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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/121,546	09/21/2021	11129163	B-9587CON 631613-2	9775

158747 7590 09/01/2021

LADAS & PARRY
E-MAIL
4525 WILSHIRE BOULEVARD
SUITE 240
LOS ANGELES, CA 90010

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

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

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

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

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

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

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

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

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United States Patent and Trademark Office

Office of the Chief Financial Officer

Document Code:WFEE

User :C46167

Sale Accounting Date:08/12/2021

Sale Item Reference Number	Effective Date
16121546	08/11/2021

Document Number	Fee Code	Fee Code Description	Amount Paid	Payment Method
I20218BC15400526	1501	UTILITY APPL ISSUE FEE	$1,200.00	Salea

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

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/121,546	09/04/2018	Geonjung KO	B-9587CON 631613-2	9775

TITLE OF INVENTION: WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET

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nonprovisional	UNDISCOUNTED	$1200	$0.00	$1200.00	$0	10/19/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
TANG, KIET G	2469	370-338000

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❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

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1 Ladas & Parry, LLP
2
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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)
1. WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC.	GYEONGGI-DO, REPUBLIC OF KOREA
2. SK TELECOM CO., LTD.	SEOUL, REPUBLIC OF 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. 12-0415

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.
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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 /Young Seok Koo 76,255/ Date August 11, 2021

Typed or printed name Young Seok Koo Registration No. 76,255

Electronic Acknowledgement Receipt	
EFS ID:	43488072
Application Number:	16121546
International Application Number:	
Confirmation Number:	9775
Title of Invention:	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET
First Named Inventor/Applicant Name:	Geonjung KO
Customer Number:	158747
Filer:	Young Seok Koo/Lianne Herbert
Filer Authorized By:	Young Seok Koo
Attorney Docket Number:	B-9587CON 631613-2
Receipt Date:	11-AUG-2021
Filing Date:	04-SEP-2018
Time Stamp:	18:57:56
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	Issue Fee Payment (PTO-85B)	631613-IssueFee-Transmittal.pdf	103827 2269bc072f5bcedb55a46c086b8ba2ef9fa43a47	no	1

Warnings:

Information:	
Total Files Size (in bytes):	103827

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.

Best Available Copy

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
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OPAP
AUG 11 2021

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/121,546	09/04/2018	Geonjung KO	B-9587CON 631613-2	9775

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EXAMINER	ART UNIT	CLASS-SUBCLASS
TANG, KIET G	2469	370-338000

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1 Ladas & Parry, LLP
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4a. Fees submitted: ☒ Issue Fee ☐ Publication Fee (if required) ☐ Advance Order - # of Copies _____

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☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. 12-0415

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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 /Young Seok Koo 76,255/ Date August 11, 2021

Typed or printed name Young Seok Koo Registration No. 76,255

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NOTICE OF ALLOWANCE AND FEE(S) DUE

158747 7590 07/19/2021

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SUITE 240
LOS ANGELES, CA 90010

EXAMINER
TANG, KIET G

ART UNIT	PAPER NUMBER
2469	

DATE MAILED: 07/19/2021

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/121,546	09/04/2018	Geonjung KO	B-9587CON 631613-2	9775

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nonprovisional	UNDISCOUNTED	$1200	$0.00	$1200.00	$0	10/19/2021

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

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

HOW TO REPLY TO THIS NOTICE:

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

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

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

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

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

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

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

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EXAMINER	
TANG, KIET G	
ART UNIT	PAPER NUMBER
2469	

DATE MAILED: 07/19/2021

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

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

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

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

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

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

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

Privacy Act Statement

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

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

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

Notice of Allowability	Application No. 16/121,546	Applicant(s) KO et al.	
	Examiner KIET TANG	Art Unit 2469	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 07/07/2021.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

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

3. ☑ The allowed claim(s) is/are See Continuation Sheet . 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 07/07/2021.
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 _____.

/KIET TANG/
Primary Examiner, Art Unit 2469

Continuation of 3. The allowed claim(s) is/are: 21-36 which have been renumbered as claims 1-16

DETAILED ACTION

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

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 07/07/2021 has been entered.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 07/07/2021 was filed after the mailing date of the Notice of Allowance and Fees Due on 05/14/2021. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Allowable Subject Matter

3. **Claims 21-36** are allowed.

4. 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

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KIET TANG whose telephone number is (571)270-7193. The examiner can normally be reached on M-F 8:00-5:00.

6. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, IAN MOORE can be reached on (571) 272-3085. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

7. 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.

/KIET TANG/

Primary Examiner, Art Unit 2469

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/121,546	KO et al.
	Examiner	Art Unit
	KIET TANG	2469

CPC - Searched*		
Symbol	**Date**	**Examiner**
H04W72/0453 or H04W48/18 or H04W74/002 or H04W84/12 or H04W88/06 or H04W24/02 or H04W74/0841 or H04W74/0825 or H04W28/06 or H04L27/2601 or H04B7/2612	03/02/2020 (Updated on 08/31/20, 01/02/21, 05/08/21, 07/12/21)	KT

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**
Inventor and assignee search in East and PALM	03/02/2020 (Updated on 08/31/20, 01/02/21, 05/08/21, 07/12/21)	KT
IP.com Search	01/02/2021 (Updated on 05/08/21, 07/12/21)	KT

Interference Search			
US Class/CPC Symbol	**US Subclass/CPC Group**	**Date**	**Examiner**
	Inventor and assignee search in East and PALM	01/02/2021 (Updated on 05/08/21, 07/12/21)	KT

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/121,546	KO et al.
	Examiner	Art Unit
	KIET TANG	2469

CPC						
Symbol					Type	Version
H04W	/	72	/	0453	F	2013-01-01
H04W	/	48	/	18	I	2013-01-01
H04W	/	74	/	002	I	2013-01-01
H04W	/	88	/	06	A	2013-01-01
H04W	/	24	/	02	A	2013-01-01
H04W	/	84	/	12	A	2013-01-01

CPC Combination Sets							
Symbol					Type	Set	Ranking	Version
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	16	
/KIET TANG/ Primary Examiner, Art Unit 2469	12 July 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20210712

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/121,546	KO et al.
	Examiner	**Art Unit**
	KIET TANG	2469

INTERNATIONAL CLASSIFICATION					
CLAIMED					
H04W	/	72	/	04	

NON-CLAIMED					
	/		/		

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

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

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	16	
/KIET TANG/ Primary Examiner, Art Unit 2469	12 July 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/121,546	KO et al.
	Examiner	Art Unit
	KIET TANG	2469

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

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		10		19	8	28								
	2		11		20	9	29								
	3		12	1	21	10	30								
	4		13	2	22	11	31								
	5		14	3	23	12	32								
	6		15	4	24	13	33								
	7		16	5	25	14	34								
	8		17	6	26	15	35								
	9		18	7	27	16	36								

NONE (Assistant Examiner)	(Date)	Total Claims Allowed: 16	
/KIET TANG/ Primary Examiner, Art Unit 2469 (Primary Examiner)	12 July 2021 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1

U.S. Patent and Trademark Office Part of Paper No.: 20210712

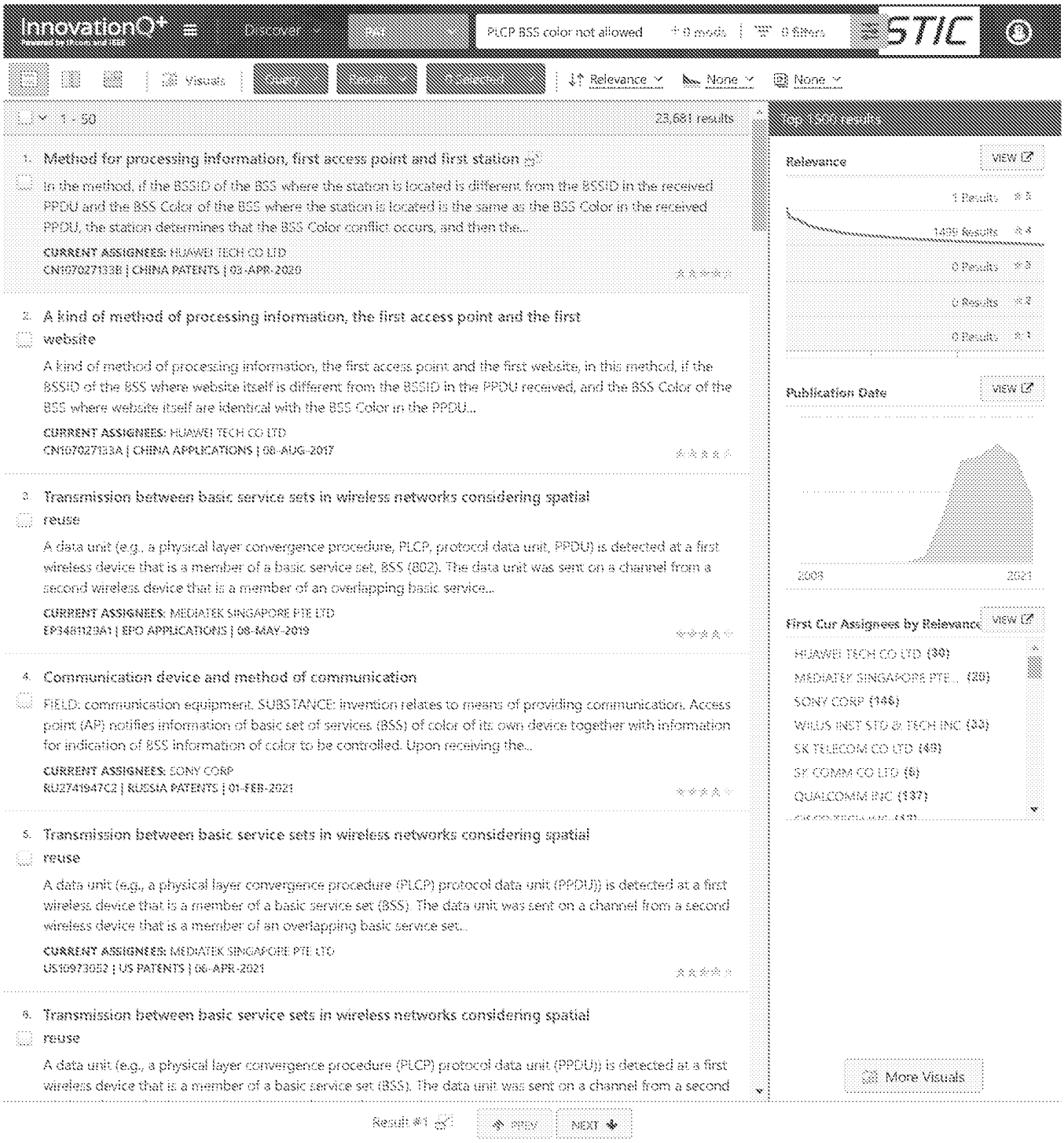
Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/121,546	KO et al.
	Examiner	**Art Unit**
	KIET TANG	2469

✓	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	03/02/2020	08/31/2020	01/02/2021	05/08/2021	07/12/2021				
	1		-	-	-	-				
	2	-	-	-	-	-				
	3	-	-	-	-	-				
	4	-	-	-	-	-				
	5	-	-	-	-	-				
	6	-	-	-	-	-				
	7	-	-	-	-	-				
	8	-	-	-	-	-				
	9	-	-	-	-	-				
	10	-	-	-	-	-				
	11	-	-	-	-	-				
	12	-	-	-	-	-				
	13	-	-	-	-	-				
	14	-	-	-	-	-				
	15	-	-	-	-	-				
	16	-	-	-	-	-				
	17	-	-	-	-	-				
	18	-	-	-	-	-				
	19	-	-	-	-	-				
	20	-	-	-	-	-				
1	21	✓	✓	=	=	=				
2	22	✓	✓	=	=	=				
3	23	✓	✓	=	=	=				
4	24	✓	✓	=	=	=				
5	25	✓	✓	=	=	=				
6	26	✓	✓	=	=	=				
7	27	✓	✓	=	=	=				
8	28	✓	✓	=	=	=				
9	29	✓	✓	=	=	=				
10	30	✓	✓	=	=	=				
11	31	✓	✓	=	=	=				
12	32	✓	✓	=	=	=				
13	33	✓	✓	=	=	=				
14	34	✓	✓	=	=	=				
15	35	✓	✓	=	=	=				
16	36	✓	✓	=	=	=				


InnovationQ+
Discover
PLCP BSS color not allowed
0 modi
0 filters
STIC
Visuals
Query
Results
0 selected
Relevance
None
None
1 - 50
23,681 results
1. Method for processing information, first access point and first station
In the method, if the BSSID of the BSS where the station is located is different from the BSSID in the received PPDU and the BSS Color of the BSS where the station is located is the same as the BSS Color in the received PPDU, the station determines that the BSS Color conflict occurs, and then the...
CURRENT ASSIGNEES: HUAWEI TECH CO LTD
CN107027133B | CHINA PATENTS | 03-APR-2020
2. A kind of method of processing information, the first access point and the first website
A kind of method of processing information, the first access point and the first website, in this method, if the BSSID of the BSS where website itself is different from the BSSID in the PPDU received, and the BSS Color of the BSS where website itself are identical with the BSS Color in the PPDU...
CURRENT ASSIGNEES: HUAWEI TECH CO LTD
CN107027133A | CHINA APPLICATIONS | 08-AUG-2017
3. Transmission between basic service sets in wireless networks considering spatial reuse
A data unit (e.g., a physical layer convergence procedure, PLCP, protocol data unit, PPDU) is detected at a first wireless device that is a member of a basic service set, BSS (802). The data unit was sent on a channel from a second wireless device that is a member of an overlapping basic service...
CURRENT ASSIGNEES: MEDIATEK SINGAPORE PTE LTD
EP3481129A1 | EPO APPLICATIONS | 08-MAY-2019
4. Communication device and method of communication
FIELD: communication equipment. SUBSTANCE: invention relates to means of providing communication. Access point (AP) notifies information of basic set of services (BSS) of color of its own device together with information for indication of BSS information of color to be controlled. Upon receiving the...
CURRENT ASSIGNEES: SONY CORP
RU2741947C2 | RUSSIA PATENTS | 01-FEB-2021
5. Transmission between basic service sets in wireless networks considering spatial reuse
A data unit (e.g., a physical layer convergence procedure (PLCP) protocol data unit (PPDU)) is detected at a first wireless device that is a member of a basic service set (BSS). The data unit was sent on a channel from a second wireless device that is a member of an overlapping basic service set...
CURRENT ASSIGNEES: MEDIATEK SINGAPORE PTE LTD
US10973052 | US PATENTS | 06-APR-2021
6. Transmission between basic service sets in wireless networks considering spatial reuse
A data unit (e.g., a physical layer convergence procedure (PLCP) protocol data unit (PPDU)) is detected at a first wireless device that is a member of a basic service set (BSS). The data unit was sent on a channel from a second
Top CPC results
Relevance
VIEW
1 Results
1499 Results
0 Results
0 Results
0 Results
Publication Date
VIEW
2008
2021
First Cur Assignees by Relevance
VIEW
HUAWEI TECH CO LTD (30)
MEDIATEK SINGAPORE PTE... (20)
SONY CORP (148)
WILUS INST STD & TECH INC (33)
SK TELECOM CO LTD (49)
SK COMM CO LTD (6)
QUALCOMM INC (137)
More Visuals
Result #1
PREV
NEXT

July 5, 2021

Form PTO-1449 (Modified) Page 1 of 1	ATTY DOCKET NO. B-9587CON 631613-2	U.S. SERIAL NO. 16/121,546
LIST OF PATENTS AND PUBLICATIONS STATEMENT	APPLICANT WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	FILING DATE September 4, 2018
		GROUP NO. 2469

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	ISSUE/PUBL. DATE	NAME	CLASS	SUB-CLASS	REMARKS
	1.	2020/0221388	Jul. 9, 2020	Oteri et al.			

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY	CLASS	SUB-CLASS	TRANSLATION
	2.	101374321	Feb. 25, 2009	CN			Espacenet
	3.	101616408	Dec. 30, 2009	CN			Espacenet
	4.	101647299	Feb. 10, 2010	CN			Espacenet
	5.	104641683	Jul. 31, 2018	CN			Espacenet

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT
	6.	Notice of Allowance dated April 29, 2021 for U.S. Patent Application No. 16/792,166
	7.	Office Action dated January 25, 2021 for U.S. Patent Application No. 16/792,166
	8.	Office Action dated April 23, 2021 for Chinese Patent Application No. 201680061366.7 and its English translation provided by Applicant's foreign counsel

EXAMINER	*DATE CONSIDERED*
/KIET TANG/	07/12/2021

EXAMINER: Initial if reference 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. /K.T./

EAST Search History

EAST Search History (Prior Art) /K.T./ /K.T./ /K.T./

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S197	4	"16792166"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/07/12 12:12
S198	1	("20200221388").PN.	US-PGPUB; USPAT	OR	ON	2021/07/12 12:15
L3	19	L2 and L1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/07/12 20:00
L2	3,372	((Basic and Service and Set) (BSS)).clm.	USPAT	OR	ON	2021/07/12 20:00
L1	116	((("WILUS") near3 ("INSTITUTE") near3 ("OF") near3 ("STANDARDS") near3 ("AND") near3 ("TECHNOLOGY") near3 ("INC"))).AS,AANM.	USPAT	OR	ON	2021/07/12 20:00
L7	15	L2 and L6	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/07/12 20:01
L6	152	((("KO") near3 ("Geonjung"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2021/07/12 20:01
L5	17	L2 and L4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/07/12 20:01
L4	731	((("SK") near3 ("TELECOM") near3 ("CO") near3 ("LTD"))).AS,AANM.	USPAT	OR	ON	2021/07/12 20:01
L13	35	L2 and L12	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2021/07/12 20:02

			DERWENT; IBM_TDB			
L12	506	((("KWAK") near3 ("Jinsam"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2021/07/12 20:02
L11	11	L2 and L10	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/07/12 20:02
L10	126	((("AHN") near3 ("Woojin"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2021/07/12 20:02
L9	19	L2 and L8	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/07/12 20:02
L8	329	((("SON") near3 ("Juhyung"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2021/07/12 20:02
L17	118	L16 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/07/12 20:03
L16	192	(((Basic and Service and Set) BSS) near3 color) same PPDU	USPAT	OR	ON	2021/07/12 20:03
L15	40	L14 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/07/12 20:03
L14	113	(((Basic adj Service adj Set) (BSS)) with color) with allow$4	US-PGPUB; USPAT	OR	ON	2021/07/12 20:03
L22	105	20 and 17	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/07/12 20:04
L21	580	20 and 19	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/07/12 20:04

L20	370,285	(H04W72/0453 or H04W48/18 or H04W74/002 or H04W84/12 or H04W88/06 or H04W24/02 or H04W74/0841 or H04W74/0825 or H04W28/06 or H04L27/2601 or H04B7/2612).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/07/12 20:04
L19	794	18 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/07/12 20:04
L18	1,469	(((Basic adj Service adj Set) (BSS)) with color)	US-PGPUB; USPAT	OR	ON	2021/07/12 20:04
L28	301	L27 and L20	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/07/12 20:05
L27	405	L26 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/07/12 20:05
L26	775	(((Basic adj Service adj Set) (BSS)) with color) with (us$4 perform$4)	US-PGPUB; USPAT	OR	ON	2021/07/12 20:05
L25	35	L24 and L20	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/07/12 20:05
L24	40	L23 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/07/12 20:05
L23	113	(((Basic adj Service adj Set) (BSS)) with color) with allow$4	US-PGPUB; USPAT	OR	ON	2021/07/12 20:05
L32	132	L30 and L31	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/07/12 20:52

L31	370,285	(H04W72/0453 or H04W48/18 or H04W74/002 or H04W84/12 or H04W88/06 or H04W24/02 or H04W74/0841 or H04W74/0825 or H04W28/06 or H04L27/2601 or H04B7/2612).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/07/12 20:52
L30	148	L29 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/07/12 20:52
L29	261	identif$3 with (((Basic and Service and Set) (BSS)) near3 color)	USPAT	OR	ON	2021/07/12 20:52
L35	77	L34 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/07/12 21:01
L34	217	(((Basic adj Service adj Set) (BSS)) with color) same allow$4	US-PGPUB; USPAT	OR	ON	2021/07/12 21:01

7/12/2021 9:10:45 PM
C:\Users\ktang2\Documents\EAST\Workspaces\16 121 546 b.wsp

EAST Search History

EAST Search History (Interference) /K.T./ /K.T./ /K.T./

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L33	3	(PLCP PPDU perform$4 operation BSS color information indicat$4 allow$4).clm.	US-PGPUB; USPAT	AND	ON	2021/07/12 20:57

7/12/2021 8:58:10 PM
C:\Users\ktang2\Documents\EAST\Workspaces\16 121 546 b.wsp

Form PTO-1449 (Modified) Page 1 of 1	ATTY DOCKET NO. B-9587CON 631613-2	U.S. SERIAL NO. 16/121,546
LIST OF PATENTS AND PUBLICATIONS STATEMENT	APPLICANT WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	FILING DATE September 4, 2018
		GROUP NO. 2469

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	ISSUE/PUBL. DATE	NAME	CLASS	SUB-CLASS	REMARKS
	1.	2020/0221388	Jul. 9, 2020	Oteri et al.			

