADHI, Alfred			
	2016/0227437	08/2016	BLANKSBY, Andrew			
	2006/0034317	02/2006	HONG, Jin-woo			
	2012/0314697	12/2012	NOH, Yu Jin			
	2017/0250784	08/2017	SAKAI, Eisuke			
	2013/0301569	11/2013	WANG et al.			
	2013/0286959	10/2013	LOU et al.			
	2017/0272138	09/2019	CHUN; Jinyoung			
	2015/0003367	01/2015	SEOK, Yongho			
	2016/0165574	06/2016	CHU; Liwen			

FOREIGN PATENT DOCUMENTS

EXAMINER'S INITIALS	PATENT NO.	PUBLICATION DATE	COUNTRY	CLASS	SUBCLASS	Translation Yes	Translation No
	2011/102575	08/2011	WIPO			X	
	2014/171788	10/2014	WIPO			X	

OTHER ART (Including Author, Title, Date, Pertinent Pages, Publisher, Place of Publication, Etc.)

	International Search Report for PCT/KR2016/002199 mailed on July 8, 2016 and English translation
	Written Opinion of the International Searching Authority for PCT/KR2016/002199 mailed on July 8, 2016 and English translation
	AHN, Woo Jin et al., "UL-OFMA Procedure in IEEE 802.11ax", IEEE 802.11-15/0091rl, 13 January 2015, slides 3-10
	U.S. Office Action dated July 2, 2018 issued in Application No. 15/555,075
	U.S. Office Action dated October 4, 2019 issued in Application No. 16/377,829
	U.S. Office Action dated May 19, 2020 issued in Application No. 16/377,829

EXAMINER	DATE CONSIDERED

EXAMINER: Initial if reference has been considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.

Electronic Patent Application Fee Transmittal	
Application Number:	
Filing Date:	
Title of Invention:	WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION
First Named Inventor/Applicant Name:	Woojin AHN
Filer:	Daniel Y.J. Kim/Kathy Humphries
Attorney Docket Number:	QUS-0003.01
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:	41608112
Application Number:	17145670
International Application Number:	
Confirmation Number:	9828
Title of Invention:	WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION
First Named Inventor/Applicant Name:	Woojin AHN
Customer Number:	34610
Filer:	Daniel Y.J. Kim/Kathy Humphries
Filer Authorized By:	Daniel Y.J. Kim
Attorney Docket Number:	QUS-0003.01
Receipt Date:	11-JAN-2021
Filing Date:	
Time Stamp:	14:08:20
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1820
RAM confirmation Number	E20211AE09378118
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Transmittals.pdf	3716717 6559606aac33c41437e2764dc0a834f301655339	yes	16

Multipart Description/PDF files in .zip description

Document Description	Start	End
Transmittal of New Application	1	2
Authorization for Extension of Time all replies	3	3
Application Data Sheet	4	12
Assignee showing of ownership per 37 CFR 3.73	13	14
Power of Attorney	15	16

Warnings:

Information:

2		Application.pdf	2836906 3514e391742e14911ddde0fe1cefc95b01def642	yes	44

Multipart Description/PDF files in .zip description

Document Description	Start	End
Specification	1	40
Claims	41	43
Abstract	44	44

Warnings:

Information:

3	Drawings-only black and white line drawings	DRAWINGS.pdf	452583 3c0220a2d7c4b502aa09a44ed7d216e61c847dcb	no	21
Warnings:					
Information:					
4	Oath or Declaration filed	Declarations.pdf	164828 a1c32cb6e73a68660da2b9a009fb9696663fe320	no	3
Warnings:					
Information:					
5	Preliminary Amendment	Preliminary-Amendment.pdf	76339 b14165d24ba264b9b18cb152b77401f3df7b7397	no	7
Warnings:					
Information:					
6		IDS.pdf	122214 c9d10ea91676f7178aa1c45e61b2814cb0fffb2e	yes	3

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	2
	Information Disclosure Statement (IDS) Form (SB08)	3	3

Warnings:					
Information:					
7	Fee Worksheet (SB06)	fee-info.pdf	35169 52282256ba803d83804f0bd2979d50931db3cd37	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	7404756		

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.

UTILITY PATENT APPLICATION
TRANSMITTAL UNDER 37 C.F.R. §1.53(b)

U.S. Patent and Trademark Office
Customer Service Window, MAIL STOP PATENT APPLICATION
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Docket No.: **QUS-0003.01**

Sir:
Transmitted herewith for filing is the patent application of
INVENTOR OR APPLICATION IDENTIFIER: **Woojin AHN; Yongho KIM; Jinsam KWAK; and Juhyung SON**

FOR: **WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION**

Enclosed are:

1. ☒ 44 pages of specification, claims, abstract

2. ☒ 21 sheets of FORMAL drawings.

3. ☒ 2 pages of Declaration (copy from a prior application).
   - ☒ Incorporation By Reference-The entire disclosure of the prior application is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
   - ☒ This is a Continuation of application No. **16/377,829**, filed on **April 8, 2019**, entitled **WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION**

4. ☒ Application Data Sheet.

5. ☒ An Information Disclosure Statement and PTO 1449 Form are submitted herewith.

6. The filing fee is calculated on the basis of the claims as filed herewith:

CLAIMS AS FILED					
For	No. Filed		No. Extra	Rate	Fee
Total Claims	14	- 20	0	X $100.00	$0.00
Independent Claims	2	- 3	0	X $480.00	$0.00
				BASIC FILING FEE	$320.00
				UTILITY SEARCH FEE	$700.00
				UTILITY EXAMINATION FEE	$800.00
				TOTAL FILING FEE	$1,820.00

7. ☒ Preliminary Amendment is enclosed.

8. ☒ Please charge my Credit Card.

9. ☒ The Commissioner is hereby authorized to charge fees under 37 C.F.R. §1.16 and §1.17 which may be required, including any extension of time fees to maintain the pendency of the parent application No. **16/377,829** or credit any overpayment to Deposit Account No. 16-0607.

10. ☒ Authorization under 37 C.F.R. §1.136(a)(3).

11. ☒ Priority is claimed. A copy of the foreign priority documents was electronically retrieved in grandparent application No. **15/555,075** on **08/21/2017** and/or retrieved in parent application **16/377,829** on **October 13, 2020**.

12. ☒ The prior application is assigned of record to **WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.** at Reel **046584**, Frame **0320**.

13. ☒ The power of attorney in the prior application is to:

KED & ASSOCIATES, LLP (Customer No. 34610)

14. ☒ Also enclosed:

Power of Attorney (PTO/AIA/80)
Statement Under 37 C.F.R. §3.73(c) (PTO/AIA/96)

Respectfully submitted,
KED & ASSOCIATES, LLP

/David C. Oren/

David C. Oren
Registration No. 38,694

Correspondence Address:
P.O. Box 8638
Reston, VA 20195
703 766-3777 (Main)
703 766-3756 (Direct) DCO/kdt
Please direct all correspondence to Customer Number 34610

Docket No.: **QUS-0003.01** PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of Customer No.: **34610**

Woojin AHN; Yongho KIM; Jinsam KWAK; and Juhyung SON

Serial No.: **Continuation of U.S. Patent Application Serial No. 16/377,829 filed April 8, 2019**

Filing Date: **January 11, 2021**

For: **WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION**

AUTHORIZATION TO TREAT A REPLY AS INCORPORATING AN EXTENSION OF TIME UNDER 37 C.F.R. §1.136(a)(3)

U.S. Patent and Trademark Office
Customer Service Window, MAIL STOP APPLICATIONS
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Sir:

The U.S. Patent and Trademark Office is hereby authorized to treat any concurrent or future reply that requires a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time under 37 C.F.R. §1.136(a)(3). The U.S. Patent and Trademark Office is hereby authorized to charge all required extension of time fees to our Deposit Account No. 16-0607, if such fees are not otherwise provided for in such reply.

Respectfully submitted,
KED & ASSOCIATES, LLP

/David C. Oren/

David C. Oren
Registration No. 38,694

Correspondence Address:
P.O. Box 8638
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Please direct all correspondence to Customer Number 34610

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	QUS-0003.01
	Application Number	
Title of Invention	WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION	

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:

Remove

Inventor 1

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Woojin		AHN	

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

City	Seoul	Country of Residence i	KR

Mailing Address of Inventor:

Address 1	18-1, Seooreung-ro 13-gil Eunpyeong-gu
Address 2	

City	Seoul	State/Province	
Postal Code	03410	Country i	KR

Remove

Inventor 2

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Yongho		KIM	

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

City	Incheon	Country of Residence i	KR

Mailing Address of Inventor:

Address 1	1404-804, 192 Guwol-ro Namdong-gu
Address 2	

City	Incheon	State/Province	
Postal Code	21561	Country i	KR

Remove

Inventor 3

Legal Name

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	QUS-0003.01
	Application Number	
Title of Invention	WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION	

Prefix	Given Name	Middle Name	Family Name	Suffix
	Jinsam		KWAK	

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

City	Gyeonggi-do	Country of Residence i	KR

Mailing Address of Inventor:

Address 1	1113-1704, 11 Naesonjungang-ro Uiwang-si		
Address 2			
City	Gyeonggi-do	State/Province	
Postal Code	16021	Country i	KR

Remove

Inventor 4

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Juhyung		SON	

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

City	Gyeonggi-do	Country of Residence i	KR

Mailing Address of Inventor:

Address 1	1114-302, 11 Naesonjungang-ro Uiwang-si		
Address 2			
City	Gyeonggi-do	State/Province	
Postal Code	16021	Country i	KR

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

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

Customer Number	34610		
Email Address	ked-docket@ked-iplaw.com	Add Email	Remove Email

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	QUS-0003.01
	Application Number	
Title of Invention	WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION	

Application Information:

Title of the Invention	WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION		
Attorney Docket Number	QUS-0003.01	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	21	**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	34610		

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.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	QUS-0003.01
	Application Number	
Title of Invention	WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION	

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	16377829	2019-04-08

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16377829	Continuation of	15555075	2018-01-02	10305638	2019-05-28

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15555075	a 371 of international	PCT/KR2016/002199	2016-03-04

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

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[j] (if applicable)
10-2015-0030369	KR	2015-03-04	2EB1

			Remove
Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[j] (if applicable)
10-2015-0036754	KR	2015-03-17	573C

			Remove
Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[j] (if applicable)
10-2015-0066670	KR	2015-05-13	1889

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

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

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	QUS-0003.01
	Application Number	
Title of Invention	WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION	

☐ 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.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	QUS-0003.01
	Application Number	
Title of Invention	WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION	

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.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	QUS-0003.01
	Application Number	
Title of Invention	WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION	

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

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. [x]

Organization Name	WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC.		
Mailing Address Information For Applicant:			
Address 1	5Fl., 216 Hwangsaeul-ro, Bundang-gu, Seongnam-si,		
Address 2	Gyeonggi-do		
City	Seoul	**State/Province**	
Country	KR	Postal Code	13595
Phone Number		Fax Number	
Email Address			

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

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	QUS-0003.01
	Application Number	
Title of Invention	WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION	

Applicant 2

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. [x]

Organization Name	SK TELECOM CO., LTD.

Mailing Address Information For Applicant:

Address 1	SK T-Tower, 65, Eulji-ro, Jung-gu		
Address 2			
City	Seoul	**State/Province**	
Country	KR	Postal Code	04539
Phone Number		Fax Number	
Email Address			

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

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.

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.

If the Assignee or Non-Applicant Assignee is an Organization check here. [ ]

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	Application Number	
Title of Invention	WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION	

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.

Signature:

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

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

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

Signature	/David C. Oren/			Date (YYYY-MM-DD)	2021-01-11
First Name	David C.	Last Name	Oren	Registration Number	38694

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

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.**

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STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.

Application No./Patent No.: Continuation of U.S. Application No. 16/377,828 Filed/Issue Date: January 11, 2021

Titled: WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION

WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD., 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 046584, Frame 0320, 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: _____ To: _____

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

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

2. 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.

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

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.

/David C. Oren/ — Signature

January 11, 2021 — Date

David C. Oren — Printed or Typed Name

38,694 — Title or Registration Number

PTO/AIA/80 (07-17)
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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:

[X] Practitioners associated with Customer Number: 34610

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:

[X] The address associated with Customer Number: 34610

OR

[ ]

Firm or individual name		
Address		
City	State	Zip
Country		
Telephone	Email	

Assignee name and address: SK Telecom Co., Ltd.
SK T-Tower, 65, Eulji-ro, Jung-gu
Seoul, 04539, Republic of Korea

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[DESCRIPTION]

[Invention Title]

WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION

[Technical Field]

The present invention relates to a wireless communication terminal and a wireless communication method for a simultaneous multi-user transmission, and more particularly, to a wireless communication terminal and a wireless communication method for efficiently managing simultaneous data transmissions of a plurality of terminals.

[Background Art]

In recent years, with supply expansion of mobile apparatuses, a wireless LAN technology that can provide a rapid wireless Internet service to the mobile apparatuses has been significantly spotlighted. The wireless LAN technology allows mobile apparatuses including a smart phone, a smart pad, a laptop computer, a portable multimedia player, an embedded apparatus, and the like to wirelessly access the Internet in home or a company or a specific service providing area based on a wireless communication technology in a short range.

Institute of Electrical and Electronics Engineers (IEEE) 802.11 has commercialized or developed various technological standards since an initial wireless LAN technology is supported using frequencies of 2.4 GHz. First, the IEEE 802.11b supports a communication speed of a maximum of 11 Mbps while using frequencies of a 2.4 GHz band. IEEE 802.11a which is commercialized after the IEEE 802.11b uses frequencies of not the 2.4 GHz band but a 5 GHz band to reduce an influence by

interference as compared with the frequencies of the 2.4 GHz band which are significantly congested and improves the communication speed up to a maximum of 54 Mbps by using an OFDM technology. However, the IEEE 802.11a has a disadvantage in that a communication distance is shorter than the IEEE 802.11b. In addition, IEEE 802.11g uses the frequencies of the 2.4 GHz band similarly to the IEEE 802.11b to implement the communication speed of a maximum of 54 Mbps and satisfies backward compatibility to significantly come into the spotlight and further, is superior to the IEEE 802.11a in terms of the communication distance.

Moreover, as a technology standard established to overcome a limitation of the communication speed which is pointed out as a weak point in a wireless LAN, IEEE 802.11n has been provided. The IEEE 802.11n aims at increasing the speed and reliability of a network and extending an operating distance of a wireless network. In more detail, the IEEE 802.11n supports a high throughput (HT) in which a data processing speed is a maximum of 540 Mbps or more and further, is based on a multiple inputs and multiple outputs (MIMO) technology in which multiple antennas are used at both sides of a transmitting unit and a receiving unit in order to minimize a transmission error and optimize a data speed. Further, the standard can use a coding scheme that transmits multiple copies which overlap with each other in order to increase data reliability.

As the supply of the wireless LAN is activated and further, applications using the wireless LAN are diversified, the need for new wireless LAN systems for supporting a higher throughput (very high throughput (VHT)) than the data processing speed supported by the IEEE 802.11n has come into the spotlight. Among them, IEEE 802.11ac supports a wide bandwidth (80 to 160 MHz) in the 5 GHz frequencies. The IEEE 802.11ac standard is defined only in the 5 GHz band, but initial 11ac chipsets will

support even operations in the 2.4 GHz band for the backward compatibility with the existing 2.4 GHz band products. Theoretically, according to the standard, wireless LAN speeds of multiple stations are enabled up to a minimum of 1 Gbps and a maximum single link speed is enabled up to a minimum of 500 Mbps. This is achieved by extending concepts of a wireless interface accepted by 802.11n, such as a wider wireless frequency bandwidth (a maximum of 160 MHz), more MIMO spatial streams (a maximum of 8), multi-user MIMO, and high-density modulation (a maximum of 256 QAM). Further, as a scheme that transmits data by using a 60 GHz band instead of the existing 2.4 GHz/5 GHz, IEEE 802.11ad has been provided. The IEEE 802.11ad is a transmission standard that provides a speed of a maximum of 7 Gbps by using a beamforming technology and is suitable for high bit rate moving picture streaming such as massive data or non-compression HD video. However, since it is difficult for the 60 GHz frequency band to pass through an obstacle, it is disadvantageous in that the 60 GHz frequency band can be used only among devices in a short-distance space.

Meanwhile, in recent years, as next-generation wireless LAN standards after the 802.11ac and 802.11ad, discussion for providing a high-efficiency and high-performance wireless LAN communication technology in a high-density environment is continuously performed. That is, in a next-generation wireless LAN environment, communication having high frequency efficiency needs to be provided indoors/outdoors under the presence of high-density stations and access points (APs) and various technologies for implementing the communication are required.

[Disclosure]

[Technical Problem]

The present invention has an object to provide high-efficiency/high-performance wireless LAN communication in a high-density environment as described

above.

In addition, the present invention has an object to reduce the possibility of collision of data transmission of a plurality of terminals in a dense user environment and to provide a stable data communication environment.

Also, the present invention has an object to provide a method by which a plurality of terminals can efficiently perform simultaneous multi-user transmission.

[Technical Solution]

In order to achieve the objects, the present invention provides a wireless communication method and a wireless communication terminal as below.

First, an exemplary embodiment of the present invention provides a base wireless communication terminal, including: a transceiver configured to transmit and receive a wireless signal; and a processor configured to control an operation of the base wireless communication terminal, wherein the processor transmits a trigger frame triggering a multi-user uplink transmission of a plurality of terminals, receives multi-user uplink data through resources allocated to the plurality of terminals, and transmits a block ACK through the resources in response to the received multi-user uplink data, wherein the transmission of the block ACK in each resource is terminated at the same time.

According to an embodiment, the processor may perform padding on the block ACK transmitted through at least one resource to match termination points of block ACK transmissions in each resource.

According to another embodiment, the processor may insert duplicated ACK information into the block ACK transmitted through at least one resource to match termination points of block ACK transmissions in each resource.

In addition, a predetermined padding may be performed before a frame check

sequence (FCS) field of the trigger frame.

In this case, the transmission of the trigger frame may be terminated at the same time in each resource through which the trigger frame is transmitted.

In addition, the resource may be a channel or a sub-channel.

According to an embodiment, a transmission packet of the multi-user uplink data may include a legacy preamble and a non-legacy preamble, and the legacy preamble may be received as common information on a 20 MHz channel basis.

In addition, the non-legacy preamble may include HE-SIG-A and remaining fields, and the HE-SIG-A may be received as common information on a 20 MHz channel basis, and the remaining fields of the non-legacy preambles may be received as individual information for each resource allocated to each terminal.

In this case, the remaining fields of the non-legacy preamble may include HE-STF and HE-LTF.

According to an embodiment, the multi-user uplink data transmission in each resource may be terminated at the same time.

In this case, the uplink data transmitted through at least one resource may be padded to terminate the multi-user uplink data transmission at the same time.

In addition, an exemplary embodiment of the present invention provides a wireless communication method of a base wireless communication terminal, including: transmitting a trigger frame triggering a multi-user uplink transmission of a plurality of terminals; receiving multi-user uplink data through resources allocated to the plurality of terminals; and transmitting a block ACK through the resources in response to the received multi-user uplink data; wherein the transmission of the block ACK in each resource is terminated at the same time.

[Advantageous Effects]

According to an embodiment of the present invention, efficient multi-user uplink transmission scheduling is possible in a contention-based channel access system.

Also, according to the embodiment of the present invention, it is possible to reduce unnecessary channel occupancy and increase total spectral efficiency of the network in a multi-user uplink transmission process.

In addition, according to the embodiment of the present invention, it is possible to prevent malfunction of the wireless LAN network by aligning the lengths of block ACKs transmitted through a plurality of channels, and at the same time, it is possible to secure transmission time of a control frame of an AP.

According to the embodiment of the present invention, it is possible to increase the total resource utilization rate in the contention-based channel access system and improve the performance of the wireless LAN system.

[Description of Drawings]

FIG. 1 illustrates a wireless LAN system according to an embodiment of the present invention.

FIG. 2 illustrates a wireless LAN system according to another embodiment of the present invention.

FIG. 3 is a block diagram illustrating a configuration of a station according to an embodiment of the present invention.

FIG. 4 is a block diagram illustrating a configuration of an access point according to an embodiment of the present invention.

FIG. 5 schematically illustrates a process in which a STA and an AP set a link.

FIG. 6 illustrates a carrier sense multiple access (CSMA)/collision avoidance (CA) method used in wireless LAN communication.

FIG. 7 illustrates a method for performing a distributed coordination function

(DCF) using a request to send (RTS) frame and a clear to send (CTS) frame.

FIG. 8 illustrates a wireless LAN network according to an embodiment of the present invention.

FIG. 9 illustrates a sequence of processes in which a multi-user uplink transmission is performed according to an embodiment of the present invention.

FIG. 10 illustrates an ACK transmission method for a multi-user uplink transmission according to an embodiment of the present invention.

FIG. 11 illustrates a NAV setting method for a multi-user uplink transmission according to an embodiment of the present invention.

FIG. 12 illustrates a frequency masking method according to the frequency bandwidth in use.

FIG. 13 illustrates a guard band setting method according to an embodiment of the present invention.

FIG. 14 illustrates a method of transmitting a legacy preamble of a non-legacy terminal in a process of a multi-user uplink data transmission.

FIG. 15 illustrates a method of configuring a non-legacy preamble in a process of a multi-user data transmission.

FIG. 16 illustrates a method for performing a multi-user uplink transmission according to an embodiment of the present invention.

FIG. 17 illustrates a structure of a multiplexed group ACK according to an embodiment of the present invention.

FIG. 18 illustrates a method of transmitting a multiplexed group ACK according to an embodiment of the present invention.

FIG. 19 illustrates a length alignment method of block ACKs according to an embodiment of the present invention.

FIG. 20 illustrates a method of frame length alignment by padding in a multi-user simultaneous transmission according to an embodiment of the present invention.

FIG. 21 illustrates a method of transmitting a multiplexed block ACK when a plurality of channels are used for a multi-user uplink transmission.

[Best Mode]

Terms used in the specification adopt general terms which are currently widely used by considering functions in the present invention, but the terms may be changed depending on an intention of those skilled in the art, customs, and emergence of new technology. Further, in a specific case, there is a term arbitrarily selected by an applicant and in this case, a meaning thereof will be described in a corresponding description part of the invention. Accordingly, it should be revealed that a term used in the specification should be analyzed based on not just a name of the term but a substantial meaning of the term and contents throughout the specification.

Throughout this specification and the claims that follow, when it is described that an element is "coupled" to another element, the element may be "directly coupled" to the other element or "electrically coupled" to the other element through a third element. Further, unless explicitly described to the contrary, the word "comprise" and variations such as "comprises" or "comprising", will be understood to imply the inclusion of stated elements but not the exclusion of any other elements. Moreover, limitations such as "or more" or "or less" based on a specific threshold may be appropriately substituted with "more than" or "less than", respectively.

This application claims priority to and the benefit of Korean Patent Application Nos. 10-2015-0030369, 10-2015-0036754 and 10-2015-0066670 filed in the Korean Intellectual Property Office and the embodiments and mentioned items described in the respective application, which forms the basis of the priority, shall be

included in the Detailed Description of the present application.

FIG. 1 is a diagram illustrating a wireless LAN system according to an embodiment of the present invention. The wireless LAN system includes one or more basic service sets (BSS) and the BSS represents a set of apparatuses which are successfully synchronized with each other to communicate with each other. In general, the BSS may be classified into an infrastructure BSS and an independent BSS (IBSS) and FIG. 1 illustrates the infrastructure BSS between them.

As illustrated in FIG. 1, the infrastructure BSS (BSS1 and BSS2) includes one or more stations STA1, STA2, STA3, STA4, and STA5, access points PCP/AP-1 and PCP/AP-2 which are stations providing a distribution service, and a distribution system (DS) connecting the multiple access points PCP/AP-1 and PCP/AP-2.

The station (STA) is a predetermined device including medium access control (MAC) following a regulation of an IEEE 802.11 standard and a physical layer interface for a wireless medium, and includes both a non-access point (non-AP) station and an access point (AP) in a broad sense. Further, in the present specification, a term 'terminal' may be used to refer to a non-AP STA, or an AP, or to both terms. A station for wireless communication includes a processor and a transceiver and according to the embodiment, may further include a user interface unit and a display unit. The processor may generate a frame to be transmitted through a wireless network or process a frame received through the wireless network and besides, perform various processing for controlling the station. In addition, the transceiver is functionally connected with the processor and transmits and receives frames through the wireless network for the station.

The access point (AP) is an entity that provides access to the distribution system (DS) via wireless medium for the station associated therewith. In the infrastructure BSS, communication among non-AP stations is, in principle, performed

via the AP, but when a direct link is configured, direct communication is enabled even among the non-AP stations. Meanwhile, in the present invention, the AP is used as a concept including a personal BSS coordination point (PCP) and may include concepts including a centralized controller, a base station (BS), a node-B, a base transceiver system (BTS), and a site controller in a broad sense. In the present invention, an AP may also be referred to as a base wireless communication terminal. The base wireless communication terminal may be used as a term which includes an AP, a base station, an eNB (i.e. eNodeB) and a transmission point (TP) in a broad sense. In addition, the base wireless communication terminal may include various types of wireless communication terminals that allocate medium resources and perform scheduling in communication with a plurality of wireless communication terminals.

A plurality of infrastructure BSSs may be connected with each other through the distribution system (DS). In this case, a plurality of BSSs connected through the distribution system is referred to as an extended service set (ESS).

FIG. 2 illustrates an independent BSS which is a wireless LAN system according to another embodiment of the present invention. In the embodiment of FIG. 2, duplicative description of parts, which are the same as or correspond to the embodiment of FIG. 1, will be omitted.

Since a BSS3 illustrated in FIG. 2 is the independent BSS and does not include the AP, all stations STA6 and STA7 are not connected with the AP. The independent BSS is not permitted to access the distribution system and forms a self-contained network. In the independent BSS, the respective stations STA6 and STA7 may be directly connected with each other.

FIG. 3 is a block diagram illustrating a configuration of a station 100 according to an embodiment of the present invention.

As illustrated in FIG. 3, the station 100 according to the embodiment of the present invention may include a processor 110, a transceiver 120, a user interface unit 140, a display unit 150, and a memory 160.

First, the transceiver 120 transmits and receives a wireless signal such as a wireless LAN packet, or the like and may be embedded in the station 100 or provided as an exterior. According to the embodiment, the transceiver 120 may include at least one transmit/receive module using different frequency bands. For example, the transceiver 120 may include transmit/receive modules having different frequency bands such as 2.4 GHz, 5 GHz, and 60 GHz. According to an embodiment, the station 100 may include a transmit/receive module using a frequency band of 6 GHz or more and a transmit/receive module using a frequency band of 6 GHz or less. The respective transmit/receive modules may perform wireless communication with the AP or an external station according to a wireless LAN standard of a frequency band supported by the corresponding transmit/receive module. The transceiver 120 may operate only one transmit/receive module at a time or simultaneously operate multiple transmit/receive modules together according to the performance and requirements of the station 100. When the station 100 includes a plurality of transmit/receive modules, each transmit/receive module may be implemented by independent elements or a plurality of modules may be integrated into one chip.

Next, the user interface unit 140 includes various types of input/output means provided in the station 100. That is, the user interface unit 140 may receive a user input by using various input means and the processor 110 may control the station 100 based on the received user input. Further, the user interface unit 140 may perform output based on a command of the processor 110 by using various output means.

Next, the display unit 150 outputs an image on a display screen. The display

unit 150 may output various display objects such as contents executed by the processor 110 or a user interface based on a control command of the processor 110, and the like. Further, the memory 160 stores a control program used in the station 100 and various resulting data. The control program may include an access program required for the station 100 to access the AP or the external station.

The processor 110 of the present invention may execute various commands or programs and process data in the station 100. Further, the processor 110 may control the respective units of the station 100 and control data transmission/reception among the units. According to the embodiment of the present invention, the processor 110 may execute the program for accessing the AP stored in the memory 160 and receive a communication configuration message transmitted by the AP. Further, the processor 110 may read information on a priority condition of the station 100 included in the communication configuration message and request the access to the AP based on the information on the priority condition of the station 100. The processor 110 of the present invention may represent a main control unit of the station 100 and according to the embodiment, the processor 110 may represent a control unit for individually controlling some component of the station 100, for example, the transceiver 120, and the like. The processor 110 controls various operations of wireless signal transmission/reception of the station 100 according to the embodiment of the present invention. A detailed embodiment thereof will be described below.

The station 100 illustrated in FIG. 3 is a block diagram according to an embodiment of the present invention, where separate blocks are illustrated as logically distinguished elements of the device. Accordingly, the elements of the device may be mounted in a single chip or multiple chips depending on design of the device. For example, the processor 110 and the transceiver 120 may be implemented while being

integrated into a single chip or implemented as a separate chip. Further, in the embodiment of the present invention, some components of the station 100, for example, the user interface unit 140 and the display unit 150 may be optionally provided in the station 100.

FIG. 4 is a block diagram illustrating a configuration of an AP 200 according to an embodiment of the present invention.

As illustrated in FIG. 4, the AP 200 according to the embodiment of the present invention may include a processor 210, a transceiver 220, and a memory 260. In FIG. 4, among the components of the AP 200, duplicative description of parts which are the same as or correspond to the components of the station 100 of FIG. 2 will be omitted.

Referring to FIG. 4, the AP 200 according to the present invention includes the transceiver 220 for operating the BSS in at least one frequency band. As described in the embodiment of FIG. 3, the transceiver 220 of the AP 200 may also include a plurality of transmit/receive modules using different frequency bands. That is, the AP 200 according to the embodiment of the present invention may include two or more transmit/receive modules among different frequency bands, for example, 2.4 GHz, 5 GHz, and 60 GHz together. Preferably, the AP 200 may include a transmit/receive module using a frequency band of 6 GHz or more and a transmit/receive module using a frequency band of 6 GHz or less. The respective transmit/receive modules may perform wireless communication with the station according to a wireless LAN standard of a frequency band supported by the corresponding transmit/receive module. The transceiver 220 may operate only one transmit/receive module at a time or simultaneously operate multiple transmit/receive modules together according to the performance and requirements of the AP 200.

Next, the memory 260 stores a control program used in the AP 200 and

various resulting data. The control program may include an access program for managing the access of the station. Further, the processor 210 may control the respective units of the AP 200 and control data transmission/reception among the units. According to the embodiment of the present invention, the processor 210 may execute the program for accessing the station stored in the memory 260 and transmit communication configuration messages for one or more stations. In this case, the communication configuration messages may include information about access priority conditions of the respective stations. Further, the processor 210 performs an access configuration according to an access request of the station. The processor 210 controls various operations such as wireless signal transmission/reception of the AP 200 according to the embodiment of the present invention. A detailed embodiment thereof will be described below.

FIG. 5 is a diagram schematically illustrating a process in which a STA sets a link with an AP.

Referring to FIG. 5, the link between the STA 100 and the AP 200 is set through three steps of scanning, authentication, and association in a broad way. First, the scanning step is a step in which the STA 100 obtains access information of BSS operated by the AP 200. A method for performing the scanning includes a passive scanning method in which the AP 200 obtains information by using a beacon message (S101) which is periodically transmitted and an active scanning method in which the STA 100 transmits a probe request to the AP (S103) and obtains access information by receiving a probe response from the AP (S105).

The STA 100 that successfully receives wireless access information in the scanning step performs the authentication step by transmitting an authentication request (S107a) and receiving an authentication response from the AP 200 (S107b). After the

authentication step is performed, the STA 100 performs the association step by transmitting an association request (S109a) and receiving an association response from the AP 200 (S109b). In this specification, an association basically means a wireless association, but the present invention is not limited thereto, and the association may include both the wireless association and a wired association in a broad sense.

Meanwhile, an 802.1X based authentication step (S111) and an IP address obtaining step (S113) through DHCP may be additionally performed. In FIG. 5, the authentication server 300 is a server that processes 802.1X based authentication with the STA 100 and may be present in physical association with the AP 200 or present as a separate server.

FIG. 6 is a diagram illustrating a carrier sense multiple access (CSMA)/collision avoidance (CA) method used in wireless LAN communication.

A terminal that performs a wireless LAN communication checks whether a channel is busy by performing carrier sensing before transmitting data. When a wireless signal having a predetermined strength or more is sensed, it is determined that the corresponding channel is busy and the terminal delays the access to the corresponding channel. Such a process is referred to as clear channel assessment (CCA) and a level to decide whether the corresponding signal is sensed is referred to as a CCA threshold. When a wireless signal having the CCA threshold or more, which is received by the terminal, indicates the corresponding terminal as a receiver, the terminal processes the received wireless signal. Meanwhile, when a wireless signal is not sensed in the corresponding channel or a wireless signal having a strength smaller than the CCA threshold is sensed, it is determined that the channel is idle.

When it is determined that the channel is idle, each terminal having data to be transmitted performs a backoff procedure after an interframe space (IFS) time

depending on a situation of each terminal, for instance, an arbitration IFS (AIFS), a PCF IFS (PIFS), or the like elapses. According to the embodiment, the AIFS may be used as a component which substitutes for the existing DCF IFS (DIFS). Each terminal stands by while decreasing slot time(s) as long as a random number assigned to the corresponding terminal during an interval of an idle state of the channel and a terminal that completely exhausts the slot time(s) attempts to access the corresponding channel. As such, an interval in which each terminal performs the backoff procedure is referred to as a contention window interval.

When a specific terminal successfully accesses the channel, the corresponding terminal may transmit data through the channel. However, when the terminal which attempts the access collides with another terminal, the terminals which collide with each other are assigned with new random numbers, respectively to perform the backoff procedure again. According to an embodiment, a random number newly assigned to each terminal may be decided within a range (2*CW) which is twice larger than a range (a contention window, CW) of a random number which the corresponding terminal is previously assigned. Meanwhile, each terminal attempts the access by performing the backoff procedure again in a next contention window interval and in this case, each terminal performs the backoff procedure from slot time(s) which remained in the previous contention window interval. By such a method, the respective terminals that perform the wireless LAN communication may avoid a mutual collision for a specific channel.