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY	CLASS	SUB-CLASS	TRANSLATION
	2.	101374321	Feb. 25, 2009	CN			Espacenet
	3.	101616408	Dec. 30, 2009	CN			Espacenet
	4.	101647299	Feb. 10, 2010	CN			Espacenet
	5.	104641683	Jul. 31, 2018	CN			Espacenet

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT
	6.	Notice of Allowance dated April 29, 2021 for U.S. Patent Application No. 16/792,166
	7.	Office Action dated January 25, 2021 for U.S. Patent Application No. 16/792,166
	8.	Office Action dated April 23, 2021 for Chinese Patent Application No. 201680061366.7 and its English translation provided by Applicant's foreign counsel

EXAMINER	*DATE CONSIDERED*

EXAMINER: Initial if reference 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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	Examiner: Tang, Kiet G
Serial No.: 16/121,546	Art Unit: 2469
Filed: September 4, 2018	Conf. No.: 9775
For: "WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET"	Our Ref: B-9587CON 631613-2
Date: July 5, 2021	Re: ***Information Disclosure Statement***

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir/Madam:

This information disclosure statement is filed in accordance with 37 C.F.R. §§ 1.56, 1.97 and 1.98 to disclose information that may be relevant to the above-identified patent application. The Applicant requests the Examiner consider the documents listed on the enclosed form PTO-1449 (modified) in the examination of this application.

The filing of this Information Disclosure Statement (IDS) shall not be construed as a representation that a search has been made (37 C.F.R. 1.97(g)), an admission that the information cited is, or is considered to be, material to patentability, or that no other material information exists.

The filing of this Information Disclosure Statement shall not be construed as an admission against interest in any manner (37 C.F.R § 1.97(h)).

If any additional fee is required for this filing, the Applicant requests the Examiner contact a practitioner associated with the Customer Number listed below for authorization.

This information disclosure statement also includes the statements marked below. Failure to mark a statement should not be construed as a negative assertion.

Timing and Fees

This IDS is being filed:

[ ] Concurrently with the application, and no fee is due.

[ ] Within three months of the filing of the national application, other than a continued prosecution application under § 1.53(d), and no fee is due.

[ ] Within three months of the date of entry of the national stage as set forth in § 1.491 in an international application, and no fee is due.

[ ] Before the mailing of a first Office Action on the merits, and no fee is due.

[ ] Before the mailing of a first Office Action after the filing of a request for continued examination under§ 1.114, and no fee is due.

[ ] After the periods described above, and before a final Office Action under § 1.113, a Notice of Allowance under § 1.311, or an action that otherwise closes prosecution in the application, and is

- [ ] accompanied by the fee set forth in § 1.17(p), or
- [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(1): That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement; or
- [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(2): That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

[ ] After the periods described above, and is accompanied by the fee set forth in § 1.17(p), and is

- [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(1), that each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement; or

- [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(2), that no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

[x] Concurrently with a Request for Continued Examination, and no additional fee is due for this IDS.

Items Disclosed

At least one item listed on the enclosed form PTO-1449 (modified) was

[x] Cited in an Office Action for a related application, the application number of the related application and the issue date of the Office Action are provided below and the Office Action is enclosed.

July 5, 2021

Please see the enclosed form PTO-1449 (modified) for related application number(s) and issue date(s)

[ ] Cited in an International Search Report (ISR) or an International Preliminary Report on Patentability (IPRP) or a Written Opinion (WO) of the International Searching Authority (ISA) for the related PCT Application, the PCT application number and the issue date of the ISR/IPRP/WO are provided below and the ISR/IPRP/WO is enclosed.

Additional Information

[x] Translations of the foreign-language documents are also enclosed as machine-translations, human-translations, or counterpart applications as noted. Machine translations were provided by the Japanese Patent Office, ESPACENET, Google Documents, Patent Fetcher® /ESPACENET, Google Translate or Google Translator Toolkit as noted and with OCR by Adobe Acrobat 9 or ABBYY PDF Transformer 3 if needed.

[x] English-language abstracts of foreign-language documents are provided.

[x] Documents listed on the enclosed ISR/IPRP/WO or the Office Action have relevance at least as described therein.

[ ] The documents with the following reference numbers were described in the specification of the present application; omission of a reference from this list does not indicate that it was not discussed in the specification of the present application.

[x] At least one of the references cited in the Office Action listed on the attached PTO-1449 (modified) were previously submitted in an IDS or cited by the Examiner for the present application on May 5, 2021, and June14, 2019 and September 20, 2019 and September 4, 2018 and therefore are not submitted in this IDS.

[ ] Other:

I hereby certify that this document is being transmitted to the Patent and Trademark Office via electronic filing.

July 5, 2021
(Date of Transmission)

Azatuhi Chinaryan
(Name of Person Transmitting)

/ Azatuhi Chinaryan /
(Signature)

Respectfully submitted,

/ Young Seok Koo 76,255 /

Young Seok Koo
Attorney for Applicant
Registration No. 76,255
LADAS & PARRY LLP
4525 Wilshire Blvd., Suite 240
Los Angeles, CA 90010
(323) 934-2300 voice

Electronic Patent Application Fee Transmittal					
Application Number:	16121546				
Filing Date:	04-Sep-2018				
Title of Invention:	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET				
First Named Inventor/Applicant Name:	Geonjung KO				
Filer:	Young Seok Koo/Azatuhi Chinaryan				
Attorney Docket Number:	B-9587CON 631613-2				
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:					
Extension-of-Time:					

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
RCE- 2ND AND SUBSEQUENT REQUEST	1820	1	2000	2000
		Total in USD ($)		**2000**

Electronic Acknowledgement Receipt	
EFS ID:	43168961
Application Number:	16121546
International Application Number:	
Confirmation Number:	9775
Title of Invention:	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET
First Named Inventor/Applicant Name:	Geonjung KO
Customer Number:	158747
Filer:	Young Seok Koo/Azatuhi Chinaryan
Filer Authorized By:	Young Seok Koo
Attorney Docket Number:	B-9587CON 631613-2
Receipt Date:	07-JUL-2021
Filing Date:	04-SEP-2018
Time Stamp:	06:32:52
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$2000
RAM confirmation Number	E202177733123302
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	Request for Continued Examination (RCE)	2021-07-05_631613_RCE_Transmittal.pdf	220783 46515d5340d322507ede8fe693d075685d1da73a	no	2
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
2		2021-07-05_631613_IDS.pdf	152336 c33059e959e76f6affe81bdbcd60325441ed0ffe	yes	4
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Information Disclosure Statement (IDS) Form (SB08)		4	4	
	Transmittal Letter		1	3	
Warnings:					
Information:					
3	Foreign Reference	Ref1_CN101374321A.pdf	1294755 dfcc89539c643d44d64cee999114c5caac35a36c	no	26
Warnings:					
Information:					
4	Foreign Reference	Ref2_CN101616408A.pdf	1790170 3ad44f4cf5739abc20083f0c5935474fbedff4d2	no	35
Warnings:					
Information:					
5	Foreign Reference	Ref3_CN101647299A.pdf	3370496 c80eb6a78661de3a983049a7c7c957abedfc5a1a	no	52
Warnings:					

Information:					
6	Foreign Reference	Ref4_CN104641683A.pdf	3402213 99b3ab6cfa1d86ab3dc9e646e1734fab1f0f3138	no	79
Warnings:					
Information:					
7	Other Reference-Patent/App/Search documents	Ref_CN2016800613667_OA_4-23-21.pdf	487040 9783f11ceadfccedf99b3c9e7aafec860edd7d10	no	10
Warnings:					
Information:					
8	Other Reference-Patent/App/Search documents	Ref_US16792166_NOA_4-29-21.pdf	427363 7c5178be105d4cf790eb93dfc4a18367f36f103e	no	7
Warnings:					
Information:					
9	Other Reference-Patent/App/Search documents	Ref_US16792166_OA_1-25-2021.pdf	293148 08a83a98aa31e52baa38481838d51adedcb8840a	no	8
Warnings:					
Information:					
10	Fee Worksheet (SB06)	fee-info.pdf	30888 89669d2673ff7e31fd108e4c8a4ff3f1a855c8d5	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	11469192	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/30 (11-17)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Request for Continued Examination (RCE) Transmittal

Address to:
Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Application Number	16/121,546
Filing Date	September 4, 2018
First Named Inventor	Geonjung Ko
Art Unit	2469
Examiner Name	Tang, Kiet G
Attorney Docket Number	B-9587CON 631613-2

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. See Instruction Sheet for RCEs (not to be submitted to the USPTO) on page 2.

1. Submission required under 37 CFR 1.114 Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

   a. ☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

      i. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

      ii. ☐ Other _____

   b. ☑ Enclosed

      i. ☐ Amendment/Reply

      ii. ☐ Affidavit(s)/ Declaration(s)

      iii. ☑ Information Disclosure Statement (IDS)

      iv. ☐ Other _____

2. Miscellaneous

   a. ☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

   b. ☐ Other _____

3. Fees The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

   a. ☑ The Director is hereby authorized to charge the following fees, any underpayment of fees, or credit any overpayments, to Deposit Account No. 12-0415.

      i. ☑ RCE fee required under 37 CFR 1.17(e)

      ii. ☐ Extension of time fee (37 CFR 1.136 and 1.17)

      iii. ☐ Other _____

   b. ☐ Check in the amount of $ _____ enclosed

   c. ☐ Payment by credit card (Form PTO-2038 enclosed)

   d. ■ Payment by EFS-Web

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Signature	/Young Seok Koo 76255/	Date	July 5, 2021
Name (Print/Type)	Young Seok Koo	Registration No.	76255

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being EFS-Web transmitted to the United States Patent and Trademark Office (USPTO), deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450 or facsimile transmitted to the USPTO on the date shown below.

Signature	/Azatuhi Chinaryan/		
Name (Print/Type)	Azayuhi Chinaryan	Date	July 5, 2021

This collection of information is required by 37 CFR 1.114. 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: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

Privacy Act Statement

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

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

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

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

158747 7590 05/14/2021

LADAS & PARRY
E-MAIL
4525 WILSHIRE BOULEVARD
SUITE 240
LOS ANGELES, CA 90010

EXAMINER
TANG, KIET G

ART UNIT	PAPER NUMBER
2469	

DATE MAILED: 05/14/2021

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/121,546	09/04/2018	Geonjung KO	B-9587CON 631613-2	9775

TITLE OF INVENTION: WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET

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	$1200.00	$0	08/16/2021

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

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

HOW TO REPLY TO THIS NOTICE:

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

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

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

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

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

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

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

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)

158747 7590 05/14/2021
LADAS & PARRY
E-MAIL
4525 WILSHIRE BOULEVARD
SUITE 240
LOS ANGELES, CA 90010

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

Certificate of Mailing or Transmission

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/121,546	09/04/2018	Geonjung KO	B-9587CON 631613-2	9775

TITLE OF INVENTION: WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET

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	$1200.00	$0	08/16/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
TANG, KIET G	2469	370-338000

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

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

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

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

1 _____
2 _____
3 _____

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

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

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

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

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

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

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

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

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

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

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

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

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/121,546	09/04/2018	Geonjung KO	B-9587CON 631613-2	9775

158747 7590 05/14/2021

LADAS & PARRY
E-MAIL
4525 WILSHIRE BOULEVARD
SUITE 240
LOS ANGELES, CA 90010

EXAMINER	
TANG, KIET G	

ART UNIT	PAPER NUMBER
2469	

DATE MAILED: 05/14/2021

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

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

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

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

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

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

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

Privacy Act Statement

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

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

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

Notice of Allowability	Application No. 16/121,546	Applicant(s) KO et al.	
	Examiner KIET TANG	Art Unit 2469	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 05/05/2021.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

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

3. ☑ The allowed claim(s) is/are See Continuation Sheet . 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 05/05/2021.
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 _____.

/KIET TANG/
Primary Examiner, Art Unit 2469

Continuation of 3. The allowed claim(s) is/are: 21-36 which have been renumbered as claims 1-16

DETAILED ACTION

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

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 05/05/2021 has been entered.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 05/05/2021 was filed after the mailing date of the Notice of Allowance and Fees Due on 01/13/2021. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Allowable Subject Matter

3. **Claims 21-36** are allowed.

4. 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

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KIET TANG whose telephone number is (571)270-7193. The examiner can normally be reached on M-F 8:00-5:00.

6. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, IAN MOORE can be reached on (571) 272-3085. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

7. 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.

/KIET TANG/

Primary Examiner, Art Unit 2469

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/121,546	KO et al.
	Examiner	Art Unit
	KIET TANG	2469

✓	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	03/02/2020	08/31/2020	01/02/2021	05/08/2021					
	1		-	-	-					
	2	-	-	-	-					
	3	-	-	-	-					
	4	-	-	-	-					
	5	-	-	-	-					
	6	-	-	-	-					
	7	-	-	-	-					
	8	-	-	-	-					
	9	-	-	-	-					
	10	-	-	-	-					
	11	-	-	-	-					
	12	-	-	-	-					
	13	-	-	-	-					
	14	-	-	-	-					
	15	-	-	-	-					
	16	-	-	-	-					
	17	-	-	-	-					
	18	-	-	-	-					
	19	-	-	-	-					
	20	-	-	-	-					
1	21	✓	✓	=	=					
2	22	✓	✓	=	=					
3	23	✓	✓	=	=					
4	24	✓	✓	=	=					
5	25	✓	✓	=	=					
6	26	✓	✓	=	=					
7	27	✓	✓	=	=					
8	28	✓	✓	=	=					
9	29	✓	✓	=	=					
10	30	✓	✓	=	=					
11	31	✓	✓	=	=					
12	32	✓	✓	=	=					
13	33	✓	✓	=	=					
14	34	✓	✓	=	=					
15	35	✓	✓	=	=					
16	36	✓	✓	=	=					

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/121,546	KO et al.
	Examiner	Art Unit
	KIET TANG	2469

CPC						
Symbol					Type	Version
H04W	/	72	/	0453	F	2013-01-01
H04W	/	74	/	002	I	2013-01-01
H04W	/	48	/	18	I	2013-01-01
H04W	/	24	/	02	A	2013-01-01
H04W	/	88	/	06	A	2013-01-01
H04W	/	84	/	12	A	2013-01-01

CPC Combination Sets								
Symbol					Type	Set	Ranking	Version
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	16	
/KIET TANG/ Primary Examiner, Art Unit 2469	08 May 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20210508

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/121,546	KO et al.
	Examiner	Art Unit
	KIET TANG	2469

INTERNATIONAL CLASSIFICATION					
CLAIMED					
H04W	/	72	/	04	

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS

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

NONE (Assistant Examiner)	(Date)	Total Claims Allowed: 16	
/KIET TANG/ Primary Examiner, Art Unit 2469 (Primary Examiner)	08 May 2021 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1

U.S. Patent and Trademark Office — Part of Paper No.: 20210508

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/121,546	KO et al.
	Examiner	Art Unit
	KIET TANG	2469

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

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		10		19	8	28								
	2		11		20	9	29								
	3		12	1	21	10	30								
	4		13	2	22	11	31								
	5		14	3	23	12	32								
	6		15	4	24	13	33								
	7		16	5	25	14	34								
	8		17	6	26	15	35								
	9		18	7	27	16	36								

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	16	
/KIET TANG/ Primary Examiner, Art Unit 2469	08 May 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20210508

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/121,546	KO et al.
	Examiner	Art Unit
	KIET TANG	2469

CPC - Searched*		
Symbol	Date	Examiner
H04W72/0453 or H04W48/18 or H04W74/002 or H04W84/12 or H04W88/06 or H04W24/02 or H04W74/0841 or H04W74/0825 or H04W28/06 or H04L27/2601 or H04B7/2612	03/02/2020 (Updated on 08/31/20, 01/02/21, 05/08/21)	KT

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
Inventor and assignee search in East and PALM	03/02/2020 (Updated on 08/31/20, 01/02/21, 05/08/21)	KT
IP.com Search	01/02/2021 (Updated on 05/08/21)	KT

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
	Inventor and assignee search in East and PALM	01/02/2021 (Updated on 05/08/21)	KT

EAST Search History

EAST Search History (Interference) /K.T./ /K.T./ /K.T./

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S196	3	(PLCP PPDU perform$4 operation BSS color information indicat$4 allow$4).clm.	US-PGPUB; USPAT	AND	ON	2021/05/08 12:57

5/8/2021 1:00:27 PM
C:\Users\ktang2\Documents\EAST\Workspaces\16 121 546.wsp

May 4, 2021

Form PTO-1449 (Modified) Page 1 of 1	ATTY DOCKET NO. B-9587CON 631613-2	U.S. SERIAL NO. 16/121,546
LIST OF PATENTS AND PUBLICATIONS STATEMENT	APPLICANT WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	FILING DATE September 4, 2018
		GROUP NO. 2469

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	ISSUE/PUBL. DATE	NAME	CLASS	SUB-CLASS	REMARKS
	1.	2020/0221088	Jul. 9, 2020	Tourapis			
	2.	2018/0270863	Sep. 20, 2018	Oteri et al.			
	3.	2018/0270038	Sep. 20, 2018	Oteri et al.			
	4.	2018/0242394	Aug. 23, 2018	Wong et al.			
	5.	2017/0048785	Feb. 16, 2017	GE et al.			
	6.	2016/0157195	Jun. 2, 2016	Wang et al.			
	7.	2013/0121293	May 16, 2013	Surineni et al.			
	8.	2006/0085543	Apr. 20, 2006	Hrastar et al.			
	9.	2016/0050691	Feb. 18, 2016	Jauh et al.			