FIG. 7 is a diagram illustrating a method for performing a distributed coordination function using a request to send (RTS) frame and a clear to send (CTS) frame.

The AP and STAs in the BSS contend in order to obtain an authority for

transmitting data. When data transmission at the previous step is completed, each terminal having data to be transmitted performs a backoff procedure while decreasing a backoff counter (alternatively, a backoff timer) of a random number allocated to each terminal after an AFIS time. A transmitting terminal in which the backoff counter expires transmits the request to send (RTS) frame to notify that corresponding terminal has data to transmit. According to an exemplary embodiment of FIG. 7, STA1 which holds a lead in contention with minimum backoff may transmit the RTS frame after the backoff counter expires. The RTS frame includes information on a receiver address, a transmitter address, and duration. A receiving terminal (i.e., the AP in FIG. 7) that receives the RTS frame transmits the clear to send (CTS) frame after waiting for a short IFS (SIFS) time to notify that the data transmission is available to the transmitting terminal STA1. The CTS frame includes the information on a receiver address and duration. In this case, the receiver address of the CTS frame may be set identically to a transmitter address of the RTS frame corresponding thereto, that is, an address of the transmitting terminal STA1.

The transmitting terminal STA1 that receives the CTS frame transmits the data after a SIFS time. When the data transmission is completed, the receiving terminal AP transmits an acknowledgment (ACK) frame after a SIFS time to notify that the data transmission is completed. When the transmitting terminal receives the ACK frame within a predetermined time, the transmitting terminal regards that the data transmission is successful. However, when the transmitting terminal does not receive the ACK frame within the predetermined time, the transmitting terminal regards that the data transmission is failed. Meanwhile, adjacent terminals that receive at least one of the RTS frame and the CTS frame in the course of the transmission procedure set a network allocation vector (NAV) and do not perform data transmission until the set NAV is

terminated. In this case, the NAV of each terminal may be set based on a duration field of the received RTS frame or CTS frame.

In the course of the aforementioned data transmission procedure, when the RTS frame or CTS frame of the terminals is not normally transferred to a target terminal (i.e., a terminal of the receiver address) due to a situation such as interference or a collision, a subsequent process is suspended. The transmitting terminal STA1 that transmitted the RTS frame regards that the data transmission is unavailable and participates in a next contention by being allocated with a new random number. In this case, the newly allocated random number may be determined within a range (2*CW) twice larger than a previous predetermined random number range (a contention window, CW).

Multi-user uplink transmission

FIG. 8 illustrates a wireless LAN network according to an embodiment of the present invention. In FIG. 8, a BSS consists of an AP and a plurality of STAs (STA1, STA2, STA3 and STA4) associated therewith. The blocks shown with each terminal represents the channel state measured at the corresponding terminal. A shadow block indicates a busy channel, and a white block indicates an idle channel.

When using an orthogonal frequency division multiple access (OFDMA) or a multi-input multi-output (MIMO), one wireless communication terminal can simultaneously transmit data to a plurality of wireless communication terminals. Further, one wireless communication terminal can simultaneously receive data from a plurality of wireless communication terminals. For example, a multi-user downlink transmission in which an AP simultaneously transmits data to a plurality of STAs, and a multi-user uplink transmission in which a plurality of STAs simultaneously transmit data to the AP may be performed.

In order to perform the multi-user uplink transmission, the channel to be used and the transmission start time of each STA that performs uplink transmission should be adjusted. However, in a wireless LAN environment in which a plurality of BSSs are adjacent to each other, the measured channel states may be different from each other in the same BSS as shown in FIG 8. That is, depending on the influence of the adjacent external BSS of each terminal, channels to which each terminal can access may be different from each other. In addition, whether or not each STA has data for uplink transmission changes in real time. Therefore, in order to efficiently schedule the multi-user uplink transmission, state information of each STA needs to be transmitted to the AP.

According to an embodiment of the present invention, information for scheduling of a multi-user uplink transmission may be indicated through a predetermined field of a preamble of a packet and/or a predetermined field of a MAC header. For example, a STA may indicate information for multi-user uplink transmission scheduling through a predetermined field of a preamble or a MAC header of an uplink transmission packet, and may transmit the information to an AP. In this case, the information for multi-user uplink transmission scheduling includes at least one of buffer status information of each STA, channel state information measured by each STA. The buffer status information of the STA may indicate at least one of whether the STA has uplink data to be transmitted, the access class (AC) of the uplink data and the size (or the transmission time) of the uplink data.

FIG. 9 illustrates a sequence of processes in which a multi-user uplink transmission is performed. As described above, the multi-user uplink transmission process may be managed by the AP because a plurality of terminals simultaneously transmit data. Therefore, in order to allocate resources and prevent data collision, the

AP should obtain the buffer status information of each STA and deliver the accurate transmission time point information to each STA before the start of multi-user uplink transmission. The buffer status information of the STA may indicate at least one of whether the STA has uplink data to be transmitted, the access category (AC) of the uplink data, and the size (or the transmission time) of the uplink data. Such information delivery of each STA may be performed through an initialization step S210 and a scheduling step S220 for the multi-user uplink transmission.

According to an embodiment of the present invention, the scheduling step S220 for the multi-user uplink transmission is performed in advance to collect related information, and the initialization step S210 may be performed if a specific condition is satisfied. Alternatively, the initialization step S210 may be performed in advance according to the time condition, and then the scheduling step S220 may be performed next to collect the related information. The initializing step S210 and the scheduling step S220 include a process of exchanging information on channels available to the AP and the STA. According to an exemplary embodiment, the AP may transmit available channel information to a plurality of STAs in advance, and the plurality of STAs may feedback channel information available to the corresponding STA among the channels available to the AP. The specific operation method of the initializing step S210 and the scheduling step S220 in the embodiment of the present invention is not limited thereto. According to an embodiment, the initialization step S210 and the scheduling step S220 may be performed with an integrated operation.

When the initialization step S210 and the scheduling step S220 are performed, a multi-user uplink data transmission step S230 is performed. At least one STA assigned a channel or a sub-channel from the AP simultaneously transmits uplink data at the time point designated by the AP. The STA may perform uplink data transmission

through a 20 MHz channel basis or a wideband channel basis over the 20 MHz. In addition, the non-legacy STA may perform uplink data transmission through a sub-channel basis smaller than 20 MHz. In the embodiment of the present invention, a term resource may be used for comprehensively meaning a channel or a sub-channel allocated to the STAs. The AP receiving the uplink data from the STA transmits an ACK in response thereto (S240). If uplink data transmission is performed through a sub-channel basis, a plurality of STAs can transmit uplink data through one channel. In this case, the AP may transmit a group ACK through the corresponding channel to transmit an ACK for a plurality of STAs that transmitted the uplink data.

In case of being affected by a plurality of external BSSs in a dense BSS environment, the available channels of each terminal may be different from each other according to the geographical location of the wireless terminal. Therefore, the number of terminals capable of data transmission through each channel may be different from each other. In this case, as shown in FIG. 9, the air time during which actual uplink data transmission is performed may be different for each channel. However, if the AP cannot simultaneously perform data transmission and reception, the AP cannot transmit an ACK through another channel in which uplink data transmission has been completed while receiving uplink data through a channel in which the air time is long. Therefore, the STAs using the channel in which the air time is short may perform zero padding until the uplink data transmission of a channel having the longest air time is completed, to wait for ACK reception (S250). That is, the padding is performed on the uplink data transmitted through at least one channel, so that the multi-user uplink data transmission in each channel can be terminated at the same time.

However, when the zero padding is performed, STAs occupy the channel regardless of data transmission, thus the overall spectral efficiency is lowered. In

addition, terminals of other BSSs using the channel as a primary channel cannot perform communication during the zero padding period, and thus directly experience a decrease in performance. Therefore, there is a need for an ACK transmission method for further improving the data transmission efficiency of the terminals.

FIG. 10 illustrates an ACK transmission method for multi-user uplink transmission according to an embodiment of the present invention. When the multi-user uplink transmission is completed, the AP transmits a multiplexed group ACK in response thereto (S244). In this case, the AP may transmit the multiplexed group ACK through a first channel having the longest air time among the plurality of channels in which the multi-user uplink transmission is performed. According to an embodiment, the first channel having the longest air time may be the primary channel of the BSS.

The STAs in which a channel other than the first channel is assigned as the uplink data transmission channel set an ACK timer at the time when the uplink data transmission of the corresponding channel ends, and wait for ACK reception until the set ACK timer expires (S242). In this case, the other channel may be a channel other than the first channel having the longest air time, that is, a secondary channel of the corresponding BSS. The ACK timer of each channel indicates the time from when the uplink data transmission of the corresponding channel is completed to when the multiplexed group ACK is transmitted. For the setting of the ACK timer, each STA should obtain information on the transmission time point of the multiplexed group ACK. The transmission time point information of the multiplexed group ACK may be transmitted to each STA which is intended to perform uplink data transmission in the initialization step S210 and/or the scheduling step S220. According to an exemplary embodiment, the STA that the ACK timer is set may switch to a sleep mode until the corresponding timer expires to perform a power saving.

As described above, according to the embodiment of the present invention, each secondary channel can be returned immediately after the uplink data transmission is completed. Therefore, the terminals of the external BSS using the corresponding secondary channel as a primary channel may access the channel and transmit data at an earlier time point. Thus, the overall spectral efficiency of the network can be improved.

FIG. 11 illustrates a NAV setting method for a multi-user uplink transmission according to an embodiment of the present invention. In the embodiment of FIG. 11, the same or corresponding parts as those of the embodiment of FIG. 10 described above will be omitted.

According to an embodiment of the present invention, in order to protect the multi-user uplink transmission process, a NAV setting frame may be transmitted. First, the AP transmits the first NAV setting frame at the start time of the multi-user uplink transmission (S310). The actual transmission length of the multi-user uplink transmission may vary depending on the uplink transmission data length and the resource allocation result of the STAs. Thus, the duration field value of the first NAV setting frame may be set to durations of the initialization step and the scheduling step. The first NAV setting frame may be an RTS or CTS of a predetermined format. According to an embodiment, the first NAV setting frame may be one of a predefined multi-user RTS, RTS-to-self, CTS-to-self and CTS-to-group.

When the resource allocation of each STA is completed in the scheduling step, an air time in which uplink data transmission is performed for each channel is calculated. Accordingly, second NAV setting frames are transmitted for setting a NAV during a period in which the multi-user uplink transmission and the multiplexed group ACK transmission are performed (S320). The second NAV setting frame may be simultaneously transmitted by a plurality of STAs in which resource is allocated and

participate in the multi-user uplink data transmission. Alternatively, a plurality of STAs and an AP may simultaneously transmit the second NAV setting frame. According to an embodiment, the second NAV setting frame may be configured in a CTS frame format. In this case, second NAV setting frames simultaneously transmitted by a plurality of STAs and/or the AP may be set to the same waveform.

The NAVs of the neighboring terminals are set based on the first NAV setting frame and the second NAV setting frame transmitted as above (S330, S340). Since the second NAV setting frames having the same waveform are simultaneously transmitted on a 20 MHz channel basis, the neighboring terminals including legacy terminals can receive the second NAV setting frame and set a NAV. When the simultaneously transmitted second NAV setting frames have the same waveform for each channel, the second NAV setting frame may have duration information reflecting the air time of the corresponding channel. Accordingly, a terminal of an external BSS that has acquired the NAV information set on the specific channel can access the corresponding channel immediately after the NAV time has expired.

On the other hand, when the multiplexed group ACK is used as in the embodiment of FIG. 10, STAs that have transmitted uplink data through secondary channels receive the multiplexed group ACK through the primary channel. If the STAs set the NAV only for the secondary channel through which the uplink data is transmitted, terminals of the external BSS adjacent to the STA may regard the primary channel as idle and perform an access to the primary channel. In this case, STAs that have been transmitted the uplink data through the secondary channels may not be able to receive the multiplexed group ACK transmitted through the primary channel.

Therefore, according to the embodiment of the present invention, the STAs transmitting uplink data through the secondary channel transmit the second NAV setting

frame through the primary channel and the secondary channel. In this case, the primary channel through which the second NAV setting frame is transmitted is a primary channel of the BSS to which the corresponding STA belongs. In addition, the secondary channel through which the second NAV setting frame is transmitted is a secondary channel through which the STA transmits uplink data. Referring to FIG. 11, STA4 and STA5 transmitting uplink data through a secondary channel transmit a second NAV setting frame not only through the secondary channel but also through a primary channel (S320). As described above, the STAs additionally protect the primary channel through which the multiplexed group ACK is transmitted as well as the secondary channel through which the uplink data is transmitted. The duration field value of the second NAV setting frame transmitted through the primary channel is set to the time when the transmission of the multiplexed group ACK is completed. The duration field value of the second NAV setting frame transmitted through the secondary channel is set to the time when the uplink data transmission of the secondary channel is completed. On the other hand, STA1, STA2, and STA3 that transmit uplink data through the primary channel are not required to transmit an additional second NAV setting frame through channels other than the primary channel.

FIG. 12 illustrates a frequency masking method according to the frequency bandwidth in use. In the wireless LAN system, a frequency masking technique is used to minimize mutual interference when different terminals perform communications through adjacent channels. The frequency masking is implemented in a way of intentionally reducing transmission power at the boundary frequencies (i.e., the minimum frequency and the maximum frequency) of the currently used channel. Therefore, the shape of frequency masking is different depending on the bandwidth in which data transmission is performed. That is, the spectral mask 410 of a packet

transmitted on a 40 MHz channel has a different shape from the spectral mask 420 of a packet transmitted on two adjacent 20 MHz channels. In particular, each of the spectral masks 410 and 420 has a difference in the presence or absence of the guard band 430 at the central frequency portion of the 40 MHz channel.

FIG. 13 illustrates a guard band setting method according to an embodiment of the present invention.

FIG. 13 (a) represents a situation where data 440 is transmitted only through a channel of a second band after a specific time point from the transmission of data 440 through a channel of a first band is started. In the embodiment of the present invention, the second band has a narrower bandwidth than the first band. For example, the first band may represent a 40 MHz bandwidth, and the second band may represent a 20 MHz bandwidth. According to an embodiment of the present invention, the transmission bandwidth may be changed during the transmission of data 440 according to the scheduling of data transmission and the result of resource allocation. Even if the transmission bandwidth is changed in this manner, the spectral mask of the RF chain may be maintained in its original shape. That is, if the transmission band of the data is changed from the first band to the second band, data 440 in a form without the guard band 442 may be transmitted. In this case, when the terminal of the external BSS (i.e., OBSS) attempts to transmit on the idle band of the first band, interference may occur due to absence of the guard band 442 of data transmitted through the second band.

FIG. 13 (b) represents an embodiment in which data is transmitted by setting a guard band 450 between two adjacent basic band channels. According to an embodiment of the present invention, when multi-user data transmission is performed, data 440a and 440b allocated to each terminal may be transmitted through bands below the basic band. In this case, the multi-user data transmission includes a multi-user

uplink data transmission and a multi-user downlink data transmission. Further, the basic band may be a 20 MHz band, but the present invention is not limited thereto. In this manner, the guard band 450 in units of the basic band can be formed by setting a resource exceeding the basic band as not to be allocated to a single terminal.

According to another embodiment of the present invention, when a multi-user data transmission is performed, data allocation of a broadband exceeding the basic band may be allowed to each terminal. However, the terminal may perform nulling to the frequency components corresponding to the guard band 450 in the basic band unit among the wideband data, thereby preventing interference with the external BSS terminals.

According to another embodiment of the present invention, if the transmission band is changed from the first band to the second band during data transmission, the terminal may transmit the data by setting the guard band 450 on the basis of the changed second band. That is, if the transmission bandwidth is reduced during data transmission, the terminal sets a spectrum mask based on the reduced transmission bandwidth and transmits the data.

According to another embodiment of the present invention, a multi-user data transmission using a plurality of subbands in the first band may be performed. In this case, each subband has a narrower bandwidth than the first band. The plurality of subbands may be contiguous channels, or may be non-contiguous channels. In addition, each subband may be set to the same bandwidth, or may be set to a different bandwidth. According to an embodiment of the present invention, a terminal transmits multi-user data by setting a guard band 450 and a spectrum mask based on each subband through which data is transmitted.

FIGS. 14 and 15 illustrate a method of configuring a preamble of a non-legacy

packet according to an embodiment of the present invention. More specifically, FIG. 14 illustrates a method of transmitting a legacy preamble (L-preamble) of a non-legacy terminal in a process of a multi-user uplink data transmission. Further, FIG. 15 illustrates a method of configuring a non-legacy preamble in the process of a multi-user data transmission.

The legacy preamble is decodable at the legacy terminals and includes a legacy short training field (L-STF), a legacy long training field (L-LTF), and a legacy signal field (L-SIG). The non-legacy preamble is a field following the legacy preamble and can be recognized only by non-legacy terminals (e.g., an 802.11ax wireless LAN terminal). The non-legacy preamble may include an HE signal A field (HE-SIG-A), an HE signal B field (HE-SIG-B), an HE short training field (HE-STF), an HE long training field (HE-LTF), and the like.