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY	CLASS	SUB-CLASS	TRANSLATION
	10.	2015/061472	Apr. 30, 2015	WO			
	11.	103081539	May 1, 2013	CN			Espacenet
	12.	102844999	Dec. 26, 2012	CN			Espacenet
	13.	103348742	Oct. 9, 2013	CN			Espacenet
	14.	103918346	Jul. 9, 2014	CN			Espacenet
	15.	103052077	Apr. 17, 2013	CN			Espacenet
	16.	105075378	Nov. 18, 2015	CN			Espacenet
	17.	10-2015-0073855	Jul. 1, 2015	KR			KIPRIS
	18.	2548316	Jan. 23, 2013	EP			
	19.	2011287	Jan. 7, 2009	EP			
	20.	2015/050311	Apr. 9, 2015	WO			Espacenet
	21.	2015/011278	Jan. 29, 2015	WO			

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /K.T./

May 4, 2021

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT
	22.	Office Action dated October 12, 2020 for Chinese Patent Application No. 201680061366.7 and its English translation provided by Applicant's foreign counsel
	23.	Office Action dated January 25, 2021 for U.S. Patent Application No. 16/792,163
	24.	Notice of Allowance dated April 28, 2021 for U.S. Patent Application No. 16/792,163
	25.	Office Action dated January 25, 2021 for Chinese Patent Application No. 201680071981.6 and its English translation provided by Applicant's foreign counsel
	26.	Office Action dated March 17, 2021 for Korean Patent Application No. 10-2018-7025837 and its English translation provided by Applicant's foreign counsel
	27.	Office Action dated March 23, 2021 for Indian Patent Application No. 201827021492
	28.	Office Action dated April 5, 2021 for Indian Patent Application No. 201827033017
	29.	Notice of Grant dated March 17, 2021 for Korean Patent Application No. 10-2020-7028167 and its English translation provided by Applicant's foreign counsel
	30.	Notice of Grant dated March 17, 2021 for Korean Patent Application No. 10-2020-7028169 and its English translation provided by Applicant's foreign counsel

EXAMINER	*DATE CONSIDERED*
/KIET TANG/	05/08/2021

EXAMINER: Initial if reference 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. /K.T./

EAST Search History

EAST Search History (Prior Art) /K.T./ /K.T./ /K.T./

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S157	9	("20060085543" | "20130121293" | "20160050691" | "20160157195" | "20170048785" | "20180242394" | "20180270038" | "20180270863" | "20200221088").PN.	US-PGPUB; USPAT	OR	ON	2021/05/08 10:19
S158	79,131	((Basic near2 Service near2 Set) (BSS))	US-PGPUB; USPAT	OR	ON	2021/05/08 10:19
S159	8	S157 and S158	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 10:20
S160	106	((("WILUS") near3 ("INSTITUTE") near3 ("OF") near3 ("STANDARDS") near3 ("AND") near3 ("TECHNOLOGY") near3 ("INC"))).AS,AANM.	USPAT	OR	ON	2021/05/08 10:21
S161	722	((("SK") near3 ("TELECOM") near3 ("CO") near3 ("LTD"))).AS,AANM.	USPAT	OR	ON	2021/05/08 10:21
S162	137	((("KO") near3 ("Geonjung"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2021/05/08 10:21
S163	305	((("SON") near3 ("Juhyung"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2021/05/08 10:21
S164	117	((("AHN") near3 ("Woojin"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2021/05/08 10:21
S165	481	((("KWAK") near3 ("Jinsam"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2021/05/08 10:21
S166	3,314	((Basic and Service and Set) (BSS)).clm.	USPAT	OR	ON	2021/05/08 10:21
S167	19	S166 and S160	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 10:25
S168	17	S166 and S161	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2021/05/08 10:25

			DERWENT; IBM_TDB			
S169	15	S166 and S162	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 10:26
S170	19	S166 and S163	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 10:26
S171	11	S166 and S164	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 10:26
S172	35	S166 and S165	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 10:26
S173	178	(((Basic and Service and Set) BSS) near3 color) same PPDU	USPAT	OR	ON	2021/05/08 10:28
S174	112	S173 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 10:28
S175	365,588	(H04W72/0453 or H04W48/18 or H04W74/002 or H04W84/12 or H04W88/06 or H04W24/02 or H04W74/0841 or H04W74/0825 or H04W28/06 or H04L27/2601 or H04B7/2612).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 10:28
S176	99	S174 and S175	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 10:28
S177	104	(((Basic adj Service adj Set) (BSS)) with color) with allow$4	US-PGPUB; USPAT	OR	ON	2021/05/08 10:32

S178	39	S177 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 10:33
S179	34	S178 and S175	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 10:33
S180	735	(((Basic adj Service adj Set) (BSS)) with color) with (us$4 perform$4)	US-PGPUB; USPAT	OR	ON	2021/05/08 10:43
S181	395	S180 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 10:43
S182	293	S181 and S175	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 10:43
S183	39	S177 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 10:48
S184	81,560	(H04W74$4).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 12:49
S185	11	S183 and S184	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 12:49
S186	60,471	(H04W72/0453).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2021/05/08 12:51

			DERWENT; IBM_TDB			
S187	482	address adj field$1 with (mac adj frame)	US-PGPUB; USPAT	OR	ON	2021/05/08 12:51
S188	408	S187 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 12:51
S189	7	S188 and S186	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 12:51
S190	237	(((Basic and Service and Set) (BSS)) adj color) with (information)	USPAT	OR	ON	2021/05/08 12:53
S191	128	S190 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 12:53
S192	113	S191 and S175	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 12:54
S193	391	(((Basic adj Service adj Set) (BSS)) adj color)	USPAT	OR	ON	2021/05/08 12:55
S194	220	S193 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 12:56
S195	177	S194 and S175	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/05/08 12:56

5/8/2021 1:00:10 PM
C:\Users\ktang2\Documents\EAST\Workspaces\16 121 546.wsp

Bibliographic Data

Application No: 16/121,546

Foreign Priority claimed: ◉ Yes ○ No

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

Verified and Acknowledged: _____ K.T.

Examiner's Signature | Initials

Title: WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
09/04/2018	370	2469	
RULE			

APPLICANTS

WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC., Gyeonggi-do, KOREA, REPUBLIC OF

SK TELECOM CO., LTD., Seoul, KOREA, REPUBLIC OF

INVENTORS

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Jinsam KWAK, Gyeonggi-do, KOREA, REPUBLIC OF

CONTINUING DATA

This application is a CON of PCT/KR2017/002407 03/06/2017

FOREIGN APPLICATIONS

KOREA, REPUBLIC OF KR10-2016-0026684 03/04/2016

KOREA, REPUBLIC OF KR10-2016-0029975 03/12/2016

KOREA, REPUBLIC OF KR10-2016-0044465 04/11/2016

KOREA, REPUBLIC OF KR10-2016-0057597 05/11/2016

KOREA, REPUBLIC OF KR10-2016-0114821 09/07/2016

IF REQUIRED, FOREIGN LICENSE GRANTED**

10/10/2018

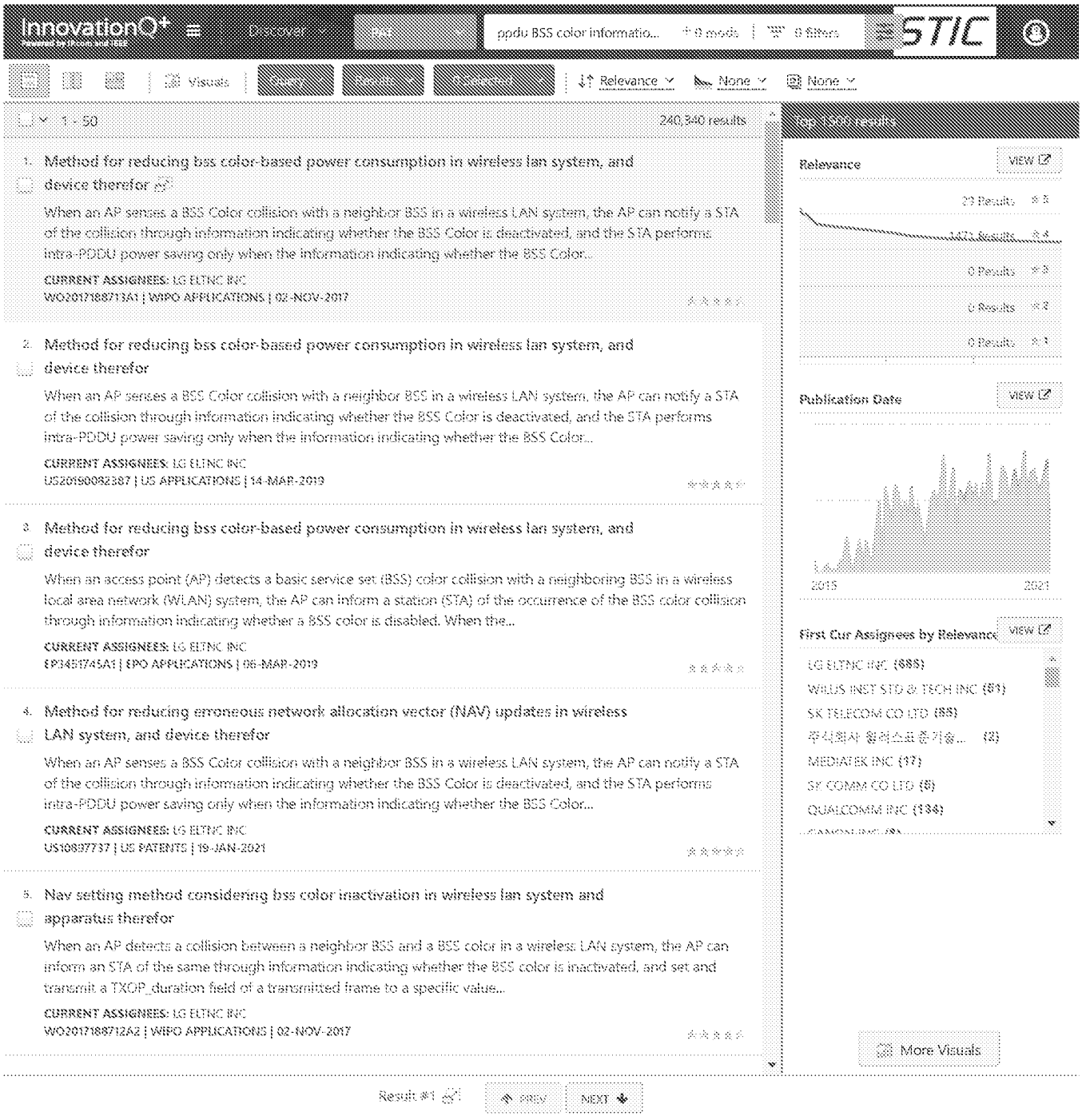
STATE OR COUNTRY

KOREA, REPUBLIC OF

ADDRESS

FILING FEE RECEIVED

$1,720


InnovationQ+
Discover
Patents
ppdu BSS color informatio...
0 modifiers
0 filters
STIC
Visuals
Claims
Results
0 selected
Relevance
None
None
1 - 50
240,340 results
1. Method for reducing bss color-based power consumption in wireless lan system, and device therefor
When an AP senses a BSS Color collision with a neighbor BSS in a wireless LAN system, the AP can notify a STA of the collision through information indicating whether the BSS Color is deactivated, and the STA performs intra-PDDU power saving only when the information indicating whether the BSS Color...
CURRENT ASSIGNEES: LG ELTNC INC
WO2017188713A1 | WIPO APPLICATIONS | 02-NOV-2017
2. Method for reducing bss color-based power consumption in wireless lan system, and device therefor
When an AP senses a BSS Color collision with a neighbor BSS in a wireless LAN system, the AP can notify a STA of the collision through information indicating whether the BSS Color is deactivated, and the STA performs intra-PDDU power saving only when the information indicating whether the BSS Color...
CURRENT ASSIGNEES: LG ELTNC INC
US20190082387 | US APPLICATIONS | 14-MAR-2019
3. Method for reducing bss color-based power consumption in wireless lan system, and device therefor
When an access point (AP) detects a basic service set (BSS) color collision with a neighboring BSS in a wireless local area network (WLAN) system, the AP can inform a station (STA) of the occurrence of the BSS color collision through information indicating whether a BSS color is disabled. When the...
CURRENT ASSIGNEES: LG ELTNC INC
EP3451745A1 | EPO APPLICATIONS | 06-MAR-2019
4. Method for reducing erroneous network allocation vector (NAV) updates in wireless LAN system, and device therefor
When an AP senses a BSS Color collision with a neighbor BSS in a wireless LAN system, the AP can notify a STA of the collision through information indicating whether the BSS Color is deactivated, and the STA performs intra-PDDU power saving only when the information indicating whether the BSS Color...
CURRENT ASSIGNEES: LG ELTNC INC
US10897737 | US PATENTS | 19-JAN-2021
5. Nav setting method considering bss color inactivation in wireless lan system and apparatus therefor
When an AP detects a collision between a neighbor BSS and a BSS color in a wireless LAN system, the AP can inform an STA of the same through information indicating whether the BSS color is inactivated, and set and transmit a TXOP_duration field of a transmitted frame to a specific value...
CURRENT ASSIGNEES: LG ELTNC INC
WO2017188712A2 | WIPO APPLICATIONS | 02-NOV-2017
Top 1,000 results
Relevance
VIEW
23 Results
1473 Results
0 Results
0 Results
0 Results
Publication Date
VIEW
2015
2021
First Cur Assignees by Relevance
VIEW
LG ELTNC INC (885)
WILUS INST STD & TECH INC (81)
SK TELECOM CO LTD (85)
주식회사 윌러스표준기술... (2)
MEDIATEK INC (17)
SK COMM CO LTD (8)
QUALCOMM INC (134)
More Visuals
Result #1
PREV
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PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/121,546	Filing Date 09/04/2018	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	05/05/2021	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 16	Minus	** 20	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0		x $480 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/JACQUELYN L WILLIAMS/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

Form PTO-1449 (Modified) Page 1 of 1	ATTY DOCKET NO. B-9587CON 631613-2	U.S. SERIAL NO. 16/121,546
LIST OF PATENTS AND PUBLICATIONS STATEMENT	APPLICANT WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	FILING DATE September 4, 2018
		GROUP NO. 2469

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	ISSUE/PUBL. DATE	NAME	CLASS	SUB-CLASS	REMARKS
	1.	2020/0221088	Jul. 9, 2020	Tourapis			
	2.	2018/0270863	Sep. 20, 2018	Oteri et al.			
	3.	2018/0270038	Sep. 20, 2018	Oteri et al.			
	4.	2018/0242394	Aug. 23, 2018	Wong et al.			
	5.	2017/0048785	Feb. 16, 2017	GE et al.			
	6.	2016/0157195	Jun. 2, 2016	Wang et al.			
	7.	2013/0121293	May 16, 2013	Surineni et al.			
	8.	2006/0085543	Apr. 20, 2006	Hrastar et al.			
	9.	2016/0050691	Feb. 18, 2016	Jauh et al.			

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY	CLASS	SUB-CLASS	TRANSLATION
	10.	2015/061472	Apr. 30, 2015	WO			
	11.	103081539	May 1, 2013	CN			Espacenet
	12.	102844999	Dec. 26, 2012	CN			Espacenet
	13.	103348742	Oct. 9, 2013	CN			Espacenet
	14.	103918346	Jul. 9, 2014	CN			Espacenet
	15.	103052077	Apr. 17, 2013	CN			Espacenet
	16.	105075378	Nov. 18, 2015	CN			Espacenet
	17.	10-2015-0073855	Jul. 1, 2015	KR			KIPRIS
	18.	2548316	Jan. 23, 2013	EP			
	19.	2011287	Jan. 7, 2009	EP			
	20.	2015/050311	Apr. 9, 2015	WO			Espacenet
	21.	2015/011278	Jan. 29, 2015	WO			

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OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT
	22.	Office Action dated October 12, 2020 for Chinese Patent Application No. 201680061366.7 and its English translation provided by Applicant's foreign counsel
	23.	Office Action dated January 25, 2021 for U.S. Patent Application No. 16/792,163
	24.	Notice of Allowance dated April 28, 2021 for U.S. Patent Application No. 16/792,163
	25.	Office Action dated January 25, 2021 for Chinese Patent Application No. 201680071981.6 and its English translation provided by Applicant's foreign counsel
	26.	Office Action dated March 17, 2021 for Korean Patent Application No. 10-2018-7025837 and its English translation provided by Applicant's foreign counsel
	27.	Office Action dated March 23, 2021 for Indian Patent Application No. 201827021492
	28.	Office Action dated April 5, 2021 for Indian Patent Application No. 201827033017
	29.	Notice of Grant dated March 17, 2021 for Korean Patent Application No. 10-2020-7028167 and its English translation provided by Applicant's foreign counsel
	30.	Notice of Grant dated March 17, 2021 for Korean Patent Application No. 10-2020-7028169 and its English translation provided by Applicant's foreign counsel

EXAMINER	*DATE CONSIDERED*

EXAMINER: Initial if reference 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.

Doc Code: PET.AUTO Document Description: Petition automatically granted by EFS-Web	PTO/SB/140 U.S. Patent and Trademark Office Department of Commerce

Electronic Petition Request	**PETITION TO WITHDRAW AN APPLICATION FROM ISSUE AFTER PAYMENT OF THE ISSUE FEE UNDER 37 CFR 1.313(c)**
Application Number	16121546
Filing Date	04-Sep-2018
First Named Inventor	Geonjung KO
Art Unit	2469
Examiner Name	KIET TANG
Attorney Docket Number	B-9587CON 631613-2
Title	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET

An application may be withdrawn from issue for further action upon petition by the applicant. To request that the Office withdraw an application from issue, applicant must file a petition under this section including the fee set forth in § 1.17(h) and a showing of good and sufficient reasons why withdrawal of the application from issue is necessary.

APPLICANT HEREBY PETITIONS TO WITHDRAW THIS APPLICATION FROM ISSUE UNDER 37 CFR 1.313(c).

A grantable petition requires the following items:
(1) Petition fee; and
(2) One of the following reasons:
(a) Unpatentability of one or more claims, which must be accompanied by an unequivocal statement that one or more claims are unpatentable, an amendment to such claim or claims, and an explanation as to how the amendment causes such claim or claims to be patentable;
(b) Consideration of a request for continued examination in compliance with § 1.114 (for a utility or plant application only); or
(c) Express abandonment of the application. Such express abandonment may be in favor of a continuing application, but not a CPA under 37 CFR 1.53(d).

Petition Fee

- ○ Small Entity
- ○ Micro Entity
- ◉ Regular Undiscounted

Reason for withdrawal from issue

◯ One or more claims are unpatentable ◉ Consideration of a request for continued examination (RCE) (List of Required Documents and Fees) ◯ Applicant hereby expressly abandons the instant application (any attorney/agent signing for this reason must have power of attorney pursuant to 37 CFR 1.32(b)).
RCE request,submission, and fee. ☐ I certify, in accordance with 37 CFR 1.4(d)(4) that : The RCE request ,submission, and fee have already been filed in the above-identified application on ☒ Are attached.
THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES I certify, in accordance with 37 CFR 1.4(d)(4) that I am: ◉ An attorney or agent registered to practice before the Patent and Trademark Office who has been given power of attorney in this application. ◯ An attorney or agent registered to practice before the Patent and Trademark Office, acting in a representative capacity. ◯ A sole inventor ◯ A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application ◯ A joint inventor; all of whom are signing this e-petition

Signature	/Young Seok Koo 76255/
Name	Young Seok Koo
Registration Number	76255

Electronic Patent Application Fee Transmittal

Application Number:	16121546
Filing Date:	04-Sep-2018
Title of Invention:	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET
First Named Inventor/Applicant Name:	Geonjung KO
Filer:	Young Seok Koo
Attorney Docket Number:	B-9587CON 631613-2

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
PETITION FEE- 37 CFR 1.17(H) (GROUP III)	1464	1	140	140
RCE- 1ST REQUEST	1801	1	1360	1360
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1500**

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Decision Date : May 5, 2021

In re Application of :

Geonjung KO

DECISION ON PETITION
UNDER CFR 1.313(c)(2)

Application No : 16121546

Filed : 04-Sep-2018

Attorney Docket No : B-9587CON 631613-2

This is an electronic decision on the petition under 37 CFR 1.313(c)(2), filed May 5, 2021 , to withdraw the above-identified application from issue after payment of the issue fee.

The petition is **GRANTED.**

The above-identified application is withdrawn from issue for consideration of a submission under 37 CFR 1.114 (request for continued examination). See 37 CFR 1.313(c)(2).

Petitioner is advised that the issue fee paid in this application cannot be refunded. If, however, this application is again allowed, petitioner may request that it be applied towards the issue fee required by the new Notice of Allowance.

Telephone inquiries concerning this decision should be directed to the Patent Electronic Business Center (EBC) at 866-217-9197.

This application file is being referred to Technology Center AU 2469 for processing of the request for continuing examination under 37 CFR 1.114 .