The non-legacy wireless LAN packet includes a legacy preamble for legacy terminals and a non-legacy preamble for non-legacy terminals. The legacy preamble and the non-legacy preamble are inserted at the beginning of a non-legacy PHY Service Data Unit (PSDU). Non-legacy wireless LAN systems may support 256 FFT while legacy wireless LAN systems support 64 FFT. Thus, at least some of the non-legacy preamble may be composed of 256 FFT-based OFDM symbols. When a plurality of non-legacy STAs perform a multi-user uplink data transmission, each STA transmits at least some information of a non-legacy preamble through a sub-channel allocated to the STA. However, since the legacy preamble is transmitted on a 20 MHz channel basis, a method is required for the STAs assigned to resources on a sub-channel basis to transmit a legacy preamble in the corresponding channel.

According to an embodiment of the present invention, as shown in FIG. 14 (a), a representative STA selected from a plurality of STAs may transmit a legacy preamble

510 on behalf of the plurality of STAs assigned to the same 20 MHz channel. Various methods can be used to select the representative STA among a plurality of STAs. According to an embodiment, a STA having the highest received signal strength indication (RSSI) among a plurality of STAs assigned to the same 20 MHz channel may transmit a legacy preamble 510 for the multi-user uplink data transmission. According to another embodiment, a STA assigned to the first sub-channel among a plurality of sub-channels allocated within the same 20 MHz channel may transmit a legacy preamble 510 for the multi-user uplink data transmission.

The representative STA transmits the legacy preamble 510 in units of 20 MHz, and then transmits the non-legacy preamble 520 through the sub-channel allocated to the STA. The remaining STAs other than the representative STA transmit the non-legacy preamble 520 through the sub-channel allocated to the corresponding STA after the transmission of the legacy preamble 510 of the representative STA. The plurality of STAs transmit the non-legacy preamble 520 through allocated sub-channels at the same time.

According to another embodiment of the present invention, as shown in FIG. 14 (b), a plurality of STAs assigned to the same 20 MHz channel may simultaneously transmit the legacy preamble 510. In this case, the legacy preamble 510 transmitted by a plurality of STAs is set to the same waveform. Each STA transmits the legacy preamble 510 set in the same waveform in units of 20 MHz, and then transmits the non-legacy preamble 520 through a sub-channel allocated to the corresponding STA. To this end, the AP may transmit information corresponding to the legacy preamble 510 to each STA in the scheduling process. The AP receives the legacy preamble 510 from at least one STA as common information in units of 20 MHz.

FIG. 15 illustrates a method of configuring a non-legacy preamble according

to an embodiment of the present invention. In the embodiment of FIG. 15, the same or corresponding parts as those of the embodiment of FIG. 14 described above will be omitted.

FIG. 15 (a) illustrates an embodiment for constructing a non-legacy preamble. Some fields of the non-legacy preamble, for example, the HE-SIG-A 522 may be composed of 64 FFT-based OFDM symbols same as the legacy preamble 510. According to an embodiment of the present invention, the HE-SIG-A 522 of the non-legacy preamble may be transmitted on a 20 MHz channel basis in common. STAs that perform the multi-user uplink data transmission transmit the legacy preamble 510 and the HE-SIG-A 522 having the same information on a 20 MHz channel basis. That is, the AP receives HE-SIG-A 522 from at least one STA as common information on a 20 MHz channel basis. Also, the STAs transmit the remaining field 524 of the non-legacy preamble through the sub-channel allocated to the corresponding STA. That is, the AP receives the remaining field 524 of the non-legacy preamble as individual information for each sub-channel allocated to each STA. In this case, the remaining fields 524 of the non-legacy preamble include HE-STF and HE-LTF.

FIG. 15 (b) illustrates another embodiment constituting the non-legacy preamble. According to another embodiment of the present invention, the HE-SIG-A 522 of the non-legacy preamble may be transmitted on a sub-channel basis. STAs that perform the multi-user uplink data transmission transmit a legacy preamble 510 having the same information on a 20 MHz channel basis. Also, the STAs may transmit the non-legacy preambles 522 and 524 through a sub-channel allocated to the corresponding STA. The STA having assigned a plurality of sub-channels as resources may repeatedly transmit the same HE-SIG-A 522 through each assigned sub-channel.

Meanwhile, although FIG. 15 illustrates a method of configuring a non-legacy

preamble in a situation of the multi-user uplink data transmission, the method can be applied to the multi-user downlink data transmission as well. The HE-SIG-A 522 of the non-legacy preamble includes information necessary to interpret the non-legacy packet. For example, the HE-SIG-A 522 may include an indicator indicating whether the packet is an uplink packet or a downlink packet. According to the embodiment of the present invention, HE-SIG-A may be duplicated in units of 20 MHz when data is transmitted through a wideband channel.

FIG. 16 illustrates a method for performing a multi-user uplink transmission according to an embodiment of the present invention. In the embodiment of FIG. 16, the same or corresponding parts to those of the embodiments of FIGS. 9 and 10 described above will be omitted.

The multi-user uplink transmission in a non-legacy wireless LAN system may be initiated by a trigger frame. That is, the initialization step (S210) of FIG. 9 may be performed by a transmission of the trigger frame of the AP. STAs that perform the multi-user uplink transmission simultaneously transmit uplink data a predetermined IFS after the transmission of the trigger frame. The trigger frame indicates the start point of the multi-user uplink transmission and may indicate information on the channel or sub-channel allocated to each uplink transmission STA. STAs in which a channel or a sub-channel has been allocated from the AP simultaneously transmit uplink data at the time point designated by the AP. When the multi-user uplink transmission is completed, the AP transmits a multiplexed group ACK in response thereto.

According to an embodiment of the present invention, the trigger frame may include information for NAV setting of the multi-user uplink data transmission process. When the trigger frame conforms to the legacy frame format, a NAV of legacy terminals can be set based on the duration field value of the MAC header of the trigger

frame. According to a further embodiment of the present invention, in order to set a NAV for hidden nodes adjacent to uplink transmission STAs, the AP may increase the coverage of the trigger frame to be more than the transmission range of a normal frame. For example, an AP may transmit the trigger frame with increased power than a normal frame. Alternatively, the AP may apply a robust MCS (Modulation and Coding Scheme) to the trigger frame as compared to a normal frame.

FIG. 17 illustrates a structure of a multiplexed group ACK according to an embodiment of the present invention. According to an embodiment of the present invention, the multiplexed group ACK may have a frame format of a block ACK (BA).

The multiplexed group ACK includes a BA Control field and a BA Information field and may indicate block ACK information for a plurality of STAs through at least one of the fields. The block ACK information field is set to a variable length and may include a Per TID information field, a Block ACK Starting Sequence Control field, and a Block ACK Bitmap field. The Per TID information field includes a reserved field (B0 to B11) and a TID Value field (B12 to B15).

According to an embodiment of the present invention, ACK information for a plurality of STAs may be represented by using a reserved field of the Per TID information field. More specifically, the reserved field includes AID information of a recipient STA and an indicator indicating whether or not the ACK is a block ACK. For example, the reserved field may be composed of 12 bits (i.e., B0 to B11). A particular bit, for example, B11, may indicate whether the frame is a block ACK or a normal ACK. In addition, some remaining bits of the reserved field, for example, 11 bits of B0 to B11, may indicate AID information of the recipient STA of the corresponding frame.

The block ACK information field having the above-described configuration may be repeated for each Traffic ID (TID). Since the block ACK information field has a

variable length, AIDs for all STAs participating in the multi-user uplink transmission may be inserted into the block ACK information field through the reserved field. For example, the block ACK information field is allocated for each STA, and may be repeated by the number of recipient STAs. Thus, an AID, a Block ACK Starting Sequence Control field, and a Block ACK Bitmap field for each STA may be included in the block ACK information field. On the other hand, when the indicator B11 of the reserved field indicates a normal ACK, the Block ACK Starting Sequence Control field and the Block ACK Bitmap field may be omitted from the block ACK information field.

According to an embodiment of the present invention, information indicating a BA for a multiple STAs (e.g., a Multi-STA BA) may be included in a block ACK control field. More specifically, the block ACK control field includes a Multi-TID field B1, a Compressed Bitmap field B2 and a reserved field B3 to B11, and whether the frame is a Multi-STA BA is indicated through at least one of the fields. For example, a specific bit among the reserved field B3 to B11 may be used as a bit indicating the Multi-STA BA.

FIG. 18 illustrates a method of transmitting a multiplexed group ACK according to an embodiment of the present invention. In the embodiment of the present invention, the multiplexed group ACK includes a Multi-STA BA for a plurality of STAs as described above.

As in the above-described embodiment, uplink data for each channel in the multi-user uplink transmission may be terminated at the same time. In this case, the AP transmits a multiplexed group ACK on each channel through which the multi-user uplink data is transmitted to notify the completion of the transmission. However, if the number of STAs assigned to each channel is different as shown in FIG. 18, at least some information of the multiplexed group ACKs transmitted on each channel may have

different lengths. As described above with reference to FIG. 17, the block ACK information field of the multiplexed group ACK has a variable length, and the length of the field may be longer as the number of assigned STAs increases. Depending on whether the indicator of the reserved field indicates a block ACK, some fields such as a Block ACK Starting Sequence Control field and a Block ACK Bitmap field may be omitted. However, according to the embodiment of the present invention, the L-SIG and the HE-SIG-A may be duplicated as common information in units of 20MHz when data is transmitted through a wideband channel. Therefore, the multiplexed group ACKs transmitted on each channel should have the same length based on the value of a PPDU length field included in the L-SIG.

FIG. 19 illustrates a length alignment method of block ACKs according to an embodiment of the present invention. In an embodiment of the present invention, the block ACK includes a multiplexed group ACK and a Multi-STA BA. In the embodiment of FIG. 19, the same or corresponding parts as those of the embodiment of FIG. 17 described above will be omitted.

The AP transmits a block ACK in response to the multi-user uplink data. The AP may transmit the block ACK to a plurality of STAs using a multi-user downlink transmission. According to an embodiment of the present invention, the AP may transmit a block ACK for a corresponding STA on a channel through which multi-user uplink data is transmitted.

In this case, the amount of ACK information of the block ACK transmitted on each channel may be different. Referring to FIG. 19, ACK information of STA1, STA2, STA3 and STA4 is included in the block ACK transmitted on the first channel, and ACK information of STA5 and STA6 is included in the block ACK transmitted on the second channel. In addition, ACK information of STA7 is included in the block ACK

transmitted on the third channel, and ACK information of STA8 and STA9 is included in the block ACK transmitted on the fourth channel.

According to an embodiment of the present invention, the transmission of the block ACK may be terminated at the same time for each channel. That is, the AP may set the lengths of block ACKs transmitted on a plurality of channels to be the same.

According to an embodiment of the present invention, as shown in FIG. 19 (a), the AP may perform padding on a block ACK transmitted through at least one channel to match the termination point of the block ACK transmissions in each channel. That is, the AP may perform padding on the block ACKs of the second channel to the fourth channel in reference to the length of the block ACK of the first channel having the largest amount of ACK information. According to an embodiment, the padding of the block ACK may be implemented with zero padding. However, the present invention is not limited thereto and the padding may also be implemented with one padding.

According to another embodiment of the present invention, as shown in FIG. 19 (b), the AP may insert duplicated ACK information into a block ACK transmitted through at least one channel to match the termination point of the block ACK transmissions in each channel. That is, the AP may insert duplicated ACK information into the block ACKs of the second channel to the fourth channel in reference to the length of the block ACK of the first channel having the largest amount of ACK information. In this case, the duplicated ACK information includes at least one of a Per TID information field, a Block ACK Starting Sequence Control field, and a Block ACK Bitmap field for each STA.

If the indicator B11 of the reserved field indicates a block ACK, the Per TID information field, the Block ACK Starting Sequence Control field and the Block ACK Bitmap field for at least one STA may be inserted in duplicate into the block ACK

transmitted on the second to fourth channels. However, if the indicator B11 of the reserved field indicates a normal ACK, the Block ACK Start Sequence Control field and the Block ACK Bitmap field may be omitted from the block ACK information field. Therefore, the Per TID information field for at least one STA may be inserted in duplicate into the block ACK transmitted through the second to fourth channels. As described above, the Per TID information field of the block ACK information field includes AID information of the recipient STA.

FIG. 20 illustrates a method of frame length alignment by padding in a multi-user simultaneous transmission according to an embodiment of the present invention.

According to an embodiment of the present invention, a trigger frame that triggers the multi-user simultaneous transmission may be also be padded. In the multi-user uplink data transmission and the multi-user downlink data transmission, a different number of STAs may be assigned to each channel. The trigger frame may include AID information of the STA assigned to each channel, and the amount of information of the transmitted trigger frame may be different for each channel.

According to an embodiment of the present invention, a predetermined padding may be performed before a Frame Check Sequence (FCS) field of the trigger frame. Thus, the transmission of the trigger frame may be terminated at the same time in each channel through which the trigger frame is transmitted. Also, through the padding of the trigger frame, the STAs can acquire additional processing time to participate in the multi-user simultaneous transmission in response to the trigger frame. Meanwhile, according to another embodiment of the present invention, the duplicated AID information may be inserted before the FCS field of the trigger frame.

As described above, when different numbers of STAs are assigned to each channel in the multi-user simultaneous transmission process, the amount of information

of the block ACK transmitted in response to the multi-user data may be different for each channel. According to an embodiment of the present invention, padding may be performed on a block ACK of another channel in reference to a length of a block ACK of a channel to which a largest number of STAs are allocated. In this case, the padding may be performed before the FCS field of the block ACK.

FIG. 21 illustrates a method of transmitting a multiplexed block ACK when a plurality of channels are used for a multi-user uplink transmission. In the present invention, the multiplexed block ACK (M-BA) may indicate the above-described multiplexed group ACK.

As described above, the AP may transmit a multiplexed block ACK for a corresponding STA on a channel through which multi-user uplink data is transmitted. Therefore, the length of the multiplexed block ACK varies depending on the number of STAs assigned to the corresponding channel, the reception state of the multi-user uplink data, and the like. Therefore, at the time when the AP transmits the trigger frame, the actual length of the multiplexed block ACK cannot be predicted.

According to the embodiment of the present invention, the AP may set the TXOP value of the trigger frame by predicting the maximum time required for a multi-user uplink data transmission. The maximum time may be set to a time required for transmitting an M-BA using the block ACK option to all STAs on the channel through which the largest number of STAs are allocated. Therefore, when the actual multi-user uplink data transmission is completed, the length of the actual M-BA may be different for each channel depending on the uplink data reception result.

If M-BAs of different lengths are transmitted for each channel, access of other terminals may be allowed an AIFS time after the transmission completion of M-BA on some channels. When the M-BA on the primary channel is set to be the shortest as in

the embodiment of FIG. 21, other terminals may perform access to the primary channel. However, since the AP cannot switch its state until the M-BA transmissions on other channels are completed, the transmission attempts of other terminals may be ignored or the competition of an access attempt of the AP may be disadvantageous.

Therefore, according to the embodiment of the present invention, the AP may set the lengths of multiplexed block ACKs transmitted through a plurality of channels to be the same. To this end, the AP may perform padding on the multiplexed block ACKs transmitted through at least one channel to match the termination points of the multiplexed block ACK transmissions in each channel. According to an embodiment, the padding scheme of IEEE 802.11ac may be used for the padding of multiplexed block ACKs.

Meanwhile, the transmission of the multiplexed block ACK may be terminated before the TXOP set in the trigger frame. According to an embodiment, the AP may return the remaining TXOP after the transmission of the multiplexed block ACK is completed. According to another embodiment, the AP may perform additional operations such as a control frame transmission during the remaining TXOP after the transmission of the multiplexed block ACK is completed.

Although the present invention is described by using the wireless LAN communication as an example, the present invention is not limited thereto and the present invention may be similarly applied even to other communication systems such as cellular communication, and the like. Further, the method, the apparatus, and the system of the present invention are described in association with the specific embodiments, but some or all of the components and operations of the present invention may be implemented by using a computer system having universal hardware architecture.

The detailed described embodiments of the present invention may be implemented by various means. For example, the embodiments of the present invention may be implemented by a hardware, a firmware, a software, or a combination thereof.

In case of the hardware implementation, the method according to the embodiments of the present invention may be implemented by one or more of Application Specific Integrated Circuits (ASICSs), Digital Signal Processors (DSPs), Digital Signal Processing Devices (DSPDs), Programmable Logic Devices (PLDs), Field Programmable Gate Arrays (FPGAs), processors, controllers, micro-controllers, micro-processors, and the like.

In case of the firmware implementation or the software implementation, the method according to the embodiments of the present invention may be implemented by a module, a procedure, a function, or the like which performs the operations described above. Software codes may be stored in a memory and operated by a processor. The processor may be equipped with the memory internally or externally and the memory may exchange data with the processor by various publicly known means.

The description of the present invention is used for exemplification and those skilled in the art will be able to understand that the present invention can be easily modified to other detailed forms without changing the technical idea or an essential feature thereof. Thus, it is to be appreciated that the embodiments described above are intended to be illustrative in every sense, and not restrictive. For example, each component described as a single type may be implemented to be distributed and similarly, components described to be distributed may also be implemented in an associated form.

The scope of the present invention is represented by the claims to be described below rather than the detailed description, and it is to be interpreted that the

meaning and scope of the claims and all the changes or modified forms derived from the equivalents thereof come within the scope of the present invention.