Office of Petitions

Electronic Acknowledgement Receipt	
EFS ID:	42638837
Application Number:	16121546
International Application Number:	
Confirmation Number:	9775
Title of Invention:	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET
First Named Inventor/Applicant Name:	Geonjung KO
Customer Number:	158747
Filer:	Young Seok Koo
Filer Authorized By:	
Attorney Docket Number:	B-9587CON 631613-2
Receipt Date:	05-MAY-2021
Filing Date:	04-SEP-2018
Time Stamp:	02:25:01
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1500
RAM confirmation Number	E202155324501049
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	Request for Continued Examination (RCE)	2021-05-04_631613_RCE_Transmittal1.pdf	200587 e7511b93f9f84b6789c4b53d23785c74ad35f720	no	2
Warnings:					
This is not a USPTO supplied RCE SB30 form.					
Information:					
2	Other Reference-Patent/App/Search documents	Ref1_CN2016800613667_OA_10-12-2020.pdf	6228469 42dc5b61959bda1ad073feb57fd1b22376b8375e	no	14
Warnings:					
Information:					
3	Foreign Reference	Ref2_WO2015-061472A1.pdf	1696875 385d9532c886679ba21b624b1ddc5b0d5a8ad99d	no	35
Warnings:					
Information:					
4	Foreign Reference	Ref3_CN103081539A.pdf	789618 979a3ee186700c68980a07b560de2edb0225a70c	no	19
Warnings:					
Information:					
5	Other Reference-Patent/App/Search documents	Ref4_US16792163_OA_1-25-2021.pdf	284891 44319df1b84649129c0a834a21cf0da6070b6e2d	no	8
Warnings:					
Information:					
6	Other Reference-Patent/App/Search documents	Ref4-1_US16792163_NOA_4-28-21.pdf	359036 bb7b23f672ba8d6e5e227b2d18bb75c10d2ad474	no	5
Warnings:					

Information:					
7	Other Reference-Patent/App/Search documents	Ref12_CN2016800719816_OA_1-25-21.pdf	2092171 c5908e468b8615905cc0ca4f84339be90725ee19	no	25
Warnings:					
Information:					
8	Foreign Reference	Ref13_CN102844999A.pdf	4353063 f2e67f56bb55d7bf400889775c77c55c2ccc368a	no	82
Warnings:					
Information:					
9	Foreign Reference	Ref14_CN103348742A.pdf	3301857 ffa48317374e1e5c246f882ab30ea3b033594568	no	96
Warnings:					
Information:					
10	Foreign Reference	Ref15_CN103918346A.pdf	2024187 e6e1c8e88db1e9dc719309003d592f12217783d7	no	59
Warnings:					
Information:					
11	Foreign Reference	Ref17_CN105075378A.pdf	2960521 824a52fa59b19f8db733fe08c1b65fd2ea888f09	no	79
Warnings:					
Information:					
12	Other Reference-Patent/App/Search documents	Ref19_KR10-2018-7025837_OA_3-17-2021.pdf	229458 ab5c37df2020671c96452382f43f55fd88f04682	no	9
Warnings:					
Information:					
13	Foreign Reference	Ref20_KR10-2015-0073855.pdf	1696730 6542ef4355de5e0c0398c4d8b963e2d7fac11465	no	58
Warnings:					
Information:					

14	Other Reference-Patent/App/Search documents	Ref21_IN201827021492_OA_3-23-21.pdf	218099 e1855a164ab4518c675000d1f8ca92061e3d1782	no	5
Warnings:					
Information:					
15	Foreign Reference	Ref23_EP2548316.pdf	389667 7e822a09c383285e17640cab7114871c6d338eca	no	34
Warnings:					
Information:					
16	Foreign Reference	Ref24_EP2011287A2.pdf	403565 5f61341b3ca886eff45894e6183d3a972026fc15	no	40
Warnings:					
Information:					
17	Foreign Reference	Ref26_WO2015050311A1.pdf	2997393 9a45b218bef62ca4e67e003d9b22b58a50ae3645	no	102
Warnings:					
Information:					
18	Other Reference-Patent/App/Search documents	Ref27_KR10-2020-7028167_NOA_3-17-2021.pdf	357432 e1e7d3040054d172baffc0dedda2d2ac699b0d2d	no	8
Warnings:					
Information:					
19	Other Reference-Patent/App/Search documents	Ref28_KR10-2020-7028169_NOA_3-17-2021.pdf	357342 84096d2429e77e7026c7efef457700f7fc0cca81	no	8
Warnings:					
Information:					
20	Foreign Reference	Ref29_WO2015-011278A1.pdf	1329039 f6a14a44f8883cd366d330426636c3bbaa25023d	no	23
Warnings:					
Information:					

21	Foreign Reference	Ref16_CN103052077A.pdf	537000 c1ff14c4a97abeb5b0e88ee669f87745f662f02b	no	15
Warnings:					
Information:					
22	Other Reference-Patent/App/Search documents	Ref25_IN201827033017_OA_4-5-21.pdf	217724 dc4e943139c0a85065cfc481bd17db5364cd3d86	no	5
Warnings:					
Information:					
23		2021-05-04_631613_IDS.pdf	161394 85ac37a095b21cc47869856e83b35c6acb9c94f2	yes	5
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Transmittal Letter		1	3	
	Information Disclosure Statement (IDS) Form (SB08)		4	5	
Warnings:					
Information:					
24	Petition automatically granted by EFS	petition-request.pdf	31610 99e0cd12b73a7be30bf4062019400f50cff18343	no	2
Warnings:					
Information:					
25	Fee Worksheet (SB06)	fee-info.pdf	32295 28cfe803c0c391afbef1c5284a8c5e3f51858be1	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	33250023		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/30 (11-17)
Approved for use through 11/30/2020. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Request for Continued Examination (RCE) Transmittal

Address to:
Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Application Number	16/121,546
Filing Date	September 4, 2018
First Named Inventor	Geonjung KO
Art Unit	2469
Examiner Name	Tang, Kiet G
Attorney Docket Number	B-9587CON 631613-2

This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. See Instruction Sheet for RCEs (not to be submitted to the USPTO) on page 2.

1. Submission required under 37 CFR 1.114 Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

   a. ☐ Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

      i. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed on _____

      ii. ☐ Other _____

   b. ☑ Enclosed

      i. ☐ Amendment/Reply

      ii. ☐ Affidavit(s)/ Declaration(s)

      iii. ☑ Information Disclosure Statement (IDS)

      iv. ☑ Other Petition to Withdraw from Issue

2. Miscellaneous

   a. ☐ Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

   b. ☐ Other _____

3. Fees The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.

   a. ☑ The Director is hereby authorized to charge the following fees, any underpayment of fees, or credit any overpayments, to Deposit Account No. 12-0415.

      i. ☑ RCE fee required under 37 CFR 1.17(e)

      ii. ☐ Extension of time fee (37 CFR 1.136 and 1.17)

      iii. ☐ Other _____

   b. ☐ Check in the amount of $ _____ enclosed

   c. ☐ Payment by credit card (Form PTO-2038 enclosed)

   d. ■ Payment by EFS-Web

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Signature	/Young Seok Koo 76,255/	Date	May 4, 2021
Name (Print/Type)	Young Seok Koo	Registration No.	76,255

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being EFS-Web transmitted to the United States Patent and Trademark Office (USPTO), deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450 or facsimile transmitted to the USPTO on the date shown below.

Signature	/Azatuhi Chinaryan/		
Name (Print/Type)	Azatuhi Chinaryan	Date	May 4, 2021

This collection of information is required by 37 CFR 1.114. 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: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**
If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

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

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

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	Examiner: Tang, Kiet G
Serial No.: 16/121,546	Art Unit: 2469
Filed: September 4, 2018	Conf. No.: 9775
For: WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET	Our Ref: B-9587CON 631613-2
Date: May 4, 2021	Re: ***Information Disclosure Statement***

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir/Madam:

This information disclosure statement is filed in accordance with 37 C.F.R. §§ 1.56, 1.97 and 1.98 to disclose information that may be relevant to the above-identified patent application. The Applicant requests the Examiner consider the documents listed on the enclosed form PTO-1449 (modified) in the examination of this application.

The filing of this Information Disclosure Statement (IDS) shall not be construed as a representation that a search has been made (37 C.F.R. 1.97(g)), an admission that the information cited is, or is considered to be, material to patentability, or that no other material information exists.

The filing of this Information Disclosure Statement shall not be construed as an admission against interest in any manner (37 C.F.R § 1.97(h)).

If any additional fee is required for this filing, the Applicant requests the Examiner contact a practitioner associated with the Customer Number listed below for authorization.

This information disclosure statement also includes the statements marked below. Failure to mark a statement should not be construed as a negative assertion.

Timing and Fees

This IDS is being filed:

[ ] Concurrently with the application, and no fee is due.

[ ] Within three months of the filing of the national application, other than a continued prosecution application under § 1.53(d), and no fee is due.

[ ] Within three months of the date of entry of the national stage as set forth in § 1.491 in an international application, and no fee is due.

[ ] Before the mailing of a first Office Action on the merits, and no fee is due.

[ ] Before the mailing of a first Office Action after the filing of a request for continued examination under§ 1.114, and no fee is due.

[ ] After the periods described above, and before a final Office Action under § 1.113, a Notice of Allowance under § 1.311, or an action that otherwise closes prosecution in the application, and is

- [ ] accompanied by the fee set forth in § 1.17(p), or
- [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(1): That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement; or
- [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(2): That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

[ ] After the periods described above, and is accompanied by the fee set forth in § 1.17(p), and is

- [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(1), that each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement; or

- [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(2), that no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

[x] Concurrently with a Request for Continued Examination, and no additional fee is due for this IDS.

Items Disclosed

At least one item listed on the enclosed form PTO-1449 (modified) was

[x] Cited in an Office Action for a related application, the application number of the related application and the issue date of the Office Action are provided below and the Office Action is enclosed.

May 4, 2021

Please see the enclosed form PTO-1449 (modified) for related application number(s) and issue date(s)

[ ] Cited in an International Search Report (ISR) or an International Preliminary Report on Patentability (IPRP) or a Written Opinion (WO) of the International Searching Authority (ISA) for the related PCT Application, the PCT application number and the issue date of the ISR/IPRP/WO are provided below and the ISR/IPRP/WO is enclosed.

Additional Information

[x] Translations of the foreign-language documents are also enclosed as machine-translations, human-translations, or counterpart applications as noted. Machine translations were provided by the Japanese Patent Office, ESPACENET, Google Documents, Patent Fetcher® /ESPACENET, Google Translate or Google Translator Toolkit as noted and with OCR by Adobe Acrobat 9 or ABBYY PDF Transformer 3 if needed.

[x] English-language abstracts of foreign-language documents are provided.

[x] Documents listed on the enclosed ISR/IPRP/WO or the Office Action have relevance at least as described therein.

[ ] The documents with the following reference numbers were described in the specification of the present application; omission of a reference from this list does not indicate that it was not discussed in the specification of the present application.

[x] At least one of the references cited in the Office Action listed on the attached PTO-1449 (modified) were previously submitted in an IDS or cited by the Examiner for the present application on September 4, 2018, September 20, 2019 and July 24, 2020 and therefore are not submitted in this IDS.

[ ] Other:

I hereby certify that this document is being transmitted to the Patent and Trademark Office via electronic filing.

May 4, 2021
(Date of Transmission)

Azatuhi Chinaryan
(Name of Person Transmitting)

/ Azatuhi Chinaryan /
(Signature)

Respectfully submitted,

/ Young Seok Koo 76,255 /

Young Seok Koo
Attorney for Applicant
Registration No. 76,255
LADAS & PARRY LLP
4525 Wilshire Blvd., Suite 240
Los Angeles, CA 90010
(323) 934-2300 voice

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/121,546	05/11/2021	11006414	B-9587CON 631613-2	9775

158747 7590 04/21/2021

LADAS & PARRY
E-MAIL
4525 WILSHIRE BOULEVARD
SUITE 240
LOS ANGELES, CA 90010

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

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

The Patent Term Adjustment is 44 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

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

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

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

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

Geonjung KO, Gyeonggi-do, KOREA, REPUBLIC OF;
WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC., Gyeonggi-do, KOREA, REPUBLIC OF;
Juhyung SON, Gyeonggi-do, KOREA, REPUBLIC OF;
SK TELECOM CO., LTD., Seoul, KOREA, REPUBLIC OF;
Woojin AHN, Gyeonggi-do, KOREA, REPUBLIC OF;
Jinsam KWAK, Gyeonggi-do, 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.

IR103 (Rev. 10/09)

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)

158747 7590 01/13/2021
LADAS & PARRY
E-MAIL
4525 Wilshire Boulevard
Suite 240
LOS ANGELES, CA 90010

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

Certificate of Mailing or Transmission

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/121,546	09/04/2018	Geonjung KO	B-9587CON 631613-2	9775

TITLE OF INVENTION: WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET

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	04/13/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
TANG, KIET G	2469	370-338000

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

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

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

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

1 Ladas & Parry, 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)
1. WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC.	GYEONGGI-DO, REPUBLIC OF KOREA
2. SK TELECOM CO., LTD.	SEOUL, REPUBLIC OF 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. 12-0415

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 /Young Seok Koo 76,255/ Date April 9, 2021

Typed or printed name Young Seok Koo Registration No. 76,255

Electronic Patent Application Fee Transmittal

Application Number:	16121546
Filing Date:	04-Sep-2018
Title of Invention:	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET
First Named Inventor/Applicant Name:	Geonjung KO
Filer:	Young Seok Koo/Lianne Herbert
Attorney Docket Number:	B-9587CON 631613-2

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:	42415473
Application Number:	16121546
International Application Number:	
Confirmation Number:	9775
Title of Invention:	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET
First Named Inventor/Applicant Name:	Geonjung KO
Customer Number:	158747
Filer:	Young Seok Koo/Lianne Herbert
Filer Authorized By:	Young Seok Koo
Attorney Docket Number:	B-9587CON 631613-2
Receipt Date:	09-APR-2021
Filing Date:	04-SEP-2018
Time Stamp:	15:14:41
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	E202149F15394576
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)	631613-IssueFee-Transmittal.pdf	104076 a79d59f50acc89cc48e414a538db7822fa923f4d	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30792 8cdcb9d1502e39a7e4bc3919099a4b5292d11782	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	134868		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

158747 7590 01/13/2021

LADAS & PARRY
E-MAIL
4525 Wilshire Boulevard
Suite 240
LOS ANGELES, CA 90010

EXAMINER
TANG, KIET G

ART UNIT	PAPER NUMBER
2469	

DATE MAILED: 01/13/2021

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/121,546	09/04/2018	Geonjung KO	B-9587CON 631613-2	9775

TITLE OF INVENTION: WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET

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	04/13/2021

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

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

HOW TO REPLY TO THIS NOTICE:

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

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

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

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

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

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

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

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)

158747 7590 01/13/2021
LADAS & PARRY
E-MAIL
4525 Wilshire Boulevard
Suite 240
LOS ANGELES, CA 90010

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

Certificate of Mailing or Transmission

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

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/121,546	09/04/2018	Geonjung KO	B-9587CON 631613-2	9775

TITLE OF INVENTION: WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET

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	04/13/2021

EXAMINER	ART UNIT	CLASS-SUBCLASS
TANG, KIET G	2469	370-338000

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

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

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

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

1 _____
2 _____
3 _____

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

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

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

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

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

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

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

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

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

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

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

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

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/121,546	09/04/2018	Geonjung KO	B-9587CON 631613-2	9775

158747 7590 01/13/2021

LADAS & PARRY
E-MAIL
4525 Wilshire Boulevard
Suite 240
LOS ANGELES, CA 90010

EXAMINER	
TANG, KIET G	
ART UNIT	PAPER NUMBER
2469	

DATE MAILED: 01/13/2021

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

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

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

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

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

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

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

Privacy Act Statement

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

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

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

Notice of Allowability	Application No. 16/121,546	Applicant(s) KO et al.	
	Examiner KIET TANG	Art Unit 2469	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 12/28/2020.
   ☐ 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 See Continuation Sheet . 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 10/26/2020.
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 _____.

/KIET TANG/
Primary Examiner, Art Unit 2469

Continuation of 3. The allowed claim(s) is/are: 21-36 which have been renumbered as claims 1-16

DETAILED ACTION

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. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

3. The arguments submitted on 12/28/2020 have been entered to the record.

Response to Arguments

4. Applicant's arguments, please see pages 2-6, filed on 12/28/2020, with respect to claims 21-36 have been fully considered and persuasive. The previous rejections have been withdrawn.

Allowable Subject Matter

5. **Claims 21-36** are allowed.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KIET TANG whose telephone number is (571)270-7193. The examiner can normally be reached on M-F 8:00-5:00.

7. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, IAN MOORE can be reached on (571) 272-3085. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

8. 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.

/KIET TANG/
Primary Examiner, Art Unit 2469

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/121,546	KO et al.
	Examiner	**Art Unit**
	KIET TANG	2469

✓	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	03/02/2020	08/31/2020	01/02/2021						
	1		-	-						
	2	-	-	-						
	3	-	-	-						
	4	-	-	-						
	5	-	-	-						
	6	-	-	-						
	7	-	-	-						
	8	-	-	-						
	9	-	-	-						
	10	-	-	-						
	11	-	-	-						
	12	-	-	-						
	13	-	-	-						
	14	-	-	-						
	15	-	-	-						
	16	-	-	-						
	17	-	-	-						
	18	-	-	-						
	19	-	-	-						
	20	-	-	-						
1	21	✓	✓	=						
2	22	✓	✓	=						
3	23	✓	✓	=						
4	24	✓	✓	=						
5	25	✓	✓	=						
6	26	✓	✓	=						
7	27	✓	✓	=						
8	28	✓	✓	=						
9	29	✓	✓	=						
10	30	✓	✓	=						
11	31	✓	✓	=						
12	32	✓	✓	=						
13	33	✓	✓	=						
14	34	✓	✓	=						
15	35	✓	✓	=						
16	36	✓	✓	=						

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/121,546	KO et al.
	Examiner	Art Unit
	KIET TANG	2469

CPC						
Symbol					Type	Version
H04W	/	72	/	0453	F	2013-01-01
H04W	/	74	/	002	I	2013-01-01
H04W	/	48	/	18	I	2013-01-01
H04W	/	24	/	02	A	2013-01-01
H04W	/	88	/	06	A	2013-01-01
H04W	/	84	/	12	A	2013-01-01

CPC Combination Sets							
Symbol					Type	Set	Ranking	Version
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	16	
/KIET TANG/ Primary Examiner, Art Unit 2469	02 January 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20210102

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/121,546	KO et al.
	Examiner	**Art Unit**
	KIET TANG	2469

INTERNATIONAL CLASSIFICATION					
CLAIMED					
H04W	/	72	/	04	
NON-CLAIMED					
	/		/		

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**

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

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	16	
/KIET TANG/ Primary Examiner, Art Unit 2469	02 January 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20210102

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/121,546	KO et al.
	Examiner	Art Unit
	KIET TANG	2469

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

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		10		19	8	28								
	2		11		20	9	29								
	3		12	1	21	10	30								
	4		13	2	22	11	31								
	5		14	3	23	12	32								
	6		15	4	24	13	33								
	7		16	5	25	14	34								
	8		17	6	26	15	35								
	9		18	7	27	16	36								

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	16	
/KIET TANG/ Primary Examiner, Art Unit 2469	02 January 2021	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office Part of Paper No.: 20210102

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/121,546	KO et al.
	Examiner	Art Unit
	KIET TANG	2469

CPC - Searched*		
Symbol	Date	Examiner
H04W72/0453 or H04W48/18 or H04W74/002 or H04W84/12 or H04W88/06 or H04W24/02 or H04W74/0841 or H04W74/0825 or H04W28/06 or H04L27/2601 or H04B7/2612	03/02/2020 (Updated on 08/31/20, 01/02/21)	KT