[Mode for Invention]

As above, related features have been described in the best mode.

[Industrial Applicability]

Various exemplary embodiments of the present invention have been described with reference to an IEEE 802.11 system, but the present invention is not limited thereto and the present invention can be applied to various types of mobile communication apparatus, mobile communication system, and the like.

[CLAIMS]

1. A base wireless communication terminal, the terminal comprising:

a transceiver configured to transmit and receive a wireless signal; and

a processor configured to control an operation of the base wireless communication terminal,

wherein the processor is configured to:

transmit a trigger frame triggering a multi-user uplink transmission of a plurality of terminals, receive multi-user uplink data through resources allocated to the plurality of terminals, and transmit a block ACK through the resources in response to the received multi-user uplink data,

wherein the transmission of the block ACK in each resource is terminated at the same time.

2. The base wireless communication terminal of claim 1, wherein the processor performs padding on the block ACK transmitted through at least one resource to match termination points of block ACK transmissions in each resource.

3. The base wireless communication terminal of claim 1, wherein the processor inserts duplicated ACK information into the block ACK transmitted through at least one resource to match termination points of block ACK transmissions in each resource.

4. The base wireless communication terminal of claim 1, wherein a predetermined padding is performed before a frame check sequence (FCS) field of the trigger frame.

5. The base wireless communication terminal of claim 4, wherein the transmission of the trigger frame is terminated at the same time in each resource through which the trigger frame is transmitted.

6. The base wireless communication terminal of claim 1, wherein the resource is a channel or a sub-channel.

7. The base wireless communication terminal of claim 1,

wherein a transmission packet of the multi-user uplink data includes a legacy preamble and a non-legacy preamble, and

wherein the legacy preamble is received as common information on a 20 MHz channel basis.

8. The base wireless communication terminal of claim 7,

wherein the non-legacy preamble includes HE-SIG-A and remaining fields, and

wherein the HE-SIG-A is received as common information on a 20 MHz channel basis, and the remaining fields of the non-legacy preambles are received as individual information for each resource allocated to each terminal.

9. The base wireless communication terminal of claim 8,

wherein the remaining fields of the non-legacy preamble include HE-STF and HE-LTF.

10. The base wireless communication terminal of claim 1,

wherein the multi-user uplink data transmission in each resource is terminated at the same time.

11. The base wireless communication terminal of claim 10,

wherein the uplink data transmitted through at least one resource is padded to terminate the multi-user uplink data transmission at the same time.

12. A wireless communication method of a base wireless communication terminal, the method comprising:

transmitting a trigger frame triggering a multi-user uplink transmission of a plurality of terminals;

receiving multi-user uplink data through resources allocated to the plurality of terminals; and

transmitting a block ACK through the resources in response to the received multi-user uplink data;

wherein the transmission of the block ACK in each resource is terminated at the same time.

[ABSTRACT]

The present invention relates to a wireless communication terminal and a wireless communication method for efficiently managing simultaneous data transmissions of a plurality of terminals.

To this end, provided are a base wireless communication terminal including: a transceiver configured to transmit and receive a wireless signal; and a processor configured to control an operation of the base wireless communication terminal, wherein the processor is configured to: transmit a trigger frame triggering a multi-user uplink transmission of a plurality of terminals, receive multi-user uplink data through resources allocated to the plurality of terminals, and transmit a block ACK through the resources in response to the received multi-user uplink data, wherein the transmission of the block ACK in each resource is terminated at the same time, and a wireless communication method using the same.

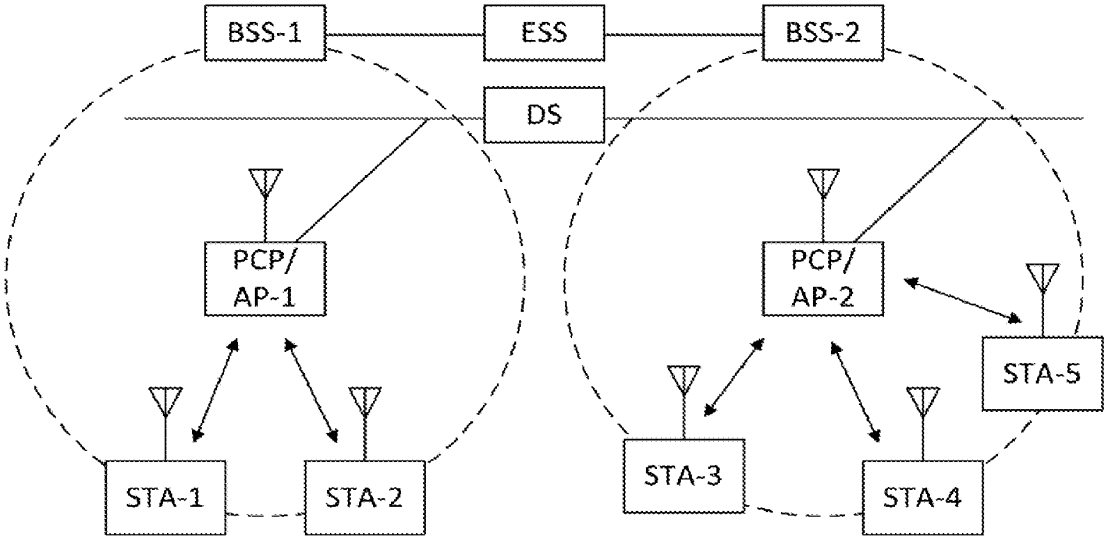


FIG. 1

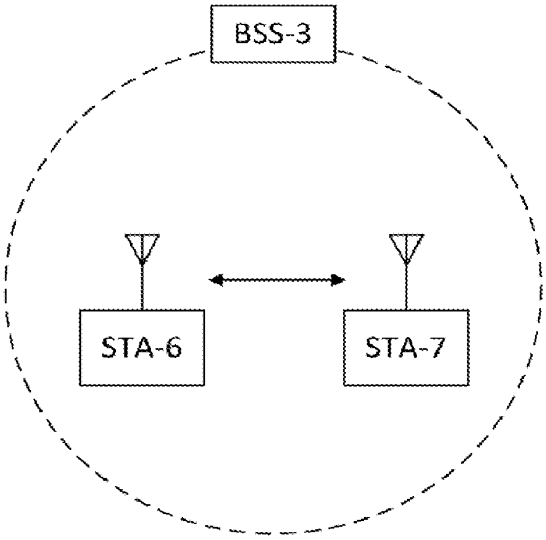


FIG. 2

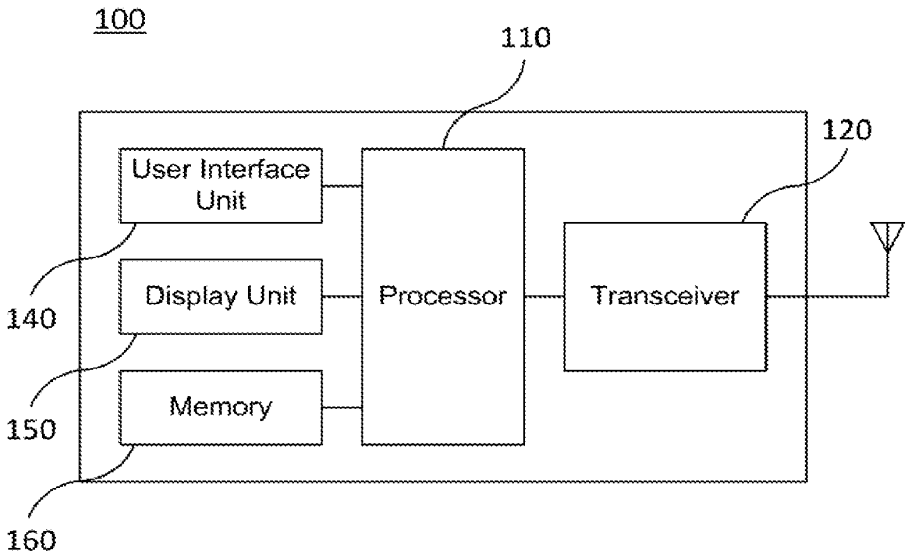

100
110
120
User Interface Unit
Display Unit
Memory
Processor
Transceiver
140
150
160

FIG. 3

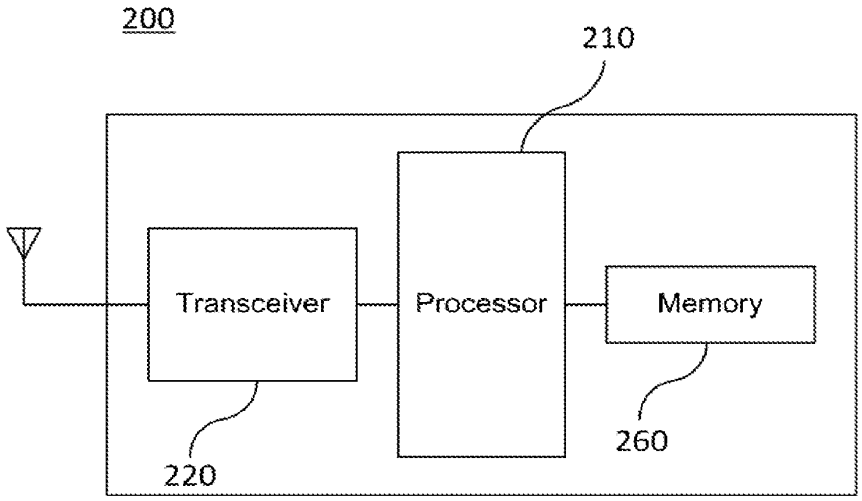


FIG. 4

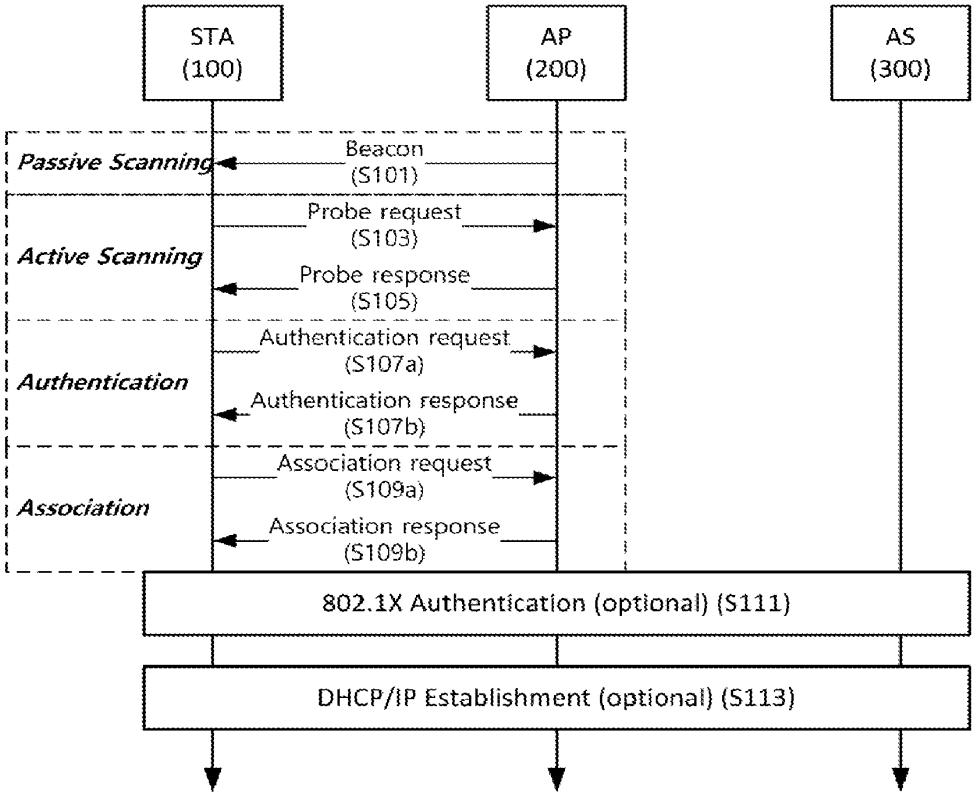

STA
(100)
AP
(200)
AS
(300)
Passive Scanning
Beacon
(S101)
Active Scanning
Probe request
(S103)
Probe response
(S105)
Authentication
Authentication request
(S107a)
Authentication response
(S107b)
Association
Association request
(S109a)
Association response
(S109b)
802.1X Authentication (optional) (S111)
DHCP/IP Establishment (optional) (S113)

FIG. 5

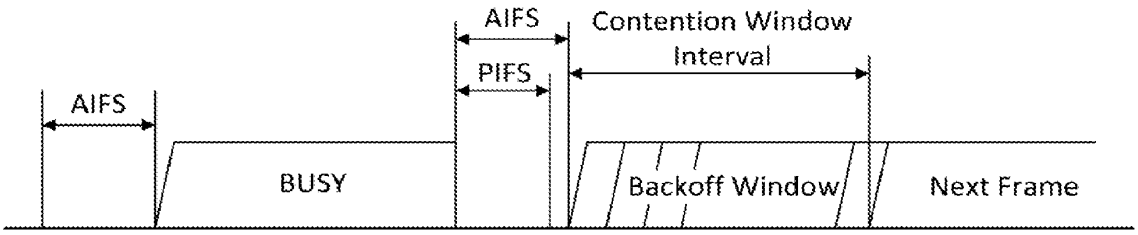

AIFS
AIFS
PIFS
Contention Window
Interval
BUSY
Backoff Window
Next Frame

FIG. 6

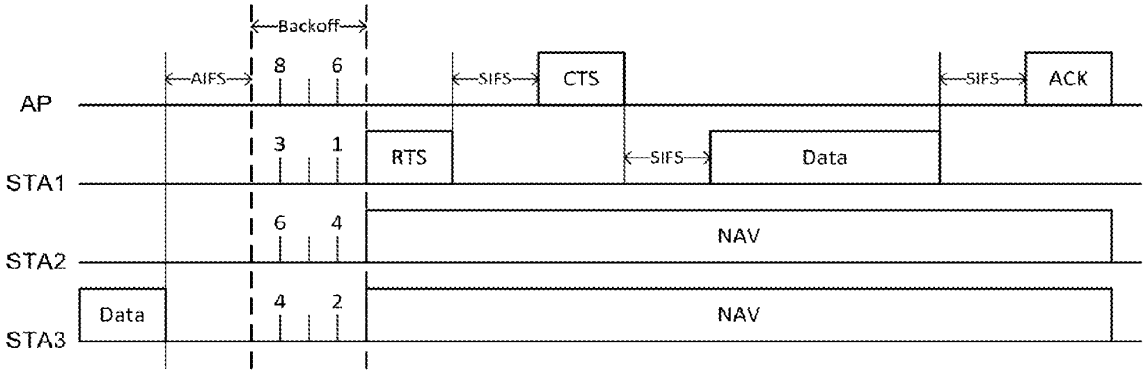

Backoff
AIFS
8
6
SIFS
CTS
SIFS
ACK
AP
3
1
RTS
SIFS
Data
STA1
6
4
NAV
STA2
Data
4
2
NAV
STA3

FIG. 7

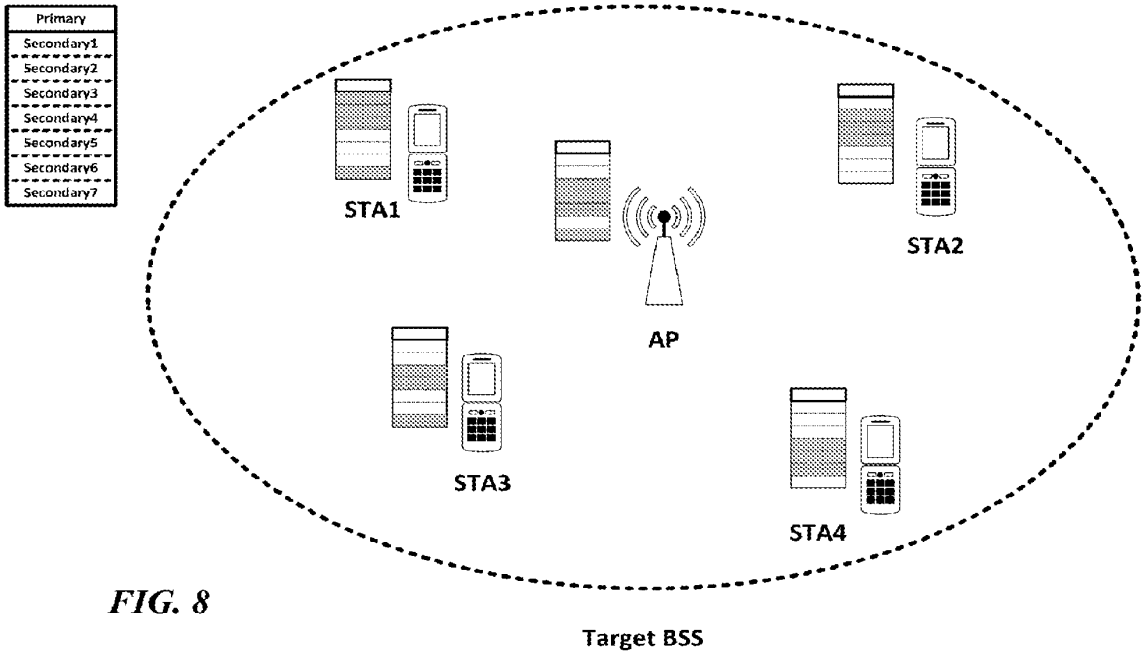

Primary
Secondary1
Secondary2
Secondary3
Secondary4
Secondary5
Secondary6
Secondary7
STA1
AP
STA2
STA3
STA4
Target BSS

FIG. 8

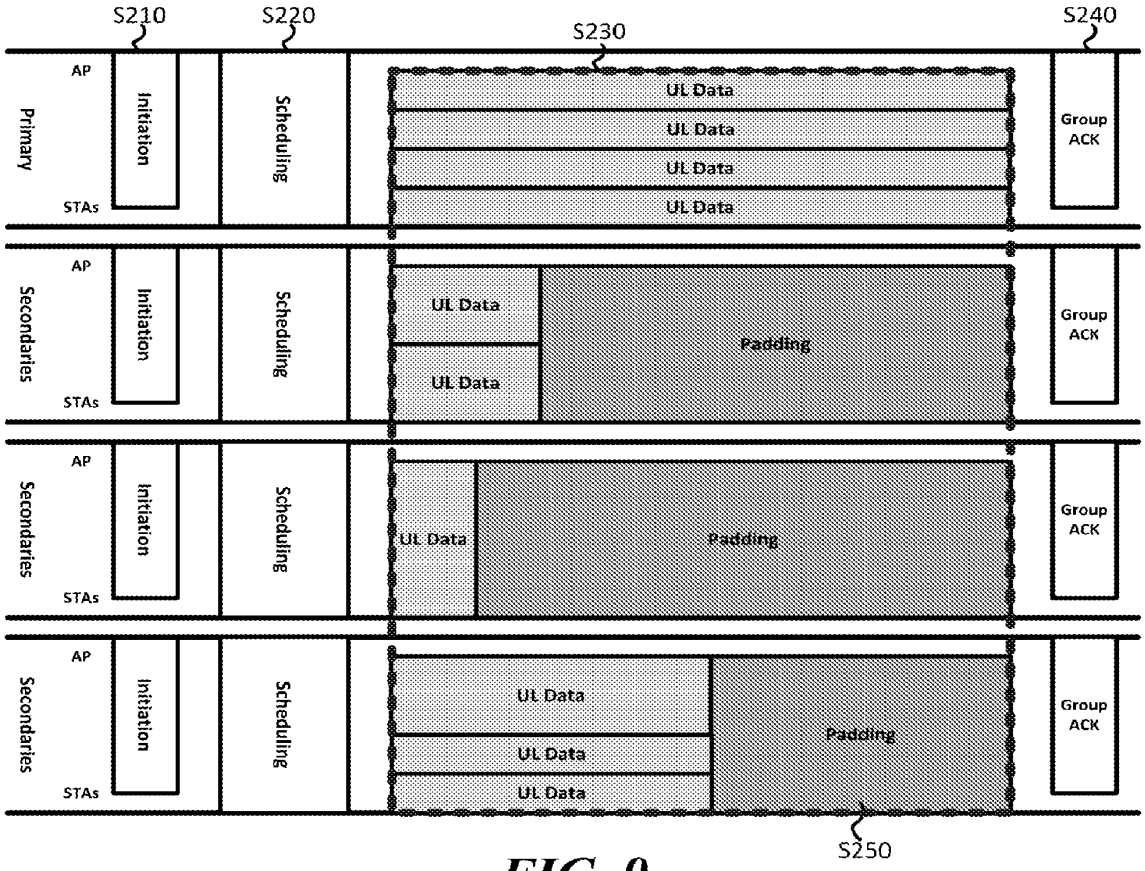

S210
S220
S230
S240
Primary
Secondaries
Secondaries
Secondaries
AP
STAs
Initiation
Scheduling
UL Data
Padding
Group ACK
S250

FIG. 9

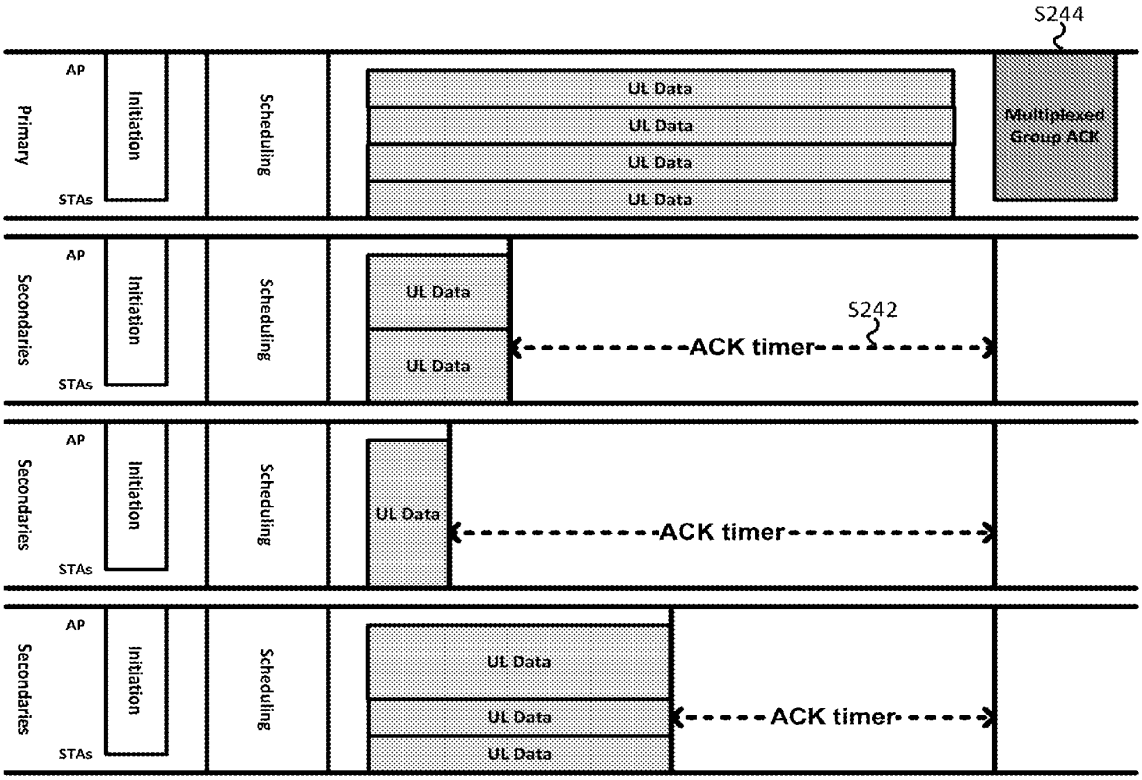

S244
Primary
AP
STAs
Initiation
Scheduling
UL Data
UL Data
UL Data
UL Data
Multiplexed Group ACK
Secondaries
AP
STAs
Initiation
Scheduling
UL Data
UL Data
S242
ACK timer
Secondaries
AP
STAs
Initiation
Scheduling
UL Data
ACK timer
Secondaries
AP
STAs
Initiation
Scheduling
UL Data
UL Data
UL Data
ACK timer

FIG. 10

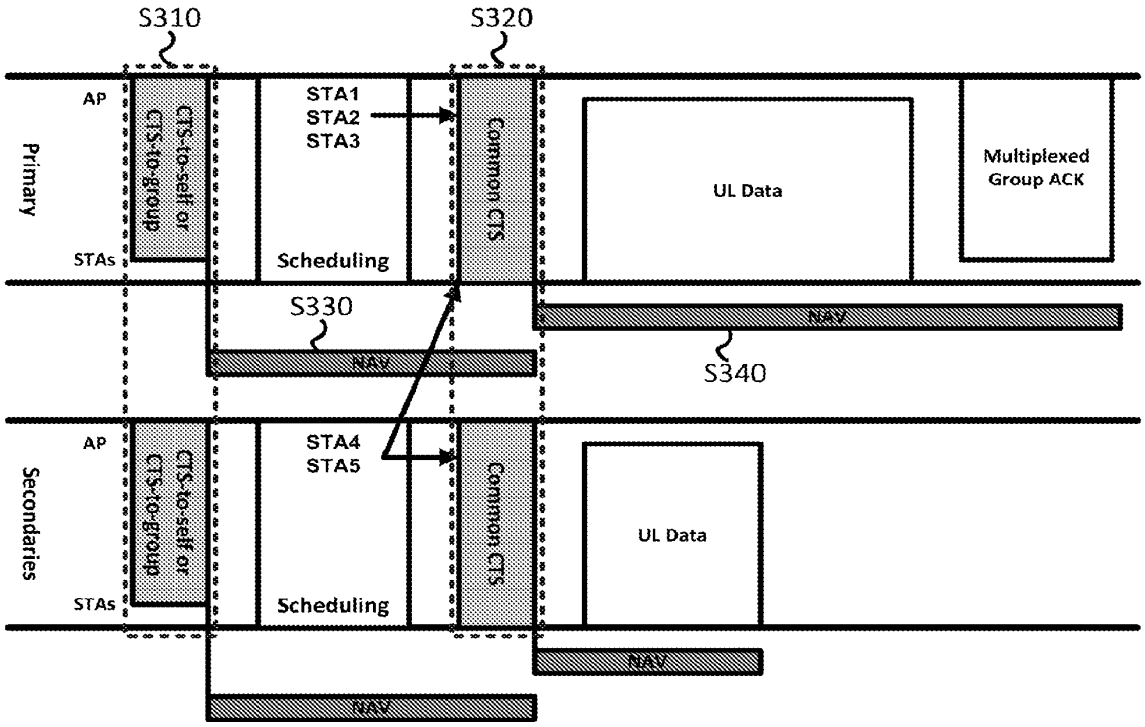

S310
S320
AP
Primary
STAs
CTS-to-self or CTS-to-group
STA1
STA2
STA3
Scheduling
Common CTS
UL Data
Multiplexed Group ACK
S330
NAV
S340
AP
Secondaries
STAs
CTS-to-self or CTS-to-group
STA4
STA5
Scheduling
Common CTS
UL Data
NAV
NAV

FIG. 11

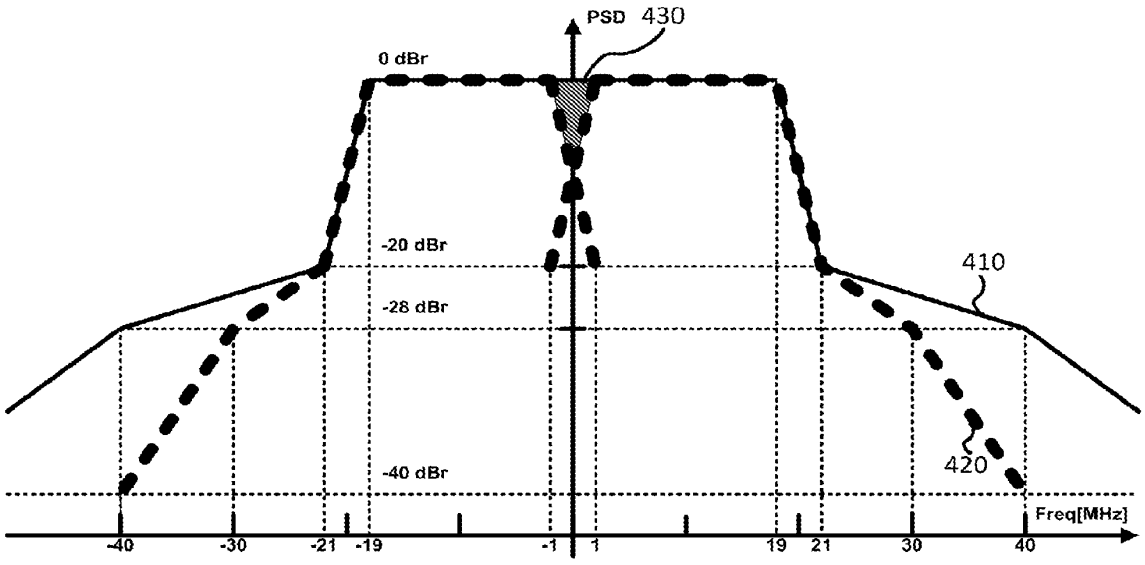

PSD
430
0 dBr
-20 dBr
-28 dBr
-40 dBr
410
420
Freq[MHz]
-40
-30
-21
-19
-1
1
19
21
30
40

FIG. 12

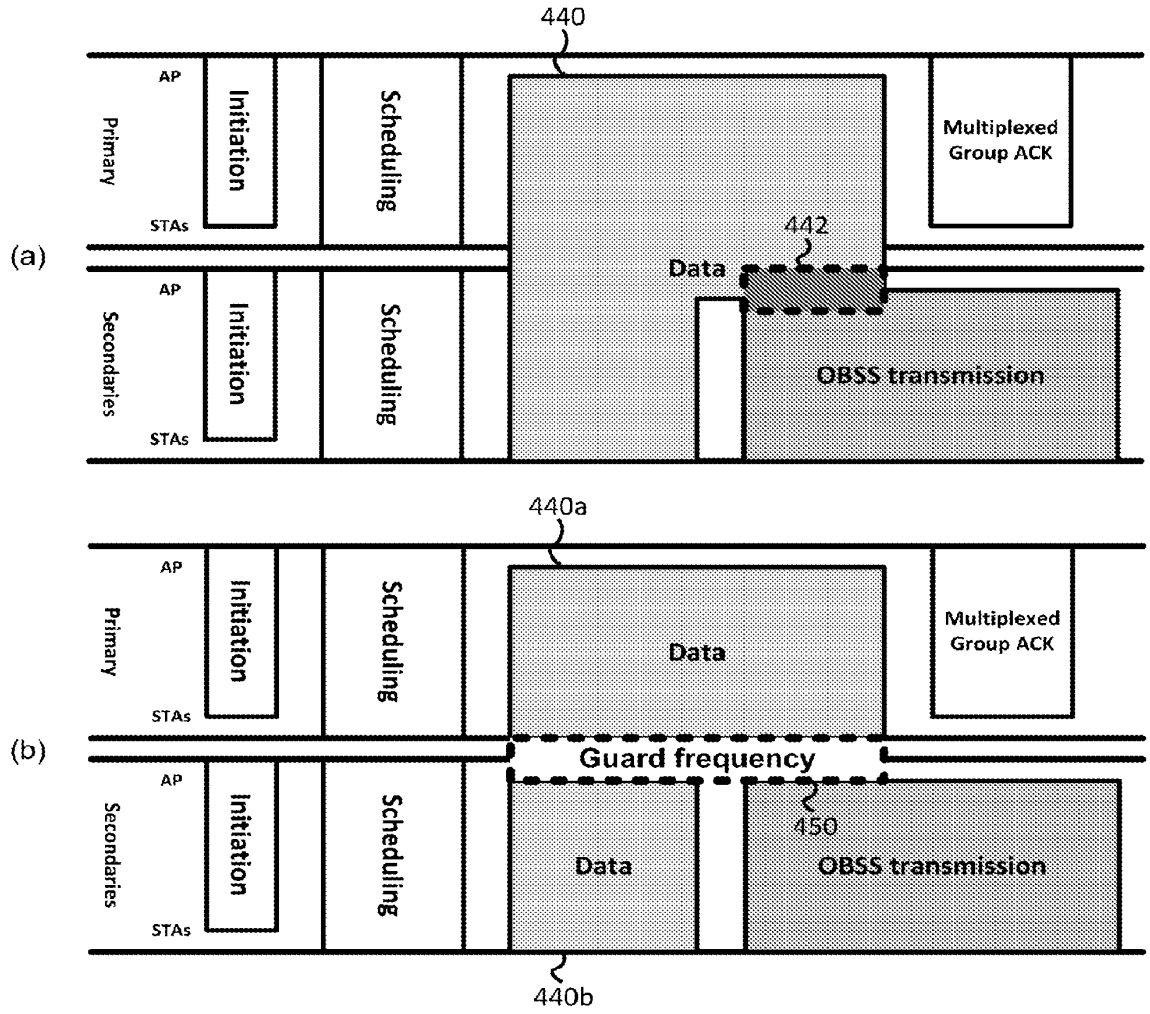

(a)
440
AP
Primary
STAs
Initiation
Scheduling
Multiplexed Group ACK
442
Data
AP
Secondaries
STAs
Initiation
Scheduling
OBSS transmission
(b)
440a
AP
Primary
STAs
Initiation
Scheduling
Data
Multiplexed Group ACK
Guard frequency
AP
Secondaries
STAs
Initiation
Scheduling
450
Data
OBSS transmission
440b