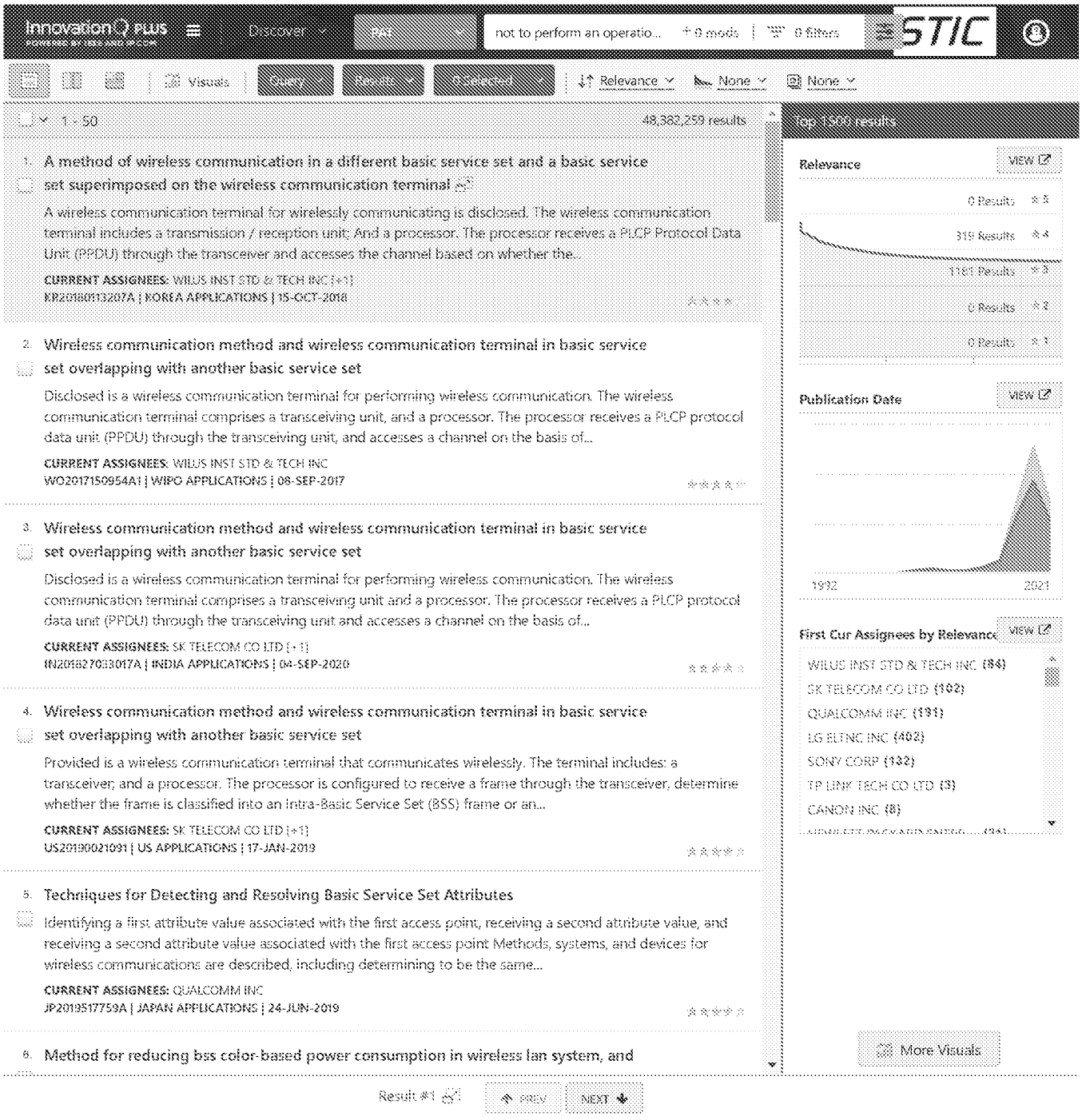
CPC Combination Sets - Searched*		
Symbol	Date	Examiner

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
Inventor and assignee search in East and PALM	03/02/2020 (Updated on 08/31/20, 01/02/21)	KT
IP.com Search	01/02/2021	KT

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
	Inventor and assignee search in East and PALM	01/02/2021	KT


Innovation PLUS
Discover
not to perform an operatio...
9 mods
0 filters
STIC
Visuals
Query
Results
0 selected
Relevance
None
None
1 - 50
48,382,259 results
Top 1,000 results
1. A method of wireless communication in a different basic service set and a basic service set superimposed on the wireless communication terminal
A wireless communication terminal for wirelessly communicating is disclosed. The wireless communication terminal includes a transmission / reception unit; And a processor. The processor receives a PLCP Protocol Data Unit (PPDU) through the transceiver and accesses the channel based on whether the...
CURRENT ASSIGNEES: WILUS INST STD & TECH INC [+1]
KR20180113207A | KOREA APPLICATIONS | 15-OCT-2018
2. Wireless communication method and wireless communication terminal in basic service set overlapping with another basic service set
Disclosed is a wireless communication terminal for performing wireless communication. The wireless communication terminal comprises a transceiving unit, and a processor. The processor receives a PLCP protocol data unit (PPDU) through the transceiving unit, and accesses a channel on the basis of...
CURRENT ASSIGNEES: WILUS INST STD & TECH INC
WO2017150954A1 | WIPO APPLICATIONS | 08-SEP-2017
3. Wireless communication method and wireless communication terminal in basic service set overlapping with another basic service set
Disclosed is a wireless communication terminal for performing wireless communication. The wireless communication terminal comprises a transceiving unit and a processor. The processor receives a PLCP protocol data unit (PPDU) through the transceiving unit and accesses a channel on the basis of...
CURRENT ASSIGNEES: SK TELECOM CO LTD [+1]
IN201827033017A | INDIA APPLICATIONS | 04-SEP-2020
4. Wireless communication method and wireless communication terminal in basic service set overlapping with another basic service set
Provided is a wireless communication terminal that communicates wirelessly. The terminal includes: a transceiver; and a processor. The processor is configured to receive a frame through the transceiver, determine whether the frame is classified into an Intra-Basic Service Set (BSS) frame or an...
CURRENT ASSIGNEES: SK TELECOM CO LTD [+1]
US20190021091 | US APPLICATIONS | 17-JAN-2019
5. Techniques for Detecting and Resolving Basic Service Set Attributes
Identifying a first attribute value associated with the first access point, receiving a second attribute value, and receiving a second attribute value associated with the first access point Methods, systems, and devices for wireless communications are described, including determining to be the same...
CURRENT ASSIGNEES: QUALCOMM INC
JP2019517759A | JAPAN APPLICATIONS | 24-JUN-2019
6. Method for reducing bss color-based power consumption in wireless lan system, and
Relevance
VIEW
0 Results
319 Results
1161 Results
0 Results
0 Results
Publication Date
VIEW
1932
2021
First Cur Assignees by Relevance
VIEW
WILUS INST STD & TECH INC (84)
SK TELECOM CO LTD (102)
QUALCOMM INC (191)
LG ELTNC INC (402)
SONY CORP (132)
TP LINK TECH CO LTD (3)
CANON INC (8)
More Visuals
Result #1
PREV
NEXT

October 26, 2020

Form PTO-1449 (Modified) Page 1 of 1	ATTY DOCKET NO. B-9587CON 631613-2	U.S. SERIAL NO. 16/121,546
LIST OF PATENTS AND PUBLICATIONS STATEMENT	APPLICANT WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	FILING DATE OR 371 (C) DATE September 4, 2018
		GROUP NO. 2469

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	ISSUE/PUBL. DATE	NAME	CLASS	SUB-CLASS	REMARKS
	1.	8,483,741	Jul. 9, 2013	Hussain et al.			

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY	CLASS	SUB-CLASS	TRANSLATION
	2.	2015/064943	May 7, 2015	WO			
	3.	10-2013-0005289	Jan. 15, 2013	KR			KIPRIS
	4.	2012/077859	Jun. 14, 2012	WO			Espacenet
	5.	2015/156616	Oct. 15, 2015	WO			Espacenet

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT
	6.	Office Action dated July 28, 2020 for Japanese Patent Application No. 2019-142262 and its English translation provided by Applicant's foreign counsel
	7.	Notice of Allowance dated July 24, 2020 for Korean Patent Application No. 10-2018-7010293 and its English translation provided by Applicant's foreign counsel

EXAMINER	*DATE CONSIDERED*
/KIET TANG/	01/02/2021

EXAMINER: Initial if reference 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. /K.T./

EAST Search History

EAST Search History (Prior Art) /K.T./ /K.T./ /K.T./

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S109	344	(((Basic and Service and Set) (BSS)) adj color)	USPAT	OR	ON	2020/12/22 00:08
S110	209	S109 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/12/22 00:09
S111	350,281	(H04W72/0453 or H04W48/18 or H04W74/002 or H04W84/12 or H04W88/06 or H04W24/02 or H04W74/0841 or H04W74/0825 or H04W28/06 or H04L27/2601 or H04B7/2612).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/12/22 00:09
S112	168	S110 and S111	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/12/22 00:09
S113	212	(((Basic and Service and Set) (BSS)) adj color) with (information)	USPAT	OR	ON	2020/12/22 00:10
S114	121	S113 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/12/22 00:10
S115	31	(((Basic and Service and Set) (BSS)) adj color) with (allow$4)	USPAT	OR	ON	2020/12/22 00:15
S116	15	S115 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/12/22 00:15
S117	200	(((Basic and Service and Set) (BSS)) adj color) with (use used using)	USPAT	OR	ON	2020/12/22 00:18
S118	120	S117 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO;	OR	ON	2020/12/22 00:18

			JPO; DERWENT; IBM_TDB			
S119	20	(((Basic and Service and Set) (BSS)) adj color) with (threshold)	USPAT	OR	ON	2020/12/22 00:25
S120	8	S119 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/12/22 00:25
S121	1	("8483741").PN.	US-PGPUB; USPAT	OR	ON	2021/01/01 23:51
S122	483	((Basic and Service and Set) BSS) near3 color	USPAT	OR	ON	2021/01/02 00:08
S123	9	("20160353275" | "20160374087" | "20170006661" | "20170041798" | "20170105143" | "20170251432" | "20170289987" | "20170294949" | "20190028898").PN.	US-PGPUB; USPAT	OR	ON	2021/01/02 00:08
S124	0	S122 and S123	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/01/02 00:09
S125	9	("20130148609" | "20140050210" | "20150124774" | "20150341750" | "20150359008" | "20160081132" | "20160088558" | "20160150569" | "20170006661").PN.	US-PGPUB; USPAT	OR	ON	2021/01/02 00:09
S126	0	S122 and S125	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/01/02 00:09
S127	1	("20150110093").PN.	US-PGPUB; USPAT	OR	ON	2021/01/02 00:09
S128	0	S122 and S127	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/01/02 00:09
S129	1	("20150264617").PN.	US-PGPUB; USPAT	OR	ON	2021/01/02 00:09

S130	0	S122 and S129	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/01/02 00:09
S131	348	(((Basic and Service and Set) (BSS)) adj color)	USPAT	OR	ON	2021/01/02 00:10
S132	161	(((Basic and Service and Set) BSS) near3 color) same PPDU	USPAT	OR	ON	2021/01/02 00:11
S133	107	S132 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/01/02 00:12
S134	350,812	(H04W72/0453 or H04W48/18 or H04W74/002 or H04W84/12 or H04W88/06 or H04W24/02 or H04W74/0841 or H04W74/0825 or H04W28/06 or H04L27/2601 or H04B7/2612).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/01/02 00:12
S135	94	S133 and S134	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/01/02 00:12
S136	54	(((Basic and Service and Set) BSS) near3 color) same allow$4	USPAT	OR	ON	2021/01/02 00:17
S137	24	S136 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/01/02 00:17
S138	348	(((Basic and Service and Set) (BSS)) adj color)	USPAT	OR	ON	2021/01/02 00:25
S139	210	S138 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/01/02 00:25
S140	169	S139 and S134	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO;	OR	ON	2021/01/02 00:25

			DERWENT; IBM_TDB			
S141	214	(((Basic and Service and Set) (BSS)) adj color) with (information)	USPAT	OR	ON	2021/01/02 00:27
S142	122	S141 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/01/02 00:27
S143	95	((("WILUS") near3 ("INSTITUTE") near3 ("OF") near3 ("STANDARDS") near3 ("AND") near3 ("TECHNOLOGY") near3 ("INC"))).AS,AANM.	USPAT	OR	ON	2021/01/02 00:37
S144	3,214	((Basic and Service and Set) (BSS)).clm.	USPAT	OR	ON	2021/01/02 00:37
S145	18	S144 and S143	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/01/02 00:37
S146	700	((("SK") near3 ("TELECOM") near3 ("CO") near3 ("LTD"))).AS,AANM.	USPAT	OR	ON	2021/01/02 00:37
S147	16	S144 and S146	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/01/02 00:37
S148	118	((("KO") near3 ("Geonjung"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2021/01/02 00:37
S149	14	S144 and S148	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/01/02 00:37
S150	272	((("SON") near3 ("Juhyung"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2021/01/02 00:38
S151	18	S144 and S150	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/01/02 00:38

S152	103	((("AHN") near3 ("Woojin"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2021/01/02 00:38
S153	10	S144 and S152	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/01/02 00:38
S154	445	((("KWAK") near3 ("Jinsam"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2021/01/02 00:38
S155	34	S144 and S154	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2021/01/02 00:38

1/2/2021 12:40:47 AM
C:\Users\ktang2\Documents\EAST\Workspaces\16 121 546.wsp

OK TO ENTER: /K.T./ 01/02/2021

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	Geonjung KO	) Examiner:	Tang, Kiet G
Application No.:	16/121,546	) Confirmation No.:	9775
Filing Date:	September 4, 2018	) Group Art Unit:	2469
Title: WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET		) Attorney Docket:	B-9587CON 631613-2
		) Date:	December 28, 2020
		) Re:	**Response to Final Office Action of September 3, 2020**

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

RESPONSE TO OFFICE ACTION

Sir:

This paper is submitted in response to the Final Office Action mailed on September 3, 2020 for the subject application. The Applicant hereby petitions under the provisions of 37 C.F.R. §1.136(a) for an extension of time in which to respond to the outstanding Office Action and includes a fee as set forth in 37 C.F.R. §1.17(a) with this response for such extension of time. Please consider the Remarks/Arguments set forth below.

Remarks/Arguments begin on page 2 of this paper.

All Remarks/Arguments are made without prejudice or disclaimer.

EAST Search History

EAST Search History (Interference) /K.T./ /K.T./ /K.T./

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	2	(PLCP PPDU perform$4 operation BSS color information indicat$4 allow$4).clm.	US-PGPUB; USPAT	AND	ON	2021/01/02 00:42

1/2/2021 12:44:09 AM
C:\Users\ktang2\Documents\EAST\Workspaces\16 121 546.wsp

UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/121,546	09/04/2018	Geonjung KO	B-9587CON 631613-2	9775

158747 7590 12/30/2020

LADAS & PARRY
E-MAIL
4525 Wilshire Boulevard
Suite 240
LOS ANGELES, CA 90010

EXAMINER	
TANG, KIET G	

ART UNIT	PAPER NUMBER
2469	

NOTIFICATION DATE	DELIVERY MODE
12/30/2020	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):

LA_MAIL@la.ladas.com
achinaryan@la.ladas.com
ykoo@la.ladas.com

Applicant-Initiated Interview Summary	**Application No.** 16/121,546	**Applicant(s)** KO et al.		
	Examiner KIET TANG	**Art Unit** 2469	**AIA (First Inventor to File) Status** Yes	**Page** 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	**Title**	**Type**
KIET TANG	Primary Examiner	Telephonic
Young Seok Koo	Attorney	

Date of Interview: 22 December 2020

Issues Discussed:

35 U.S.C. 103

Applicant's representative argued that Chu does not teach "not to perform an operation based on a Basic Service Set (BSS) color when signaling information indicates that the operation based on the BSS color is not allowed". The argument appeared to be persuasive. The examiner indicated that a further search and/or consideration would be necessary upon receipt of the amendment.

/KIET TANG/ Primary Examiner, Art Unit 2469	

Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04
Please further see:
MPEP 713.04
Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)
37 CFR § 1.2 Business to be transacted in writing

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	Geonjung KO	) Examiner:	Tang, Kiet G
Application No.:	16/121,546	) Confirmation No.:	9775
Filing Date:	September 4, 2018	) Group Art Unit:	2469
Title: WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET		) Attorney Docket:	B-9587CON 631613-2
		) Date:	December 28, 2020
		) Re:	**Response to Final Office Action of September 3, 2020**

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

RESPONSE TO OFFICE ACTION

Sir:

This paper is submitted in response to the Final Office Action mailed on September 3, 2020 for the subject application. The Applicant hereby petitions under the provisions of 37 C.F.R. §1.136(a) for an extension of time in which to respond to the outstanding Office Action and includes a fee as set forth in 37 C.F.R. §1.17(a) with this response for such extension of time. Please consider the Remarks/Arguments set forth below.

Remarks/Arguments begin on page 2 of this paper.

All Remarks/Arguments are made without prejudice or disclaimer.

REMARKS/ARGUMENTS

The following Remarks/Arguments are in response to the Final Office Action mailed on December 3, 2020 (hereinafter "Office Action") for the subject application. Pending in the application are claims 21-36.

In the Office Action, claims 21, 24, 29 and 32 stand rejected under 35 U.S.C. §103 as allegedly being obvious over U.S. Patent Application Publication No. 2017/0094685 (hereinafter "Noh") in view of U.S. Patent No. 10,045,340 (hereinafter "Chu"). Claims 22 and 30 stand rejected under 35 U.S.C. §103 as allegedly being obvious over Noh in view of Chu and U.S. Patent Application Publication No. 2018/0324859 (hereinafter "Kim"). Claims 23 and 31 stand rejected under 35 U.S.C. §103 as allegedly being obvious over Noh in view of Chu, Kim and U.S. Patent Application Publication No. 2017/0367078 (hereinafter "Chun"). Claims 25 and 33 stand rejected under 35 U.S.C. §103 as allegedly being obvious over Noh in view of Chu and Chun. Claims 26 and 34 stand rejected under 35 U.S.C. §103 as allegedly being obvious over Noh in view of Chu and U.S. Patent Application Publication No. 2019/0021106 (hereinafter "Oteri"). Claims 27-28 and 35-36 stand rejected under 35 U.S.C. §103 as allegedly being obvious over Noh in view of Chu and U.S. Patent Application Publication No. 2016/0249397 (hereinafter "Seok").

In this response, no claim is amended, added or canceled. Accordingly, the claims pending in this application after entry of this response are claims 21-36.

For at least the following reasons, this application should be considered in condition for allowance and passed to issuance.

Examiner Interview

The undersigned thanks Examiner Kiet Tang for the courtesies extended during the telephonic interview on December 22, 2020. The §103 rejections of claims 21 and 29 over Noh and Chu were discussed. The Examiner agreed to withdraw the §103 rejections based on Noh and Chu, and indicated that he would need further consideration and search.

Claim Rejections – 35 U.S.C. §103

In the Office Action, claims 21, 24, 29 and 32 stand rejected under 35 U.S.C. §103 as allegedly being obvious over Noh in view of Chu (See Office Action: item 8 at page 3). Claims 22 and 30 stand rejected under 35 U.S.C. §103 as allegedly being obvious over Noh in view of Chu and Kim (See Office Action: item 19 at page 7). Claims 23 and 31 stand rejected under 35 U.S.C. §103 as allegedly being obvious over Noh in view of Chu, Kim and Chun (See Office Action: item 26 at page 8). Claims 25 and 33 stand rejected under 35 U.S.C. §103 as allegedly being obvious over Noh in view of Chu and Chun (See Office Action: item 35 at page 10). Claims 26 and 34 stand rejected under 35 U.S.C. §103 as allegedly being obvious over Noh in view of Chu and Oteri (See Office Action: item 41 at page 12). Claims 27-28 and 35-36 stand rejected under 35 U.S.C. §103 as allegedly being obvious over Noh in view of Chu and Seok (See Office Action: item 47 at page 13). These rejections are hereby traversed, and reconsideration and withdrawal are respectfully requested.

Claim 21

Claim 21 recites:

> *A wireless communication terminal communicating wirelessly, the wireless communication terminal comprising:*
> *a transceiver; and*
> *a processor,*
> *wherein the processor is configured to receive a physical layer convergence procedure (PLCP) Processing Data Unit (PPDU) by using the transceiver, and not to use a Basic Service Set (BSS) color when signaling information indicates that an operation based on the BSS color is not allowed,*
> *wherein the BSS color is an identifier of a BSS,*
> *wherein the signaling information is transmitted from a base wireless communication terminal to which the wireless communication terminal is associated.*

Noh and Chu fail to disclose, teach or suggest each and every limitation recited in claim 21. As discussed in the interview of December 22, 2020, neither Noh nor Chu discloses, teaches or suggests that "*the processor is configured … **not to use a Basic Service Set (BSS) color when signaling information indicates that an operation based on the BSS color is not allowed***", "*wherein the signaling information is **transmitted from a base wireless communication terminal to which the wireless communication terminal is associated***" as recited in claim 21 (emphasis added).

The Office Action acknowledges that "**NOH** does not explicitly teach not to use a Basic Service Set (BSS) color when signaling information indicates that an operation based on the BSS color is not allowed" (Office Action: item 10 at page 4).

Instead, the Office Action indicates that "**Chu** teaches not to use a Basic Service Set (BSS) color when signaling information indicates that an operation based on the BSS color is not allowed (column 13, lines 10-13, If the broadcast BSS color is not acceptable, the HEW PPDU is not allowed to carry i) inter-BSS frames or ii) frames for the communication between an AP 14 and unassociated client station 25)" (Office Action: item 11 at page 4).

Column 13, lines 5-13 of Chu states that:

> In an embodiment, a device (either AP 14 or client station 25) of a WLAN 10 transmits and receives public action frames and association frames as follows. A broadcast BSS color is used for i) an HEW PPDU that carries inter-BSS frames and ii) frames for communication between an AP 14 and unassociated client station 25. If the broadcast BSS color is not acceptable, the HEW PPDU is not allowed to carry i) inter-BSS frames or ii) frames for the communication between an AP 14 and unassociated client station 25.

However, nothing in column 13, lines 10-13 of Chu teaches or suggest "***signaling information indicat[ing] that an operation based on the BSS color is not allowed***" as recited in claim 21 (emphasis added). At most, column 13, lines 10-13 of Chu teaches "if the broadcast **BSS color is not acceptable**" (emphasis added). However, Chu's simple statement of "if the broadcast **BSS color is not acceptable**" is not a specific disclosure, teach or suggestion that "*the processor is configured … **not to use a Basic Service Set (BSS) color when signaling information indicates that an operation based on the BSS color is not allowed***" "*wherein the signaling information is **transmitted from a base wireless communication terminal to which the wireless communication terminal is associated***" as recited in claim 21 (emphasis added). Therefore, Chu does not cure the deficiency of Noh with respect to the limitation of claim 21 that "*the processor is configured … **not to use a Basic Service Set (BSS) color when signaling information indicates that an operation based on the BSS color is not allowed***", "*wherein the signaling information is **transmitted from a base wireless communication terminal to which the wireless communication terminal is associated***" as recited in claim 21 (emphasis added).

Hence, Noh and Chu, alone or in combination, fail to disclose, teach or suggest that "*the processor is configured … **not to use a Basic Service Set (BSS) color when signaling information indicates that an operation based on the BSS color is not allowed***", "*wherein the signaling information is **transmitted from a base wireless communication terminal to which the wireless communication terminal is associated***" as recited in claim 21 (emphasis added).

For at least the foregoing reasons, the Applicant respectfully submits that claim 21 is not obvious over Noh in view of Chu, and requests reconsideration and withdrawal of §103 rejection of claim 21.

Claim 29

The Applicant respectfully submits that arguments similar to the arguments set forth for claim 21 can be used, *mutatis mutandis*, to show that claim 29 is not obvious over Noh in view of Chu and requests reconsideration and withdrawal of the §103 rejection of claim 29.

Claims 22-28 and 30-36

"If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious." *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). As discussed above, claims 21 and 29 are patentable 35 U.S.C. §103. Claims 22-28 and 30-36 depend from claim 21 or 29. Therefore, the Applicant respectfully submits that claims 22-28 and 30-36 are patentable 35 U.S.C. §103 at least by way of their dependencies on claim 21 or 29, and requests reconsideration and withdrawal of the §103 rejections of claims 22-28 and 30-36.

CONCLUSION

It is believed that all of the grounds of rejection have been properly traversed, accommodated, or rendered moot. The Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (323) 934-2300.

The Commissioner is authorized to charge any additional fees which may be required or credit overpayment to deposit account no. 12-0415. In particular, if this response is not timely filed, then the Commissioner is authorized to treat this response as including a petition to extend the time period pursuant to 37 CFR 1.136 (a) requesting an extension of time of the number of months necessary to make this response timely filed and the petition fee due in connection therewith may be charged to deposit account no. 12-0415.

I hereby certify that this document is being transmitted electronically to the United States Patent and Trademark Office via electronic filing.

December 28, 2020
(Date of Transmission)

Azatuhi Chinaryan
(Name of Person Transmitting)

/ Azatuhi Chinaryan /
(Signature)

Respectfully submitted,

/ Young Seok Koo 76,255 /

Young Seok Koo
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Tel No.: (323) 934-2300
Fax No.: (323) 934-0202

Electronic Patent Application Fee Transmittal

Application Number:	16121546
Filing Date:	04-Sep-2018
Title of Invention:	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET
First Named Inventor/Applicant Name:	Geonjung KO
Filer:	Young Seok Koo/Azatuhi Chinaryan
Attorney Docket Number:	B-9587CON 631613-2

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:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension - 1 month with $0 paid	1251	1	220	220
Miscellaneous:				
			Total in USD ($)	**220**

Electronic Acknowledgement Receipt	
EFS ID:	41502185
Application Number:	16121546
International Application Number:	
Confirmation Number:	9775
Title of Invention:	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET
First Named Inventor/Applicant Name:	Geonjung KO
Customer Number:	158747
Filer:	Young Seok Koo/Azatuhi Chinaryan
Filer Authorized By:	Young Seok Koo
Attorney Docket Number:	B-9587CON 631613-2
Receipt Date:	28-DEC-2020
Filing Date:	04-SEP-2018
Time Stamp:	17:30:49
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$220
RAM confirmation Number	E2020BRH31183436
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		2020-12-28_631613_Response_to_Final_OA_9-3-2020.pdf	70636 48ca11ad34746316813d2a3470ee1671f09f c8c8	yes	6
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Response After Final Action		1	1	
	Applicant Arguments/Remarks Made in an Amendment		2	6	
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	31297 1b98ac896f5e97cd8354dd7538f29b4af5b9 3579	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	101933		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/121,546	Filing Date 09/04/2018	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	12/28/2020	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 16	Minus	** 20	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0		x $480 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/PEGGY S YARBOROUGH/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	Geonjung KO	) Examiner:	Tang, Kiet G
Application No.:	16/121,546	) Confirmation No.:	9775
Filing Date:	September 4, 2018	) Group Art Unit:	2469
Title: WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET		) Attorney Docket:	B-9587CON 631613-2
		) Date:	December 28, 2020
		) Re:	**Response to Final Office Action of September 3, 2020**

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

RESPONSE TO OFFICE ACTION

Sir:

This paper is submitted in response to the Final Office Action mailed on September 3, 2020 for the subject application. The Applicant hereby petitions under the provisions of 37 C.F.R. §1.136(a) for an extension of time in which to respond to the outstanding Office Action and includes a fee as set forth in 37 C.F.R. §1.17(a) with this response for such extension of time. Please consider the Remarks/Arguments set forth below.

Remarks/Arguments begin on page 2 of this paper.

All Remarks/Arguments are made without prejudice or disclaimer.

UNITED STATES PATENT AND TRADEMARK OFFICE

USPTO Automated Interview Request (AIR)

Dec 14 2020

This paper requesting to schedule and/or conduct an interview is appropriate because:

This submission is requested to be accepted as an authorization for this interview to communicate via the internet. Recognizing that Internet communications are not secure, I hereby authorize the USPTO to communicate with the undersigned concerning scheduling of the interview via video conference, instant messaging, or electronic mail, and to conduct the interview in accordance with office practice including video conferencing.

Name(s):
Young Seok Koo

S-signature:
/Young Seok Koo/

Registration Number:
76255

U.S. Application Number:
16121546

Confirmation Number:
9775

E-mail Address:
ykoo@la.ladas.com

Phone Number:
+1 3239884468

Proposed Time of Interview:
12-21-2020 2:00 PM ET

Alternative Proposed Time(s) of Interview:
12-22-2020 2:00 PM ET

Alternative Proposed Time(s) of Interview:
12-23-2020 2:00 PM ET

Prefered Interview Type:
Telephonic

I am the applicant or applicant's representative for this application.

Topic for Discussion:
103 Rejections of claims 21 and 29 (References Noh and Chu)

Form PTO-1449 (Modified) Page 1 of 1	ATTY DOCKET NO. B-9587CON 631613-2	U.S. SERIAL NO. 16/121,546
LIST OF PATENTS AND PUBLICATIONS STATEMENT	APPLICANT WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	FILING DATE OR 371 (C) DATE September 4, 2018
		GROUP NO. 2469

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	ISSUE/PUBL. DATE	NAME	CLASS	SUB-CLASS	REMARKS
	1.	8,483,741	Jul. 9, 2013	Hussain et al.			

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY	CLASS	SUB-CLASS	TRANSLATION
	2.	2015/064943	May 7, 2015	WO			
	3.	10-2013-0005289	Jan. 15, 2013	KR			KIPRIS
	4.	2012/077859	Jun. 14, 2012	WO			Espacenet
	5.	2015/156616	Oct. 15, 2015	WO			Espacenet

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT
	6.	Office Action dated July 28, 2020 for Japanese Patent Application No. 2019-142262 and its English translation provided by Applicant's foreign counsel
	7.	Notice of Allowance dated July 24, 2020 for Korean Patent Application No. 10-2018-7010293 and its English translation provided by Applicant's foreign counsel

EXAMINER	*DATE CONSIDERED*

EXAMINER: Initial if reference 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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	Examiner: Tang, Kiet G
Serial No.: 16/121,546	Art Unit: 2469
Filing or 371 (c) Date: September 4, 2018	Conf. No.: 9775
For: "WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET"	Our Ref: B-9587CON 631613-2
Date: October 26, 2020	Re: ***Information Disclosure Statement***

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir/Madam:

This information disclosure statement is filed in accordance with 37 C.F.R. §§ 1.56, 1.97 and 1.98 to disclose information that may be relevant to the above-identified patent application. The Applicant requests the Examiner consider the documents listed on the enclosed form PTO-1449 (modified) in the examination of this application.

The filing of this Information Disclosure Statement (IDS) shall not be construed as a representation that a search has been made (37 C.F.R. 1.97(g)), an admission that the information cited is, or is considered to be, material to patentability, or that no other material information exists.

The filing of this Information Disclosure Statement shall not be construed as an admission against interest in any manner (37 C.F.R § 1.97(h)).

If any additional fee is required for this filing, the Applicant requests the Examiner contact a practitioner associated with the Customer Number listed below for authorization.

This information disclosure statement also includes the statements marked below. Failure to mark a statement should not be construed as a negative assertion.

Timing and Fees

This IDS is being filed:

[ ] Concurrently with the application, and no fee is due.

[ ] Within three months of the filing of the national application, other than a continued prosecution application under § 1.53(d), and no fee is due.

[ ] Within three months of the date of entry of the national stage as set forth in § 1.491 in an international application, and no fee is due.

[ ] Before the mailing of a first Office Action on the merits, and no fee is due.

[ ] Before the mailing of a first Office Action after the filing of a request for continued examination under§ 1.114, and no fee is due.

[ ] After the periods described above, and before a final Office Action under § 1.113, a Notice of Allowance under § 1.311, or an action that otherwise closes prosecution in the application, and is

  [ ] accompanied by the fee set forth in § 1.17(p), or

  [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(1): That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement; or

  [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(2): That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

---

[x] After the periods described above, and is accompanied by the fee set forth in § 1.17(p), and is

  [x] filed with the statement set forth in 37 C.F.R. 1.97(e)(1), that each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement; or

  [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(2), that no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

[ ] Concurrently with a Request for Continued Examination, and no additional fee is due for this IDS.

Items Disclosed

At least one item listed on the enclosed form PTO-1449 (modified) was

[x] Cited in an Office Action for a related application, the application number of the related application and the issue date of the Office Action are provided below and the Office Action is enclosed.

Please see the enclosed form PTO-1449 (modified) for related application number(s) and issue date(s).

[ ] Cited in an International Search Report (ISR) or an International Preliminary Report on Patentability (IPRP) or a Written Opinion (WO) of the International Searching Authority (ISA) for the related PCT Application, the PCT application number and the issue date of the ISR/IPRP/WO are provided below and the ISR/IPRP/WO is enclosed.

Additional Information

[x] Translations of the foreign-language documents are also enclosed as machine-translations, human-translations, or counterpart applications as noted. Machine translations were provided by the Japanese Patent Office, ESPACENET, Google Documents, Patent Fetcher® /ESPACENET, Google Translate or Google Translator Toolkit as noted and with OCR by Adobe Acrobat 9 or ABBYY PDF Transformer 3 if needed.

[x] English-language abstracts of foreign-language documents are provided.

[x] Documents listed on the enclosed ISR/IPRP/WO or the Office Action have relevance at least as described therein.

[ ] The documents with the following reference numbers were described in the specification of the present application; omission of a reference from this list does not indicate that it was not discussed in the specification of the present application.

---

[x] At least one of the references cited in the Office Action listed on the attached PTO-1449 (modified) were previously submitted in an IDS or cited by the Examiner for the present application on September 3, 2020, July 27, 2020, June 14, 2019 and September 4, 2018 and therefore are not submitted in this IDS.

[x] Other: copy of the statement as set forth under 37 C.F.R. 1.97(e)(1).

I hereby certify that this document is being transmitted to the Patent and Trademark Office via electronic filing.

October 26, 2020
(Date of Transmission)

Azatuhi Chinaryan
(Name of Person Transmitting)

/ Azatuhi Chinaryan /
(Signature)

Respectfully submitted,

/ Young Seok Koo 76255 /

Young Seok Koo
Attorney for Applicant
Registration No. 76,255
LADAS & PARRY LLP
4525 Wilshire Blvd., Suite 240
Los Angeles, CA 90010
(323) 934-2300 voice

Electronic Patent Application Fee Transmittal

Application Number:	16121546
Filing Date:	04-Sep-2018
Title of Invention:	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET
First Named Inventor/Applicant Name:	Geonjung KO
Filer:	Young Seok Koo/Azatuhi Chinaryan
Attorney Docket Number:	B-9587CON 631613-2

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:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	1806	1	260	260
		Total in USD ($)		**260**

Electronic Acknowledgement Receipt	
EFS ID:	40952436
Application Number:	16121546
International Application Number:	
Confirmation Number:	9775
Title of Invention:	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET
First Named Inventor/Applicant Name:	Geonjung KO
Customer Number:	158747
Filer:	Young Seok Koo/Azatuhi Chinaryan
Filer Authorized By:	Young Seok Koo
Attorney Docket Number:	B-9587CON 631613-2
Receipt Date:	26-OCT-2020
Filing Date:	04-SEP-2018
Time Stamp:	23:53:08
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$260
RAM confirmation Number	E20200PN53378972
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		2020-10-26_631613_IDS.pdf	422991 ca38b65ce6f2e70e0e1950634c33eb37dcf749af	yes	5
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Transmittal Letter		5	5	
	Information Disclosure Statement (IDS) Form (SB08)		4	4	
	Transmittal Letter		1	3	
Warnings:					
Information:					
2	Other Reference-Patent/App/Search documents	Ref1_JP2019-142262_1stOA.pdf	152043 b11a6ea5d7b9af498b4ae65f6dba705a59ed7832	no	3
Warnings:					
Information:					
3	Foreign Reference	Ref2_WO2015-064943.pdf	233744 2c21535a927d94433a9f5c2f84174ff7a52b34bd	no	27
Warnings:					
Information:					
4	Other Reference-Patent/App/Search documents	Ref3_KR10-2018-7010293_NOA.pdf	139321 a85d048cf461517281a4b36cc7e5b543b276888e	no	5
Warnings:					
Information:					
5	Foreign Reference	Ref4_KR10-2013-0005289.pdf	2101661 c8f6d10c8db6a7e76838a60fc1fb768ee7109269	no	82

Warnings:					
Information:					
6	Foreign Reference	Ref6_WO2012-077859.pdf	1313747 8ff647b126a274b4272dd28ce9a94046853 9a632	no	46
Warnings:					
Information:					
7	Foreign Reference	Ref7_WO2015-156616.pdf	754406 bdcd1da41f29f2d8a20d3145eee4c6073f3d 04ba	no	53
Warnings:					
Information:					
8	Fee Worksheet (SB06)	fee-info.pdf	30928 ca994e0c37deaeb7a5db95178dcfee4e587 ab624	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	5148841		

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.

STATEMENT UNDER 37 C.F.R. 1.97(e)(1)

Each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement.

Date: 23 October, 2020

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/121,546	09/04/2018	Geonjung KO	B-9587CON 631613-2	9775

158747 7590 09/03/2020

LADAS & PARRY
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4525 Wilshire Boulevard
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LOS ANGELES, CA 90010

EXAMINER	
TANG, KIET G	

ART UNIT	PAPER NUMBER
2469	

NOTIFICATION DATE	DELIVERY MODE
09/03/2020	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):

LA_MAIL@la.ladas.com
achinaryan@la.ladas.com
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Office Action Summary	Application No. 16/121,546	Applicant(s) KO et al.	
	Examiner KIET TANG	Art Unit 2469	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 06/04/2020.

☐ 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) 21-36 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) 21-36 is/are rejected.

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

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

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

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

11)☐ The drawing(s) filed on _____ 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 07/27/2020.

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

4) ☐ Other: _____.

DETAILED ACTION

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 21-36 are pending.

3. Claims 1-20 have been cancelled.

Response to Arguments

4. Applicant's arguments filed on 06/04/2020 have been considered but they are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

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

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

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

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. This application currently names joint inventors. In considering patentability of the claims the examiner presumes that the subject matter of the various claims was commonly owned as of the effective filing date of the claimed invention(s) absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and effective filing dates of each claim that was not commonly owned as of the effective filing date of the later invention in order for the examiner to consider the applicability of 35 U.S.C. 102(b)(2)(C) for any potential 35 U.S.C. 102(a)(2) prior art against the later invention.

8. **Claims 21, 24, 29 and 32 are rejected under 35 U.S.C. 103 as being unpatentable over NOH, in view of Chu et al. (Patent No.: US 10,045,340 B1), hereinafter Chu.**

9. **With respect to claim 21**, **NOH** teaches A wireless communication terminal communicating wirelessly, the terminal comprising:

a transceiver ([0010], transceiver); and

a processor ([0010], processor),

wherein the processor is configured to receive a PLCP Processing Data Unit (PPDU) by using the transceiver (figure 1, [0010, 0040], a STA receives a PPDU),

wherein the BSS color is an identifier of a BSS (figure 1, [0040], The BSS color helps identify a BSS associated with the STA that transmitted the PPDU),

wherein the signaling information is transmitted from a base wireless communication terminal to which the wireless communication terminal is associated (figure 1, [0030, 0040], the signaling information is transmitted from a base wireless communication terminal / access point to which the wireless communication terminal/STA is associated).

10. **NOH** does not explicitly teach not to use a Basic Service Set (BSS) color when signaling information indicates that an operation based on the BSS color is not allowed.

11. However, **Chu** teaches not to use a Basic Service Set (BSS) color when signaling information indicates that an operation based on the BSS color is not allowed (column 13, lines 10-13, If the broadcast BSS color is not acceptable, the HEW PPDU is not allowed to carry i) inter-BSS frames or ii) frames for the communication between an AP 14 and unassociated client station 25).

12. Therefore, it would have been obvious to one of the ordinary skills in the art before the effective filing data of the claimed invention to combine the teachings of **Chu,** not to use a Basic Service Set (BSS) color when signaling information indicates that an operation based on the BSS color is not allowed, into the teachings of **NOH**, in order to carry out on a device capable of utilizing a high efficiency wireless local area network

(HEW or HE) communication protocol and a legacy communication protocol (**Chu,** abstract).

13. **With respect to claim 24**, **NOH** teaches wherein the processor is configured to signal that the operation based on the BSS color is not allowed when the wireless communication terminal recognizes that the BSS color collision has occurred (figure 1, [0040], the operation based on the BSS color is not allowed when the wireless communication terminal/STA recognizes that the BSS color collision/ does not match the BSS color), wherein the BSS color collision represents that different BSSs correspond to the same BSS color (figure 1, [0040], If the BSS color indicated in the HE-SIG-A field matches the BSS color of the BSS associated with the receiving STA, the receiving STA regards the PPDU as an intra-BSS PPDU and sets/updates its NAV using the duration indicated in the TXOP duration field of the HE-SIG-A field, if this new NAV is greater than the existing NAV (e.g., current NAV value). If the BSS color indicated in the HE-SIG-A field does not match the BSS color of the BSS associated with the receiving STA, the receiving STA regards the PPDU as an inter-BSS PPDU).

14. **With respect to claim 29**, **NOH** teaches An operation method of a wireless communication terminal communicating wirelessly, the method comprising:
receiving a PLCP Processing Data Unit (PPDU) by using the transceiver (figure 1, [0010, 0040], a STA receives a PPDU); and
wherein the BSS color is an identifier of a BSS (figure 1, [0040], The BSS color helps identify a BSS associated with the STA that transmitted the PPDU),

wherein the signaling information is transmitted from a base wireless communication terminal to which the wireless communication terminal is associated (figure 1, [0030, 0040], the signaling information is transmitted from a base wireless communication terminal / access point to which the wireless communication terminal/STA is associated).