FIG. 13

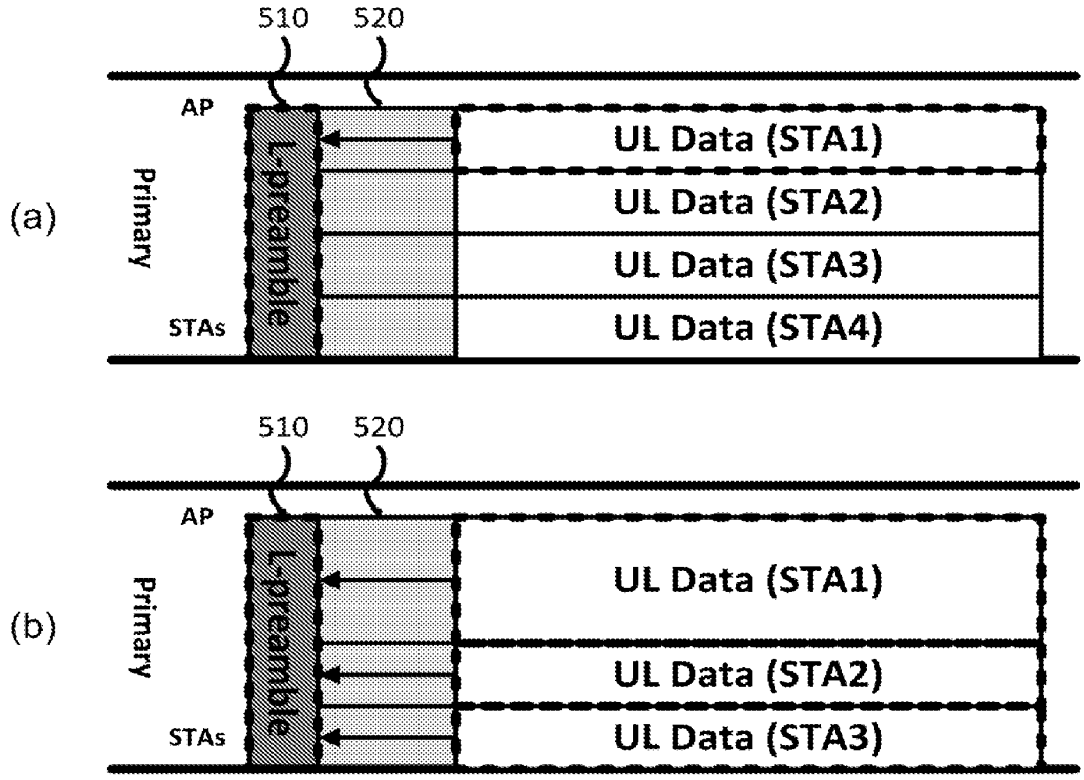

510
520
AP
Primary
STAs
L-preamble
UL Data (STA1)
UL Data (STA2)
UL Data (STA3)
UL Data (STA4)
(a)
510
520
AP
Primary
STAs
L-preamble
UL Data (STA1)
UL Data (STA2)
UL Data (STA3)
(b)

FIG. 14

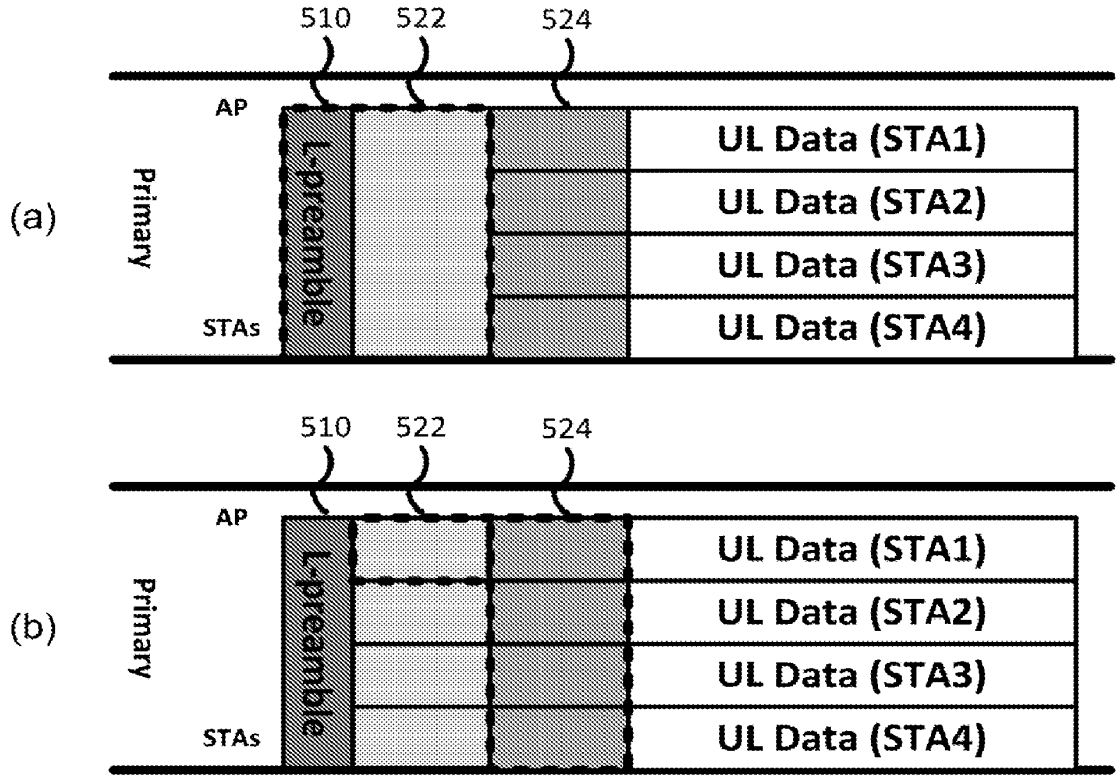

(a)
510
522
524
AP
Primary
STAs
L-preamble
UL Data (STA1)
UL Data (STA2)
UL Data (STA3)
UL Data (STA4)
(b)
510
522
524
AP
Primary
STAs
L-preamble
UL Data (STA1)
UL Data (STA2)
UL Data (STA3)
UL Data (STA4)

FIG. 15

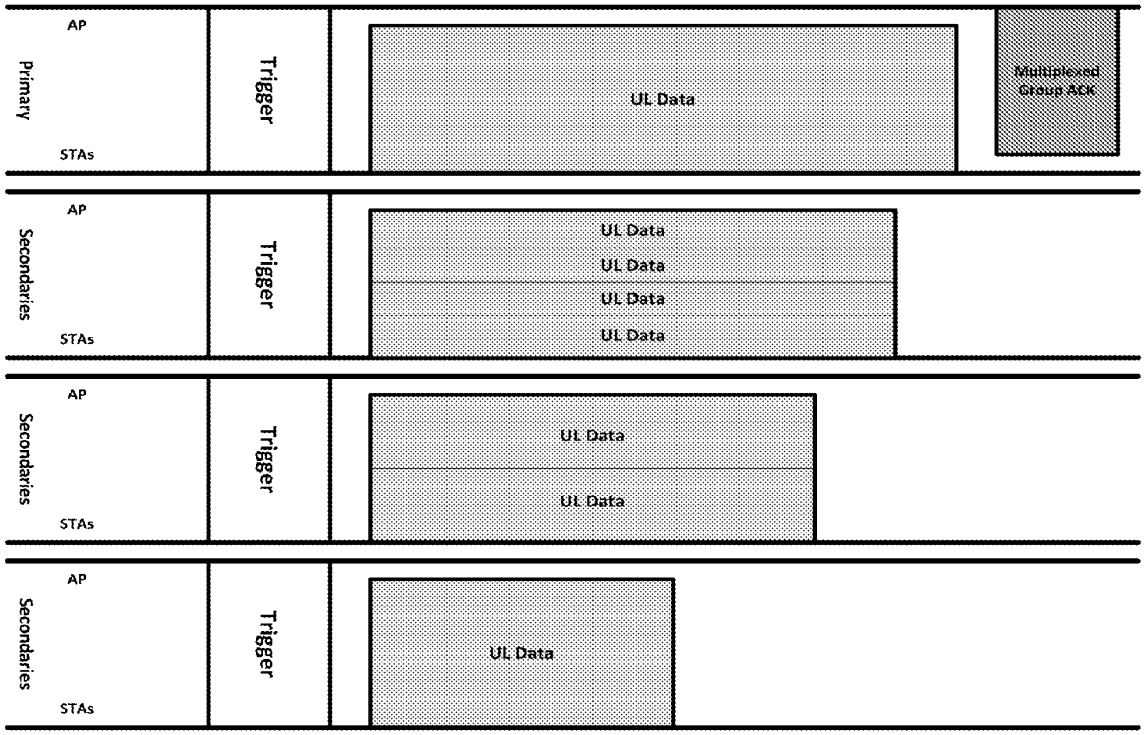

AP
Primary
STAs
Trigger
UL Data
Multiplexed Group ACK
AP
Secondaries
STAs
Trigger
UL Data
UL Data
UL Data
UL Data
AP
Secondaries
STAs
Trigger
UL Data
UL Data
AP
Secondaries
STAs
Trigger
UL Data

FIG. 16

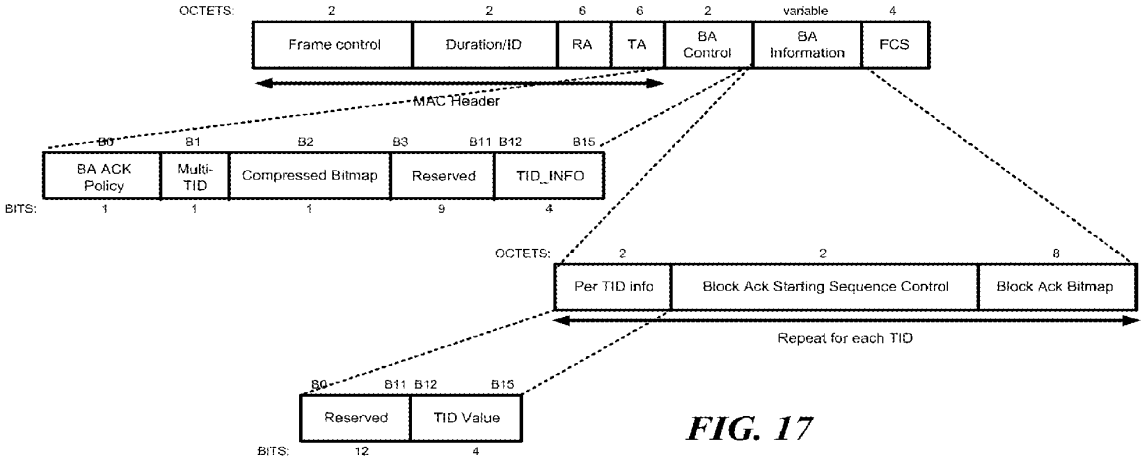

OCTETS:
2
2
6
6
2
variable
4
Frame control
Duration/ID
RA
TA
BA Control
BA Information
FCS
MAC Header
B0
B1
B2
B3
B11
B12
B15
BA ACK Policy
Multi-TID
Compressed Bitmap
Reserved
TID_INFO
BITS:
1
1
1
9
4
OCTETS:
2
2
8
Per TID info
Block Ack Starting Sequence Control
Block Ack Bitmap
Repeat for each TID
B0
B11
B12
B15
Reserved
TID Value
BITS:
12
4

FIG. 17

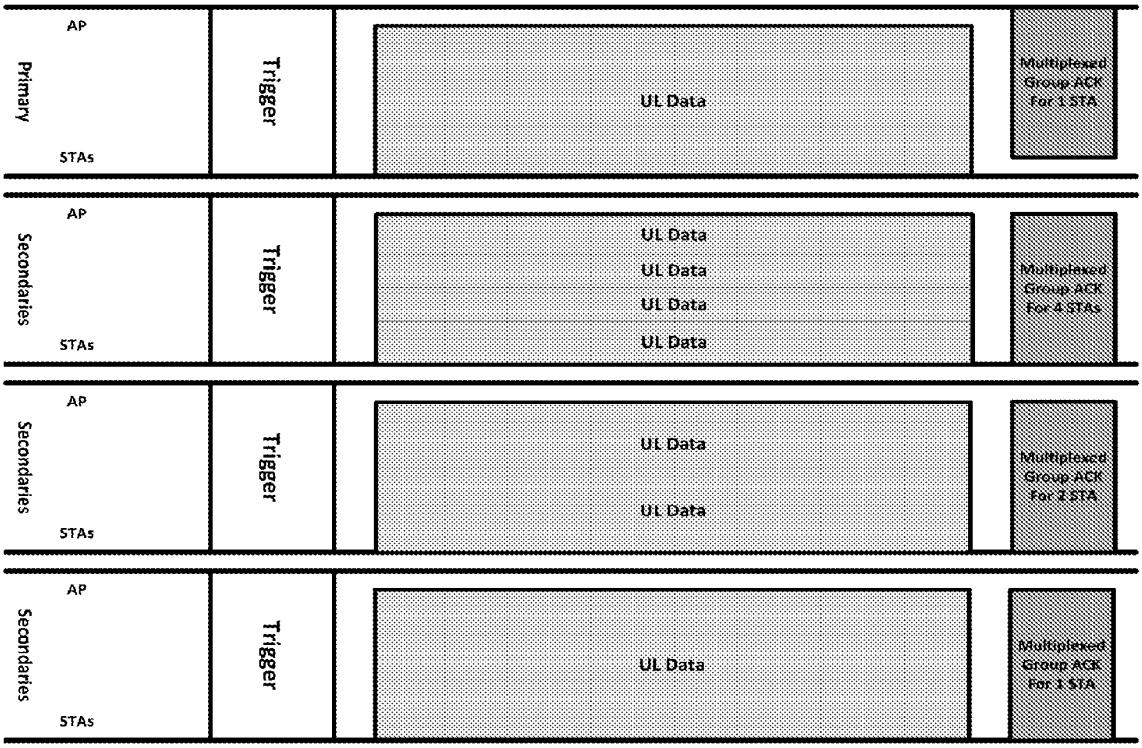

AP
Primary
STAs
Trigger
UL Data
Multiplexed Group ACK For 1 STA
AP
Secondaries
STAs
Trigger
UL Data
UL Data
UL Data
UL Data
Multiplexed Group ACK For 4 STAs
AP
Secondaries
STAs
Trigger
UL Data
UL Data
Multiplexed Group ACK For 2 STA
AP
Secondaries
STAs
Trigger
UL Data
Multiplexed Group ACK For 1 STA

FIG. 18

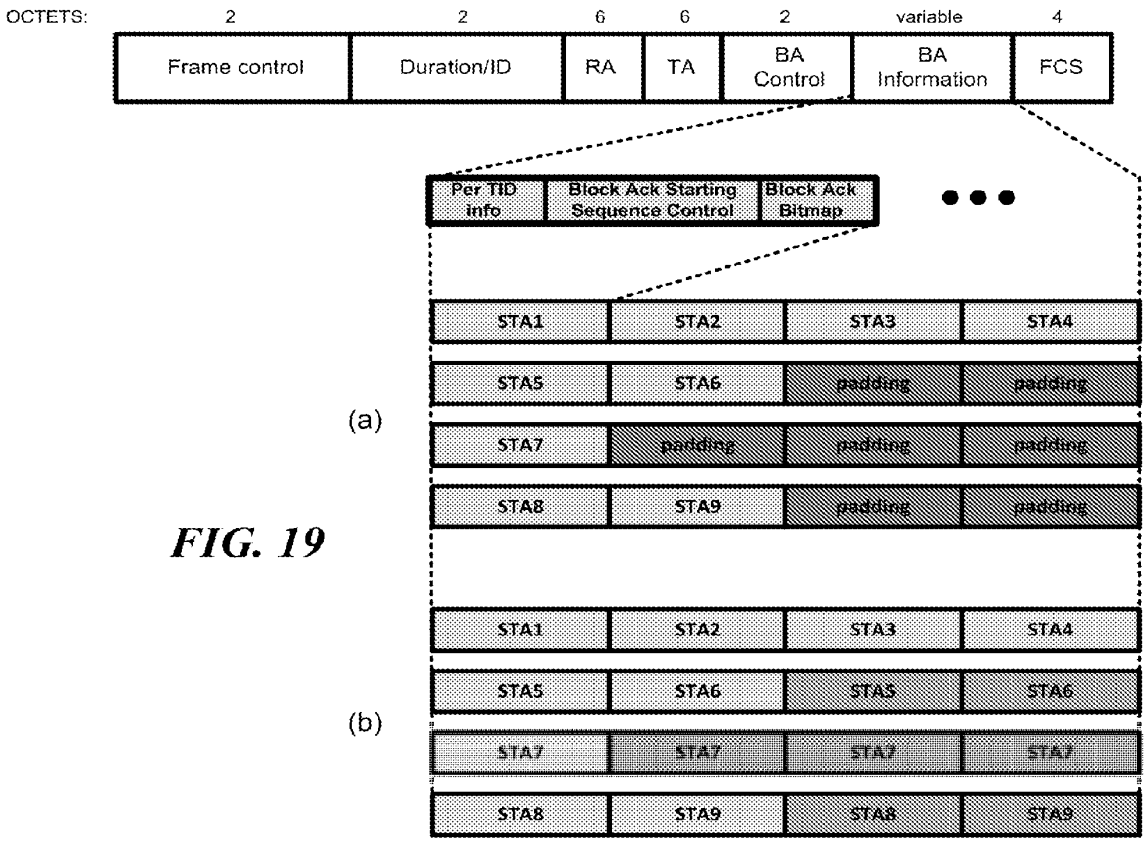

OCTETS:
2
2
6
6
2
variable
4
Frame control
Duration/ID
RA
TA
BA Control
BA Information
FCS
Per TID info
Block Ack Starting Sequence Control
Block Ack Bitmap
(a)
STA1
STA2
STA3
STA4
STA5
STA6
padding
padding
STA7
padding
padding
padding
STA8
STA9
padding
padding
(b)
STA1
STA2
STA3
STA4
STA5
STA6
STA5
STA6
STA7
STA7
STA7
STA7
STA8
STA9
STA8
STA9