15. **NOH** does not explicitly teach not using a Basic Service Set (BSS) color when signaling information indicates that an operation based on the BSS color is not allowed.

16. However, **Chu** teaches not using a Basic Service Set (BSS) color when signaling information indicates that an operation based on the BSS color is not allowed (column 13, lines 10-13, If the broadcast BSS color is not acceptable, the HEW PPDU is not allowed to carry i) inter-BSS frames or ii) frames for the communication between an AP 14 and unassociated client station 25).

17. Therefore, it would have been obvious to one of the ordinary skills in the art before the effective filing data of the claimed invention to combine the teachings of **Chu,** not using a Basic Service Set (BSS) color when signaling information indicates that an operation based on the BSS color is not allowed, into the teachings of **NOH**, in order to carry out on a device capable of utilizing a high efficiency wireless local area network (HEW or HE) communication protocol and a legacy communication protocol (**Chu,** abstract).

18. **With respect to claim 32**, this claim recites the wireless communication terminal of claim 24, and it is rejected for at least the same reasons.

19. **Claims 22 and 30 are rejected under 35 U.S.C. 103 as being unpatentable over NOH, in view of Chu, in view of KIM et al. (Pub. No.: US 20180324859 A1), hereinafter KIM.**

20. Patent No.: Pub. No.: US 20180324859 A1 is a translation of Pub. No.: WO/2017/074024.

21. **With respect to claim 22**, **NOH** teaches wherein the processor is configured not to set an Intra-BSS Network Vector Allocation (NAV) by using the BSS color indicated by a signaling field of the PPDU when the signaling information indicates that the operation based on the BSS color is not allowed (figure 1, [0040], not to set an Intra-BSS (NAV) when the BSS color indicated in the HE-SIG-A field does not match the BSS color of the BSS associated with the receiving STA, the receiving STA regards the PPDU as an inter-BSS PPDU).

22. **NOH and Chu** does not explicitly teach wherein the Intra-BSS NAV is different from a Basic NAV and is a NAV which is set based on the Intra-BSS PPDU, wherein the Basic NAV is set based on an Inter-BSS PPDU or a PPDU which is not able to be identified as the Inter-BSS PPDU or the Intra-BSS PPDU.

23. However, **KIM** teaches wherein the Intra-BSS NAV is different from a Basic NAV and is a NAV which is set based on the Intra-BSS PPDU ([0183], The inter-BSS NAV may be referred to as a non-intra-BSS NAV, a regular NAV or a basic NAV), wherein the Basic NAV is set based on an Inter-BSS PPDU ([0183], The inter-BSS NAV is an NAV updated by receiving a frame transmitted by an STA of the inter-BSS).

24. Therefore, it would have been obvious to one of the ordinary skills in the art before the effective filing data of the claimed invention to combine the teachings of **KIM,** wherein the Intra-BSS NAV is different from a Basic NAV and is a NAV which is set based on the Intra-BSS PPDU, wherein the Basic NAV is set based on an Inter-BSS PPDU or a PPDU which is not able to be identified as the Inter-BSS PPDU or the Intra-BSS PPDU, into the teachings of **NOH and Chu**, in order for the NAV to be managed more accurately and efficiently (**KIM,** [0014]).

25. **With respect to claim 30**, this claim recites the wireless communication terminal of claim 22, and it is rejected for at least the same reasons.

26. **Claims 23 and 31 are rejected under 35 U.S.C. 103 as being unpatentable over NOH, in view of Chu, in view of KIM, and further in of CHUN et al. (Pub. No.: US 20170367078 A1), hereinafter CHUN.**

27. Patent No.: Pub. No.: US 20170367078 A1 is a translation of Pub. No.: WO/2016/099140.

28. **With respect to claim 23**, **NOH** teaches wherein the PPDU includes a TXOP Duration field in the signaling field of the PPDU (figure 1, [0040], the receiving STA regards the PPDU as an intra-BSS PPDU and sets/updates its NAV using the duration indicated in the TXOP duration field of the HE-SIG-A field), wherein the TXOP Duration field indicates information used for setting the Intra- BSS NAV and the Basic NAV ([0039-0040], the receiving STA sets/updates its NAV using the duration indicated in the TXOP duration field), wherein the duration field indicates information used for setting the Intra-BSS NAV and the Basic NAV ([0041], the STA sets/updates its NAV using the duration indicated in a duration field).

29. The combination of **NOH** and **Chu** does not explicitly teach the Basic NAV. However, **KIM** teaches the Basic NAV ([0183], The inter-BSS NAV may be referred to as a non-intra-BSS NAV, a regular NAV or a basic NAV).

30. Therefore, it would have been obvious to one of the ordinary skills in the art before the effective filing data of the claimed invention to combine the teachings of **KIM,** the Basic NAV, into the teachings of **NOH and Chu**, in order for the NAV to be managed more accurately and efficiently (**KIM,** [0014]).

31. The combination of **NOH, Chu** and **KIM** does not explicitly teach a MAC frame which includes a duration field.

32. However, **CHUN** teaches a MAC frame which includes a duration field ([0408], a trigger frame is transmitted in the MAC frame format of a legacy system, a legacy STA may read the duration field), and wherein the processor is configured not to use the TXOP Duration field for setting the Intra-BSS NAV or the Basic NAV when the wireless communication terminal gets valid signaling field of the MAC frame ([0408], If a trigger frame is transmitted in the MAC frame format of a legacy system, a legacy STA may read the duration field of a MAC header within the trigger frame and perform NAV setting).

33. Therefore, it would have been obvious to one of the ordinary skills in the art before the effective filing data of the claimed invention to combine the teachings of **CHUN,** a MAC frame which includes a duration field, and wherein the processor is configured not to use the TXOP Duration field for setting the Intra-BSS NAV or the Basic NAV when the wireless communication terminal gets valid signaling field of the MAC frame, into the teachings of **NOH, Chu** and **KIM**, in order for transmitting data for supporting a data transmission of multi-user and a device for supporting the same (**CHUN,** [0001]).

34. **With respect to claim 31**, this claim recites the wireless communication terminal of claim 23, and it is rejected for at least the same reasons.

35. **Claims 25 and 33 are rejected under 35 U.S.C. 103 as being unpatentable over NOH, in view of Chu, in view of CHUN**

36. **With respect to claim 25**, **NOH** teaches wherein the processor is configured to determine that BSS color collision has occurred based on address fields of MAC frame (figure 1, [0038], when a STA receives a PPDU which results in that the STA determines the wireless medium is busy, the STA decodes the PPDU and checks the contents in the BSS color field of the HE-SIG-A field or the MAC address in the MAC header to determine whether the PPDU is an intra-BSS PPDU or an inter-BSS PPDU with respect to the STA).

37. The combination of **NOH** and **Chu** does not explicitly teach a MAC frame which includes a duration field.

38. However, **CHUN** teaches address fields of MAC frame ([0173], the MAC address of an STA that sends a corresponding MAC frame).

39. Therefore, it would have been obvious to one of the ordinary skills in the art before the effective filing data of the claimed invention to combine the teachings of **CHUN,** address fields of MAC frame, into the teachings of **NOH** and **Chu,** in order for transmitting data for supporting a data transmission of multi-user and a device for supporting the same (**CHUN,** [0001]).

40. **With respect to claim 33**, this claim recites the wireless communication terminal of claim 25, and it is rejected for at least the same reasons.

41. **Claims 26 and 34 are rejected under 35 U.S.C. 103 as being unpatentable over NOH, in view of Chu, in view of OTERI et al. (Pub. No.: US 20190021106 A1), hereinafter OTERI.**

42. **With respect to claim 26**, **NOH** teaches wherein the operation based on the BSS color as set forth above.

43. The combination of **NOH** and **Chu** does not explicitly teach wherein the operation based on the BSS color includes entering a doze state of a power save operation based on a Basic Service Set (BSS) color indicated by a signaling field of the PPDU, wherein the power save operation is an operation for the wireless communication terminal to enter the doze state until an end of a received PPDU which is an Intra-BSS PPDU.

44. However, **OTERI** teaches wherein the operation based on the BSS color includes entering a doze state of a power save operation based on a Basic Service Set (BSS) color indicated by a signaling field of the PPDU, wherein the power save operation is an operation for the wireless communication terminal to enter the doze state until an end of a received PPDU which is an Intra-BSS PPDU ([0072]).

45. Therefore, it would have been obvious to one of the ordinary skills in the art before the effective filing data of the claimed invention to combine the teachings of **OTERI,** wherein the operation based on the BSS color includes entering a doze state of

a power save operation based on a Basic Service Set (BSS) color indicated by a signaling field of the PPDU, wherein the power save operation is an operation for the wireless communication terminal to enter the doze state until an end of a received PPDU which is an Intra-BSS PPDU, into the teachings of The combination of **NOH** and **Chu,** in order to enhance the quality of service (QoS) experienced by wireless users in many usage scenarios, such as high-density deployments of APs and STAs (**OTERI,** [0063]).

46. **With respect to claim 34**, this claim recites the wireless communication terminal of claim 26, and it is rejected for at least the same reasons.

47. **Claims 27-28 and 35-36 are rejected under 35 U.S.C. 103 as being unpatentable over NOH, in view of Chu, in view of SEOK (Pub. No.: US 20160249397 A1), hereinafter SEOK.**

48. **With respect to claim 27**, **NOH** teaches wherein the processor is configured not to perform a spatial reuse operation when the BSS color indicated by the (figure 1, [0010, 0040], not to perform a spatial reuse operation when the BSS color matches).

49. The combination of **NOH** and **Chu** does not explicitly teach indicated by the signaling field of the PPDU is a predetermined value.

50. However, **SEOK** teaches indicated by the signaling field of the PPDU is a predetermined value ([0311], On the other hand, if the associated AP is a legacy AP that does not support HE capabilities, the AP does not provide a COLOR parameter and thus a predetermined value (e.g., 0) may be determined to be the first COLOR parameter).

51. Therefore, it would have been obvious to one of the ordinary skills in the art before the effective filing data of the claimed invention to combine the teachings of **SEOK,** indicated by the signaling field of the PPDU is a predetermined value, into the teachings of **NOH** and **Chu,** in order for dynamic channel sensing for direct link in a High Efficiency WLAN (HEW) (**SEOK,** [0003]).

52. **With respect to claim 28**, **NOH** teaches wherein the predetermined value is 0 ([0311], a predetermined value (e.g., 0)).

53. **With respect to claim 35**, this claim recites the wireless communication terminal of claim 27, and it is rejected for at least the same reasons.

54. **With respect to claim 36**, this claim recites the wireless communication terminal of claim 28, and it is rejected for at least the same reasons.

Conclusion

55. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

56. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KIET TANG whose telephone number is (571)270-7193. The examiner can normally be reached on M-F 8:00-5:00.

57. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

58. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, IAN MOORE can be reached on (571) 272-3085. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

59. 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.

/KIET TANG/
Primary Examiner, Art Unit 2469

Notice of References Cited	Application/Control No. 16/121,546	Applicant(s)/Patent Under Reexamination KO et al.	
	Examiner KIET TANG	Art Unit 2469	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-10045340-B1	08-2018	Chu; Liwen	H04W74/0816	1/1
	B					
	C					
	D					
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FOREIGN PATENT DOCUMENTS

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

NON-PATENT DOCUMENTS

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

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

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/121,546	KO et al.
	Examiner	Art Unit
	KIET TANG	2469

CPC - Searched*		
Symbol	Date	Examiner
H04W72/0453 or H04W48/18 or H04W74/002 or H04W84/12 or H04W88/06 or H04W24/02 or H04W74/0841 or H04W74/0825 or H04W28/06 or H04L27/2601 or H04B7/2612	03/02/2020 (Updated on 08/31/20)	KT

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
Inventor and assignee search in East and PALM	03/02/2020 (Updated on 08/31/20)	KT

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

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/121,546	KO et al.
	Examiner	**Art Unit**
	KIET TANG	2469

✓	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	03/02/2020	08/31/2020							
	1		-							
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	34	✓	✓							
	35	✓	✓							
	36	✓	✓							

July 24, 2020

Form PTO-1449 (Modified) Page 1 of 1	ATTY DOCKET NO. B-9587CON 631613-2	U.S. SERIAL NO. 16/121,546
LIST OF PATENTS AND PUBLICATIONS STATEMENT	APPLICANT WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	FILING DATE September 4, 2018
		GROUP NO. 2469

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	ISSUE/PUBL. DATE	NAME	CLASS	SUB-CLASS	REMARKS
	1.	2018/0227952	Aug. 9, 2018	KIM et al.			
	2.	2018/0213565	Jul. 26, 2018	Huang et al.			

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY	CLASS	SUB-CLASS	TRANSLATION
	3.	2011/115408	Sep. 22, 2011	WO			
	4.	2014/027838	Feb. 20, 2014	WO			Espacenet
	5.	10-2013-0028972	Mar. 20, 2013	KR			KIPRIS

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT
	6.	Notice of Allowance dated April 29, 2020 for US Patent Application No. 15/953,404
	7.	Office Action dated May 27, 2020 for Indian Patent Application No. 201827014271
	8.	Office Action dated May 6, 2020 for European Patent Application No. 16857801.1
	9.	Notice of Allowance dated July 1, 2020 for Korean Patent Application No. 10-2018-7016103 and its English translation provided by Applicant's foreign counsel

EXAMINER	*DATE CONSIDERED*
/KIET TANG/	08/31/2020

EXAMINER: Initial if reference 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. /K.T./

EAST Search History

EAST Search History (Prior Art) /K.T./ /K.T./ /K.T./

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S82	2	("20180213565" | "20180227952").PN.	US-PGPUB; USPAT	OR	ON	2020/08/30 23:57
S83	1	able with identif$3 with (BSS adj color)	USPAT	OR	ON	2020/08/31 00:08
S85	1	able with identif$3 with (((Basic and Service and Set) (BSS)) near3 color)	USPAT	OR	ON	2020/08/31 00:10
S84	1	able with identif$3 with (((Basic and Service and Set) (BSS)) adj color)	USPAT	OR	ON	2020/08/31 00:10
S88	337,484	(H04W72/0453 or H04W48/18 or H04W74/002 or H04W84/12 or H04W88/06 or H04W24/02 or H04W74/0841 or H04W74/0825 or H04W28/06 or H04L27/2601 or H04B7/2612).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/08/31 00:11
S87	130	S86 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/08/31 00:11
S86	203	identif$3 with (((Basic and Service and Set) (BSS)) near3 color)	USPAT	OR	ON	2020/08/31 00:11
S89	113	S87 and S88	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/08/31 00:12
S90	201	(use$1 using) with (((Basic and Service and Set) (BSS)) near3 color)	USPAT	OR	ON	2020/08/31 00:16
S92	102	S91 and S88	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/08/31 00:17
S91	130	S90 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/08/31 00:17

S93	0	"not" with (((Basic and Service and Set) (BSS)) near3 color)	USPAT	OR	ON	2020/08/31 00:23
S94	27	(((Basic and Service and Set) (BSS)) near3 color) with allow$4	USPAT	OR	ON	2020/08/31 00:26
S95	15	S94 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/08/31 00:27
L14	32	L2 and L13	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/08/31 01:16
L13	405	((("KWAK") near3 ("Jinsam"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2020/08/31 01:16
L12	8	L2 and L11	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/08/31 01:16
L11	83	((("AHN") near3 ("Woojin"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2020/08/31 01:16
L9	16	L2 and L8	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/08/31 01:16
L8	233	((("SON") near3 ("Juhyung"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2020/08/31 01:16
L7	12	L2 and L6	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/08/31 01:16
L6	102	((("KO") near3 ("Geonjung"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2020/08/31 01:16
L5	14	L2 and L4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/08/31 01:16

L4	685	((("SK") near3 ("TELECOM") near3 ("CO") near3 ("LTD"))).AS,AANM.	USPAT	OR	ON	2020/08/31 01:16
L3	16	L2 and L1	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/08/31 01:16
L2	3,087	((Basic and Service and Set) (BSS)).clm.	USPAT	OR	ON	2020/08/31 01:16
L1	83	((("WILUS") near3 ("INSTITUTE") near3 ("OF") near3 ("STANDARDS") near3 ("AND") near3 ("TECHNOLOGY") near3 ("INC"))).AS,AANM.	USPAT	OR	ON	2020/08/31 01:16

8/31/2020 1:17:29 AM
C:\Users\ktang2\Documents\EAST\Workspaces\16 121 546.wsp

Form PTO-1449 (Modified) Page 1 of 1	ATTY DOCKET NO. B-9587CON 631613-2	U.S. SERIAL NO. 16/121,546
LIST OF PATENTS AND PUBLICATIONS STATEMENT	APPLICANT WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	FILING DATE September 4, 2018
		GROUP NO. 2469

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	ISSUE/PUBL. DATE	NAME	CLASS	SUB-CLASS	REMARKS
	1.	2018/0227952	Aug. 9, 2018	KIM et al.			
	2.	2018/0213565	Jul. 26, 2018	Huang et al.			

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY	CLASS	SUB-CLASS	TRANSLATION
	3.	2011/115408	Sep. 22, 2011	WO			
	4.	2014/027838	Feb. 20, 2014	WO			Espacenet
	5.	10-2013-0028972	Mar. 20, 2013	KR			KIPRIS

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

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	9.	Notice of Allowance dated July 1, 2020 for Korean Patent Application No. 10-2018-7016103 and its English translation provided by Applicant's foreign counsel

EXAMINER	*DATE CONSIDERED*

EXAMINER: Initial if reference 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.

STATEMENT UNDER 37 C.F.R. 1.97(e)(1)

Each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement.

Date: July 24, 2020

Sungjin HONG
Patent Attorney
QUS INT'L PATENT & LAW GROUP
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Electronic Acknowledgement Receipt

EFS ID:	40104047
Application Number:	16121546
International Application Number:	
Confirmation Number:	9775
Title of Invention:	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET
First Named Inventor/Applicant Name:	Geonjung KO
Customer Number:	158747
Filer:	Young Seok Koo/Azatuhi Chinaryan
Filer Authorized By:	Young Seok Koo
Attorney Docket Number:	B-9587CON 631613-2
Receipt Date:	27-JUL-2020
Filing Date:	04-SEP-2018
Time Stamp:	19:40:25
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		2020-07-24_631613_IDS.pdf	183142 ab1e4590fd19b361af8fb43d72916dfb557ff7dd	yes	5

	Multipart Description/PDF files in .zip description			
	Document Description	**Start**	**End**	
	Transmittal Letter	1	3	
	Information Disclosure Statement (IDS) Form (SB08)	4	4	
	Transmittal Letter	5	5	
Warnings:				
Information:				

2	Other Reference-Patent/App/Search documents	Ref1_US15953404_NOA.pdf	383711 7d9946398611fe80ff7896112e07b4ac22ca192c	no	7
Warnings:					
Information:					
3	Other Reference-Patent/App/Search documents	Ref4_IN201827014271_1stOA.pdf	244194 bc3641985d92ce64ef99b9afb2c6b2e36224c378	no	6
Warnings:					
Information:					
4	Other Reference-Patent/App/Search documents	Ref6_EP168578011_1stOA.pdf	273324 c43fc2c3137aa77afa2fe59bb5a4bce89f97d5e4	no	5
Warnings:					
Information:					
5	Foreign Reference	Ref8_KR10-2013-0028972.pdf	1926499 e90ca47e69f1280751722c641cc030187b006580	no	58
Warnings:					
Information:					
6	Foreign Reference	Ref10_WO2014-027838.pdf	2364856 90e42a6f0f77e24abb1e57ce102265c5f9f6b563	no	73
Warnings:					
Information:					

7	Other Reference-Patent/App/Search documents	Ref7_KR10-2018-7016103_NOA.pdf	502185 fcc5e0d584cb0865fecf96c58eaeba08b538541e	no	8
Warnings:					
Information:					
8	Foreign Reference	Ref5_WO2011-115408.pdf	2463830 13068382756b1fd8556d255e8334a66a1e949bb7	no	62
Warnings:					
Information:					
		Total Files Size (in bytes):	8341741		

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	Examiner: Tang, Kiet G
Serial No.: 16/121,546	Art Unit: 2469
Filed: September 4, 2018	Conf. No.: 9775
For: WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET	Our Ref: B-9587CON 631613-2
Date: July 24, 2020	Re: ***Information Disclosure Statement***

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir/Madam:

This information disclosure statement is filed in accordance with 37 C.F.R. §§ 1.56, 1.97 and 1.98 to disclose information that may be relevant to the above-identified patent application. The Applicant requests the Examiner consider the documents listed on the enclosed form PTO-1449 (modified) in the examination of this application.