FIG. 19

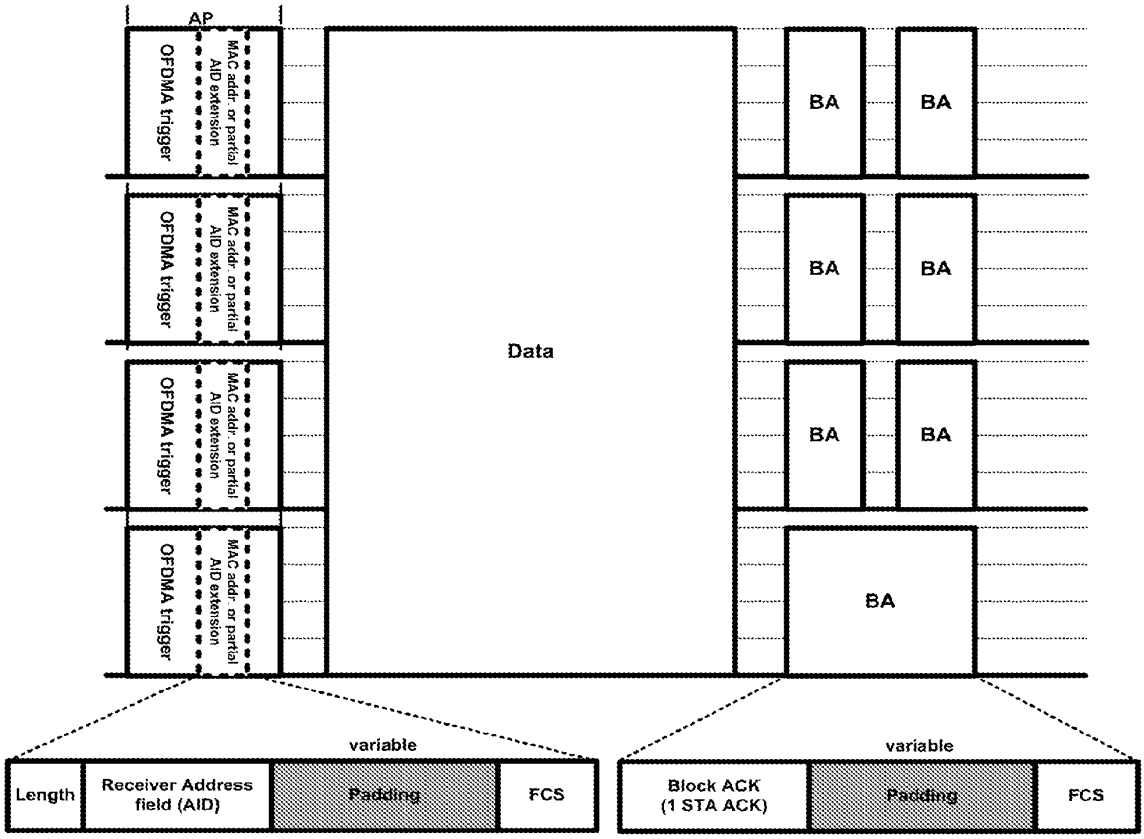

AP
OFDMA trigger
MAC addr. or partial AID extension
Data
BA
variable
Length
Receiver Address field (AID)
Padding
FCS
Block ACK (1 STA ACK)

FIG. 20

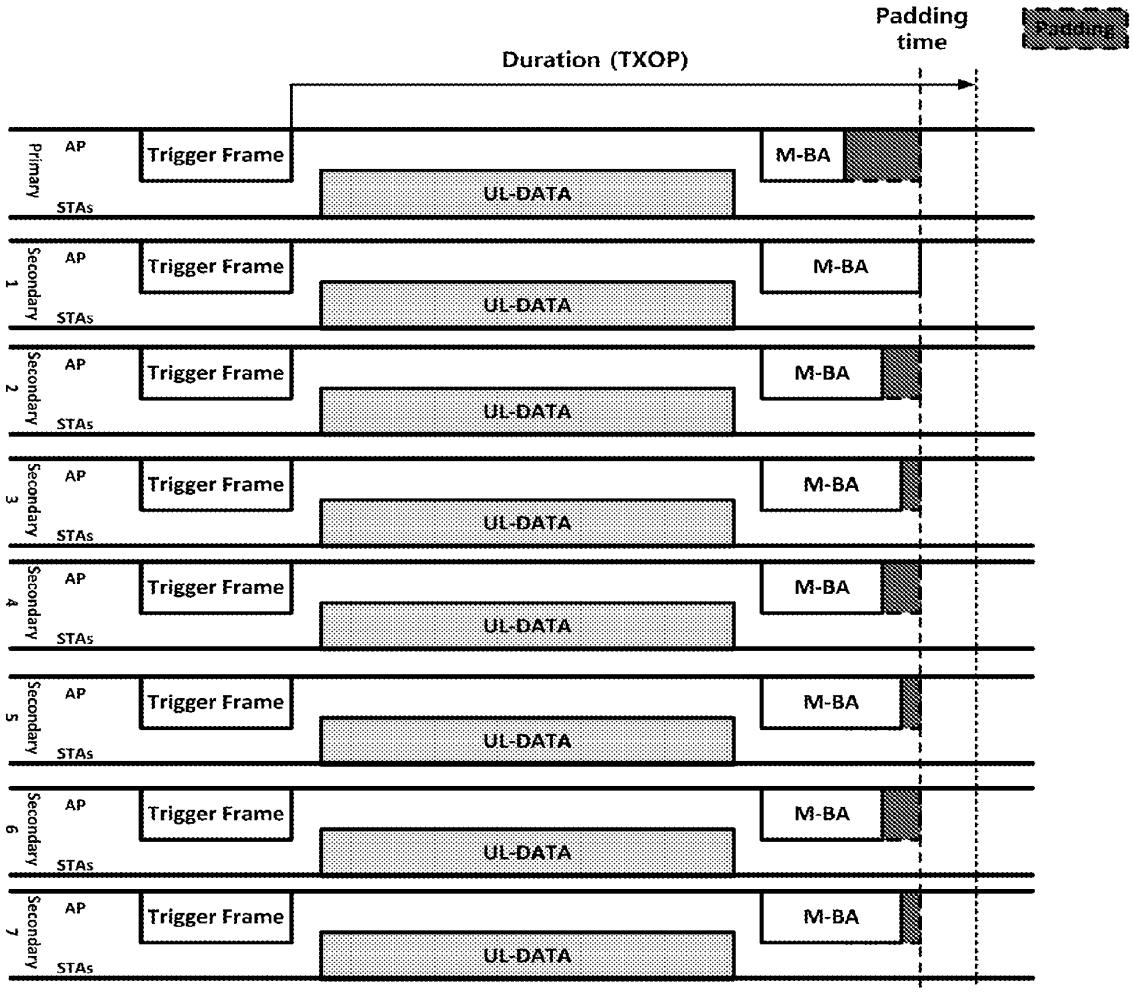

Padding time
Padding
Duration (TXOP)
Primary
Secondary 1
Secondary 2
Secondary 3
Secondary 4
Secondary 5
Secondary 6
Secondary 7
AP
STAs
Trigger Frame
UL-DATA
M-BA

FIG. 21

NOTE: 37 CFR 1.63(c) states, "A person may not execute an oath or declaration unless the person has reviewed and understands the contents of the application, including the claims and is aware of the duty to disclose to the Office all information known to be material to patentability as defined in § 1.56."

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

Title of Invention	WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION

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 PCT/KR2016/002199 filed on March 4, 2016.

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 (1)

Inventor: Woojin AHN Date (Optional): Aug. 29. 2017

Signature: 

LEGAL NAME OF INVENTOR (2)

Inventor: Yongho KIM Date (Optional): _____

Signature: _____

WILP_160024-US

NOTE: 37 CFR 1.63(c) states, "A person may not execute an oath or declaration unless the person has reviewed and understands the contents of the application, including the claims and is aware of the duty to disclose to the Office all information known to be material to patentability as defined in § 1.56."

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

Title of Invention	WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION

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 PCT/KR2016/002199 filed on March 4, 2016.

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.

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LEGAL NAME OF INVENTOR (1)

Inventor: Woojin AHN Date (Optional): _____

Signature: _____

LEGAL NAME OF INVENTOR (2)

Inventor: Yongho KIM Date (Optional): 8/30/2017

Signature: Yongho Kim

LEGAL NAME OF INVENTOR (3)

Inventor: Jinsam KWAK Date (Optional): Aug 28, 2017

Signature:

LEGAL NAME OF INVENTOR (4)

Inventor: Juhyung SON Date (Optional): Aug 28 2017

Signature:

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form. 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.

Docket No.: **QUS-0003.01** PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Woojin AHN; Yongho KIM; Jinsam KWAK; and Juhyung SON

Serial No.: **Continuation of U.S. Patent Application Serial No. 16/377,829 filed April 8, 2019**

Filed: **January 11, 2021** Customer No.: **34610**

For: **WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION**

INFORMATION DISCLOSURE STATEMENT

U.S. Patent and Trademark Office
Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, Virginia 22314

Sir:

Pursuant to 37 C.F.R.§ 1.56, the attention of the Patent and Trademark Office is hereby directed to the references listed on the attached PTO-1449. It is respectfully requested that the information be expressly considered during the prosecution of this application, and that the reference(s) be made of record therein and appear among the "References Cited" on any patent to issue therefrom.

Applicants have listed publication dates on the attached PTO-1449 based on information presently available to the undersigned. However, the listed publication dates should not be construed as an admission that the information was actually published on the indicated date. Applicants reserve the right to establish the patentability of the claimed invention over any of the information provided herewith, and/or to prove that this information may not be prior art, and/or to prove that this information may not be enabling for the teachings purportedly offered. This statement should not be construed as a representation that a search has been made, that information cited in the statement is considered to be and/or is material to patentability, or that information more material to the examination of the present patent application does not exist. The Examiner is specifically requested not to rely solely on the material submitted herewith. It is further understood that the Examiner will consider information that was cited or submitted to the U.S. Patent and Trademark Office in a prior application relied on under 35 U.S.C. §120. 1138 OG 37, 38 (May 19, 1992).

☒ 1. This Information Disclosure Statement is being filed (i) within three months of the U.S. filing date of a U.S. application other than a CPA continued prosecution application under §1.53(d) OR (ii) within three months of the date of entry of the national stage as set forth in §1.491 in an international application OR (iii) before the mailing date of a first Office Action on the merits OR (iv) before the mailing of a first Office Action after the filing of a Request for continued examination under §1.114. No certification or fee is required. 37 C.F.R. §1.97(b).

☐ 2. This Information Disclosure Statement is being filed more than three months after the U.S. filing date AND after the mailing date of the first Office Action on the merits, but before the mailing date of a Final Rejection OR Notice of Allowance OR an action that otherwise closes prosecution in the application. 37 C.F.R. §1.97(c).

☐ a. I hereby state 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 Information Disclosure Statement. 37 C.F.R. §1.97(e)(1). No fee is required.

☐ b. I hereby state that no item of information in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application and, to my knowledge after making reasonable inquiry, was known to any individual designated in 37 C.F.R. §1.56(c) more than three months prior to the filing of this Information Disclosure Statement. 37 C.F.R. §1.97(e)(2). No fee is required.

☐ c. Please charge our Credit Card in the amount of $260.00.00 in payment of the fee under 37 C.F.R. §1.17(p). Please credit or debit Deposit Account No. 16-0607 as needed to ensure consideration of the disclosed information.

☐ 3. This Information Disclosure Statement is being filed after the mailing date of a Final Rejection OR Notice of Allowance OR an action that otherwise closes prosecution in the application, but on or before payment of the Issue Fee. Please charge our Credit Card in the amount of $260.00.00 in payment of the fee under 37 C.F.R. §1.17(p). Please credit or debit Deposit Account No. 16-0607 as needed to ensure consideration of the disclosed information. 37 C.F.R. §1.97(d).

☐ a. I hereby state 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 Information Disclosure Statement. 37 C.F.R. §1.97(e)(1).

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

☒ 4. Copies of the references were cited by or submitted to the Office in parent application No. **16/377,829**, filed **April 8, 2019**, which is relied upon for an earlier filing date under 35 U.S.C. §120. Thus, copies of these references are not attached. 37 C.F.R. §1.98(d).

☒ 5. To the extent necessary, a petition for an extension of time under 37 C.F.R. §1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
KED & ASSOCIATES, LLP

/David C. Oren/

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Docket No.: **QUS-0003.01** PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Woojin AHN; Yongho KIM; Jinsam KWAK; and Juhyung SON

Serial No.: **Continuation of U.S. Application 16/377,829**

Filing Date: **January 11, 2021** Customer No.: **34610**

For: **WIRELESS COMMUNICATION TERMINAL AND WIRELESS COMMUNICATION METHOD FOR MULTI-USER CONCURRENT TRANSMISSION**

PRELIMINARY AMENDMENT

U.S. Patent and Trademark Office
Customer Service Window, **MAIL STOP AMENDMENT**
Randolph Building
401 Dulany Street
Alexandria, VA 22314

Sir:

Prior to initial examination on the merits, please amend the above-identified application as follows:

Amendments to the Specification are reflected in this paper.

Amendments to the Claims are reflected in the listing of claims.

Remarks begin after the listing of the claims.

AMENDMENTS TO THE SPECIFICATION

Please add the following new paragraph after the title:

CROSS-REFERENCE TO RELATED PATENT APPLICATIONS

This application is a continuation application of U.S. Patent Application Serial No. 16/377,829, filed April 8, 2019, which is a continuation application of U.S. Patent Application Serial No. 15/555,075, filed January 2, 2018, which is a U.S. National Stage Application under 35 U.S.C. §371 of PCT Application No. PCT/KR2016/002199, filed March 4, 2016, which claims priority to Korean Patent Application No's. 10-2015-0030369, filed March 4, 2015, 10-2015-0036754, filed March 17, 2015 and 10-2015-0066670, filed May 13, 2015, whose entire disclosures are hereby incorporated by reference.

AMENDMENTS TO THE CLAIMS

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

Listing of Claims:

1-12. (Cancelled)

13. (New) A wireless communication terminal, the terminal comprising:

a transceiver; and

a processor,

wherein the processor is configured to:

receive a frame for uplink (UL) multi-user (MU) transmission,

wherein the frame includes an association identifier (AID) field and a frame check sequence (FCS) field,

wherein a specific field for adjusting a length of the frame is included in the frame according to a value of the AID field, and

wherein the specific field is related to a preparation of a response frame for the frame,

transmit the response frame in response to the frame.

14. (New) The wireless communication terminal of claim 13,

wherein the specific field is included in the frame when the value of the AID field is set to a specific value.

15. (New) The wireless communication terminal of claim 14,

wherein the specific value consists of at least one bit, and

wherein all of the at least one bit are set to '1'.

16. (New) The wireless communication terminal of claim 13,

wherein the specific field is located before the FCS field in the frame.

17. (New) The wireless communication terminal of claim 13,

wherein the AID field is used to identify whether the frame includes the specific field to which padding is applied.

18. (New) The wireless communication terminal of claim 13,

wherein the specific field is used to extend the length of the frame.

19. (New) The wireless communication terminal of claim 13,

wherein a duration of the specific field is set based on a time needed for one or more terminals to process the frame.

20. (New) A wireless communication method of a wireless communication terminal, comprising:

receiving a frame for uplink (UL) multi-user (MU) transmission,

wherein the frame includes an association identifier (AID) field and a frame check sequence (FCS) field,

wherein a specific field for adjusting a length of the frame is included in the frame according to a value of the AID field, and

wherein the specific field is related to a preparation of a response frame for the frame; and

transmitting the response frame in response to the frame.

21. (New) The wireless communication method of claim 20,

wherein the specific field is included in the frame when the value of the AID field is set to a specific value.

22. (New) The wireless communication method of claim 21,

wherein the specific value consists of at least one bit, and

wherein all of the at least one bit are set to '1'.

23. (New) The wireless communication method of claim 20,

wherein the specific field is located before the FCS field in the frame.

24. (New) The wireless communication method of claim 20,

wherein the AID field is used to identify whether the frame includes the specific field to which padding is applied.

25. (New) The wireless communication method of claim 20,

wherein the specific field is used to extend the length of the frame.

26. (New) The wireless communication method of claim 20,

wherein a duration of the specific field is set based on a time needed for the one or more terminals to process the frame.

REMARKS

Claims 13-26 are pending. By this Amendment, the specification is amended, claims 1-12 are canceled without prejudice or disclaimer, and new claims 13-26 are added. Prompt examination and allowance in due course are respectfully solicited.

CONCLUSION

Should the Examiner have any questions regarding the above-identified application, the Examiner is invited to contact the undersigned attorney, **David C. Oren,** at the telephone number listed below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. §1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this, concurrent and future replies, including extension of time fees, to Deposit Account 16-0607 and please credit any excess fees to such deposit account.

Respectfully submitted,
KED & ASSOCIATES, LLP

/David C. Oren/

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