The filing of this Information Disclosure Statement (IDS) shall not be construed as a representation that a search has been made (37 C.F.R. 1.97(g)), an admission that the information cited is, or is considered to be, material to patentability, or that no other material information exists.

The filing of this Information Disclosure Statement shall not be construed as an admission against interest in any manner (37 C.F.R § 1.97(h)).

If any additional fee is required for this filing, the Applicant requests the Examiner contact a practitioner associated with the Customer Number listed below for authorization.

This information disclosure statement also includes the statements marked below. Failure to mark a statement should not be construed as a negative assertion.

Timing and Fees

This IDS is being filed:

[ ] Concurrently with the application, and no fee is due.

[ ] Within three months of the filing of the national application, other than a continued prosecution application under § 1.53(d), and no fee is due.

[ ] Within three months of the date of entry of the national stage as set forth in § 1.491 in an international application, and no fee is due.

[ ] Before the mailing of a first Office Action on the merits, and no fee is due.

[ ] Before the mailing of a first Office Action after the filing of a request for continued examination under§ 1.114, and no fee is due.

---

[x] After the periods described above, and before a final Office Action under § 1.113, a Notice of Allowance under § 1.311, or an action that otherwise closes prosecution in the application, and is

  [ ] accompanied by the fee set forth in § 1.17(p), or

  [x] filed with the statement set forth in 37 C.F.R. 1.97(e)(1): That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement; or

  [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(2): That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

[ ] After the periods described above, and is accompanied by the fee set forth in § 1.17(p), and is

  [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(1), that each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement; or

  [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(2), that no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

[ ] Concurrently with a Request for Continued Examination, and no additional fee is due for this IDS.

Items Disclosed

At least one item listed on the enclosed form PTO-1449 (modified) was

[x] Cited in an Office Action for a related application, the application number of the related application and the issue date of the Office Action are provided below and the Office Action is enclosed.

July 24, 2020

Please see the enclosed form PTO-1449 (modified) for related application number(s) and issue date(s)

[ ] Cited in an International Search Report (ISR) or an International Preliminary Report on Patentability (IPRP) or a Written Opinion (WO) of the International Searching Authority (ISA) for the related PCT Application, the PCT application number and the issue date of the ISR/IPRP/WO are provided below and the ISR/IPRP/WO is enclosed.

Additional Information

[x] Translations of the foreign-language documents are also enclosed as machine-translations, human-translations, or counterpart applications as noted. Machine translations were provided by the Japanese Patent Office, ESPACENET, Google Documents, Patent Fetcher® /ESPACENET, Google Translate or Google Translator Toolkit as noted and with OCR by Adobe Acrobat 9 or ABBYY PDF Transformer 3 if needed.

[x] English-language abstracts of foreign-language documents are provided.

[x] Documents listed on the enclosed ISR/IPRP/WO or the Office Action have relevance at least as described therein.

[ ] The documents with the following reference numbers were described in the specification of the present application; omission of a reference from this list does not indicate that it was not discussed in the specification of the present application.

[x] At least one of the references cited in the Office Action listed on the attached PTO-1449 (modified) were previously submitted in an IDS or cited by the Examiner for the present application on September 4, 2018, September 20, 2019 and June 14, 2019 and therefore are not submitted in this IDS.

[x] Other: copy of the statement as set forth under 37 C.F.R. 1.97(e)(1).

I hereby certify that this document is being transmitted to the Patent and Trademark Office via electronic filing.

July 24, 2020
(Date of Transmission)

Azatuhi Chinaryan
(Name of Person Transmitting)

/ Azatuhi Chinaryan /
(Signature)

Respectfully submitted,

/ Young Seok Koo 76,255 /

Young Seok Koo
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(323) 934-2300 voice

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	Geonjung KO	Examiner:	Tang, Kiet G
Application No.:	16/121,546	Confirmation No.:	9775
Filing Date:	September 4, 2018	Group Art Unit:	2469
Title:	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET	Attorney Docket:	B-9587CON 631613-2
		Date:	June 4, 2020
		Re:	**Response to Non-Final Office Action of March 5, 2020**

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

RESPONSE TO OFFICE ACTION

Sir:

This paper is timely submitted in response to the non-Final Office Action mailed on March 5, 2020 for the subject application. Please amend the application as follows and consider the Remarks/Arguments set forth below.

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

Remarks/Arguments begin on page 6 of this paper.

All Amendments and Remarks/Arguments are made without prejudice or disclaimer.

AMENDMENTS TO THE CLAIMS

Please amend the claims to read as indicated in the following list of claims:

Listing of claims

1-20. (Canceled).

21. (Currently Amended) A wireless communication terminal communicating wirelessly, the wireless communication terminal comprising:

a transceiver; and

a processor,

wherein the processor is configured to receive a physical layer convergence procedure (PLCP) Processing Data Unit (PPDU) by using the transceiver, and not to use ~~perform an operation based on~~ a Basic Service Set (BSS) color when signaling information indicates that [[the]] an operation based on the BSS color is not allowed,

wherein the BSS color is an identifier of a BSS,

wherein the signaling information is transmitted from a base wireless communication terminal to which the wireless communication terminal is associated.

22. (Currently Amended) The wireless communication terminal of claim 21, wherein the processor is configured not to set an Intra-BSS Network ~~Vector~~ Allocation Vector (NAV) by using the BSS color indicated by a signaling field of the PPDU when the signaling information indicates that the operation based on the BSS color is not allowed,

wherein the Intra-BSS NAV is different from a Basic NAV and is a NAV which is set based on [[the]] an Intra-BSS PPDU,

wherein the Basic NAV is set based on an Inter-BSS PPDU or a PPDU which is not able to be identified as the Inter-BSS PPDU or the Intra-BSS PPDU.

23. (Currently Amended) The wireless communication terminal of claim 22, wherein the PPDU includes a TXOP Duration field in the signaling field of the PPDU and a medium access control (MAC) frame which includes a duration field,

wherein the TXOP Duration field indicates information used for setting the Intra-BSS NAV and the Basic NAV,

wherein the duration field indicates information used for setting the Intra-BSS NAV and the Basic NAV,

wherein the processor is configured not to use the TXOP Duration field for setting the Intra-BSS NAV or the Basic NAV when the wireless communication terminal gets a valid signaling field of the MAC frame.

24. (Currently Amended) The wireless communication terminal of claim 21, wherein the processor is configured to signal that the operation based on the BSS color is not allowed when the wireless communication terminal recognizes that [[the]] a BSS color collision has occurred,

wherein the BSS color collision represents that different BSSs correspond to one ~~the same~~ BSS color.

25. (Currently Amended) The wireless communication terminal of claim 24, wherein the processor is configured to determine that BSS color collision has occurred based on address fields of a medium access control (MAC) frame.

26. (Currently Amended) The wireless communication terminal of claim [[1]] 21, wherein the operation based on the BSS color includes entering a doze state of a power save operation based on a ~~Basic Service Set (BSS)~~ BSS color indicated by a signaling field of the PPDU,

wherein the power save operation is an operation for the wireless communication terminal to enter the doze state until an end of a received PPDU which is an Intra-BSS PPDU.

27. (Previously Presented) The wireless communication terminal of claim 21, wherein the processor is configured not to perform a spatial reuse operation when the BSS color indicated by the signaling field of the PPDU is a predetermined value.

28. (Previously Presented) The wireless communication terminal of claim 27, wherein the predetermined value is 0.

29. (Currently Amended) An operation method of a wireless communication terminal communicating wirelessly, the method comprising:

receiving a physical layer convergence procedure (PLCP) Processing Data Unit (PPDU) ~~by using the transceiver~~; and

not using ~~performing an operation based on~~ a Basic Service Set (BSS) color when signaling information indicates that an [[the]] operation based on the BSS color is not allowed,

wherein the BSS color is an identifier of a BSS,

wherein the signaling information is transmitted from a base wireless communication terminal to which the wireless communication terminal is associated.

30. (Currently Amended) The method of claim 29, wherein the method further comprises not setting an Intra-BSS Network ~~Vector~~ Allocation Vector (NAV) by using the BSS color indicated by a signaling field of the PPDU when the signaling information indicates that the operation based on the BSS color is not allowed,

wherein the Intra-BSS NAV is different from a Basic NAV and is a NAV which is set based on an [[the]] Intra-BSS PPDU,

wherein the Basic NAV is set based on an Inter-BSS PPDU or a PPDU which is not able to be identified as the Inter-BSS PPDU or the Intra-BSS PPDU.

31. (Currently Amended) The method of claim 30 [[29]], wherein the PPDU includes a TXOP Duration field in the signaling field of the PPDU and a medium access control (MAC) frame which includes a duration field,

wherein the TXOP Duration field indicates information used for setting the Intra-BSS NAV and the Basic NAV,

wherein the duration field indicates information used for setting the Intra-BSS NAV and the Basic NAV,

wherein the method further comprises not using the TXOP Duration field for setting the Intra-BSS NAV or the Basic NAV when the wireless communication terminal gets a valid signaling field of the MAC frame.

32. (Currently Amended) The method of claim 29, wherein the method further comprises signal that the operation based on the BSS color is not allowed when the wireless communication terminal recognizes that a [[the]] BSS color collision has occurred,

wherein the BSS color collision represents that different BSSs correspond to one ~~the same~~ BSS color.

33. (Currently Amended) The method of claim 32, wherein the signaling that a BSS color collision has occurred comprises determining that BSS color collision has occurred based on address fields of a medium access control (MAC) frame.

34. (Currently Amended) The method of claim 29, wherein the operation based on the BSS color includes entering a doze state of a power save operation based on a ~~Basic Service Set (BSS)~~ BSS color indicated by the signaling field of the PPDU,

wherein the power save operation is an operation for the wireless communication terminal to enter the doze state until an end of a received PPDU which is an Intra-BSS PPDU.

35. (Previously Presented) The method of claim 29, wherein the method further comprises not performing a spatial reuse operation when the BSS color indicated by the signaling field of the PPDU is a predetermined value.

36. (Previously Presented) The method of claim 35, wherein the predetermined value is 0.

REMARKS/ARGUMENTS

The following Remarks/Arguments are in response to the non-Final Office Action mailed on March 5, 2020 (hereinafter "Office Action") for the subject application. Pending in the application are claims 21-36.

In the Office Action, claims 21, 23, 25, 26, 29, 31 and 33 are objected to as allegedly including informalities. Claim 29 stands rejected under 35 U.S.C. §112(b) as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor regards as the invention. Claims 21, 24, 29 and 32 stand rejected under 35 U.S.C. §102(a)(2) as allegedly being anticipated by U.S. Patent Application Publication No. 2017/0094685 (hereinafter "Noh"). Claims 22 and 30 stand rejected under 35 U.S.C. §103 as allegedly being obvious over Noh in view of U.S. Patent Application Publication No. 2018/0324859 (hereinafter "Kim"). Claims 23 and 31 stand rejected under 35 U.S.C. §103 as allegedly being obvious over Noh in view of Kim and U.S. Patent Application Publication No. 2017/0367078 (hereinafter "Chun"). Claims 25 and 33 stand rejected under 35 U.S.C. §103 as allegedly being obvious over Noh in view of Chun. Claims 26 and 34 stand rejected under 35 U.S.C. §103 as allegedly being obvious over Noh in view of U.S. Patent Application Publication No. 2019/0021106 (hereinafter "Oteri"). Claims 27-28 and 35-36 stand rejected under 35 U.S.C. §103 as allegedly being obvious over Noh in view of U.S. Patent Application Publication No. 2016/0249397 (hereinafter "Seok").

In this response, claims 21-26 and 29-34 are amended. No new matter is presented as a result of these amendments. No claim is added or cancelled. Accordingly, the claims pending in this application after entry of this response are claims 21-36.

For at least the following reasons, this application should be considered in condition for allowance and passed to issuance.

Claim Objections

In the Office Action, claims 21, 23, 25, 26, 29, 31 and 33 are objected to as allegedly including informalities (See Office Action: item 4 at page 2). The Office Action opines that:

> Claim 21 recites the limitation "the terminal" in lines 1-2. For clarity and consistency, it is suggested to revise as "the wireless communication terminal".

> Claims 21 and 29 recite the acronym "PLCP" without initially defining what it stands for.
>
> Claims 23, 25, 31 and 33 recite the acronym "MAC" without initially defining what it stands for.
>
> Claim 26 contains a typographical error. Claim 26 recites "The wireless communication terminal of claim 1" in line 1. Claim 1 has been cancelled.

(Office Action: page 2). In response to this opinion, claims 21, 23, 25, 26, 29, 31 and 33 are amended. Therefore, the Applicant respectfully requests reconsideration and withdrawal of the objections to claims 21, 23, 25, 26, 29, 31 and 33.

Claim Rejections – 35 U.S.C. §112

In the Office Action, claim 29 stands rejected under 35 U.S.C. §112(b) as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor regards as the invention (See Office Action: item 10 at page 3). The Examiner indicates that there is insufficient antecedent basis for the limitation of "the transceiver" cited in line 3 of claim 29 (See Office Action: item 11 at page 3). Claim 29 is amended to delete "*the transceiver*". Thus, the Applicant respectfully requests reconsideration and withdrawal of the §112 rejection of claim 29.

Claim Rejections – 35 U.S.C. §102

In the Office Action, claims 21, 24, 29 and 32 stand rejected under 35 U.S.C. §102(a)(2) as allegedly being anticipated by Noh (See Office Action: item 14 at page 4). In order to anticipate the claimed invention under 35 U.S.C. §102, a single prior art reference must identically disclose each and every element of the claimed invention. MPEP §2131; *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The Applicant respectfully submits that Noh fails to satisfy this high burden, and traverses the §102 rejection as follows.

Claim 21

Claim 21 recites:

> *A wireless communication terminal communicating wirelessly, the wireless communication terminal comprising:*
> *a transceiver; and*
> *a processor,*
> *wherein the processor is configured to receive a physical layer convergence procedure (PLCP) Processing Data Unit (PPDU) by using the transceiver, and not to use a Basic Service Set (BSS) color when signaling information indicates that an operation based on the BSS color is not allowed,*
> *wherein the BSS color is an identifier of a BSS,*
> *wherein the signaling information is transmitted from a base wireless communication terminal to which the wireless communication terminal is associated.*

Although the Applicant respectfully disagrees with the Examiner, solely to expedite prosecution of the present application and allowance of the claims, claim 21 is amended to recite "*wherein the processor is configured … not to use a Basic Service Set (BSS) color when signaling information indicates that an operation based on the BSS color is not allowed*".

Noh fails to disclose that "*the processor is configured … **not to use a Basic Service Set (BSS) color** when **signaling information** indicates that an **operation based on the BSS color** is **not allowed***" as recited in claim 21 (emphasis added). The Office Action states that "NOH teaches … the processor is configured … not to perform an operation based on a Basic Service Set (BSS) color when signaling information indicates that the operation based on the BSS color is not allowed (figure 1, [0040], not to set an Intra-BSS (NAV) when the BSS color indicated in the HE-SIG-A field does not match the BSS color of the BSS associated with the receiving STA, the receiving STA regards the PPDU as an inter-BSS PPDU)" (Office Action: page 4).

However, as the Examiner acknowledges in the Office Action, at FIG. 1 and paragraph [0040] of Noh, Noh **uses** a Basic Service Set (BSS) color to determine "[i]f the BSS color indicated in the HE-SIG-A field does not match the BSS color of the BSS associated with the receiving STA" (See paragraph [0040] of Noh "If the BSS color indicated in the HE-SIG-A field does not match the BSS color of the BSS associated with the receiving STA, the receiving STA regards the PPDU as an inter-BSS PPDU and is allowed to adjust the OBSS PD level (e.g., to a predetermined level) according to a function of transmit power control."). By way of contrast, claim 21 as amended recites that "*the processor is configured … **not to use a Basic Service Set (BSS) color** when*

signaling information indicates that an operation based on the BSS color is not allowed" (emphasis added).

Further, determining "[i]f the BSS color indicated in the HE-SIG-A field does not match the BSS color of the BSS associated with the receiving STA" in Noh is not a disclosure, teaching or suggestion of "*when* ***signaling information*** *indicates that an* ***operation based on the BSS color is not allowed***" as recited in claim 21 because "the BSS color indicated in the HE-SIG-A field" in Noh does not "*indicate[] that* ***an operation based on the BSS color is not allowed***" (emphasis added).

Hence, there is no identical or completely detailed disclosure in Noh that "*the processor is configured … not to use a* ***Basic Service Set (BSS) color*** *when* ***signaling information*** *indicates that an* ***operation based on the BSS color is not allowed***" as recited in claim 21 (emphasis added). The Applicant notes that "'[t]he identical invention must be shown in as complete detail as is contained in the ... claim.' *Richardson v. Suzuki Motor Co.,* 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)" MPEP §2131 (emphasis added).

For at least the foregoing reasons, the Applicant respectfully submits that claim 1 is not anticipated by Noh, and requests reconsideration and withdrawal of §102 rejection of claim 1.

Claim 29

The Applicant respectfully submits that arguments similar to the arguments set forth for claim 21 can be used, *mutatis mutandis*, to show that claim 29 is not anticipated by Noh and requests reconsideration and withdrawal of the §102 rejection of claim 29.

Claims 24 and 32

As a matter of law, if an independent claim is not anticipated, claims that depend upon it cannot be anticipated. *Minnesota Mining & Mfg. Co. v. Chemque, Inc.*, 303 F.3d 1294, 1299 (Fed. Cir. 2002). As discussed above, claims 21 and 29 are not anticipated by Noh. Claims 24 and 32 depend from claim 21 or 29. Therefore, the Applicant respectfully submits that claims 24 and 32 are not anticipated by Noh at least by way of their dependencies on claims 21 and 29, and requests reconsideration and withdrawal of the §102 rejections of claims 24 and 32.

Claim Rejections – 35 U.S.C. §103

In the Office Action, claims 22 and 30 stand rejected under 35 U.S.C. §103 as allegedly being obvious over Noh in view of Kim (See Office Action: item 22 at page 7). Claims 23 and 31 stand rejected under 35 U.S.C. §103 as allegedly being obvious over Noh in view of Kim and Chun (See Office Action: item 29 at page 9). Claims 25 and 33 stand rejected under 35 U.S.C. §103 as allegedly being obvious over Noh in view of Chun (See Office Action: item 38 at page 11). Claims 26 and 34 stand rejected under 35 U.S.C. §103 as allegedly being obvious over Noh in view of Oteri (See Office Action: item 44 at page 12). Claims 27-28 and 35-36 stand rejected under 35 U.S.C. §103 as allegedly being obvious over Noh in view of Seok (See Office Action: item 50 at page 14). The Office Action does not contend that Kim, Chun, Oteri or Seok makes up the Noh's deficiencies discussed above with respect to claims 21 and 22. Therefore, the Applicant respectfully submits that claims 22, 23, 25-28, 30, 31 and 33-36 are patentable under 35 U.S.C. §103 and requests reconsideration and withdrawal of the §103 rejections of claims 22, 23, 25-28, 30, 31 and 33-36.

CONCLUSION

It is believed that all of the grounds of rejection have been properly traversed, accommodated, or rendered moot. The Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (323) 934-2300.

The Commissioner is authorized to charge any additional fees which may be required or credit overpayment to deposit account no. 12-0415. In particular, if this response is not timely filed, then the Commissioner is authorized to treat this response as including a petition to extend the time period pursuant to 37 CFR 1.136 (a) requesting an extension of time of the number of months necessary to make this response timely filed and the petition fee due in connection therewith may be charged to deposit account no. 12-0415.

I hereby certify that this document is being transmitted electronically to the United States Patent and Trademark Office via electronic filing.

June 4, 2020
(Date of Transmission)

Azatuhi Chinaryan
(Name of Person Transmitting)

/ Azatuhi Chinaryan /
(Signature)

Respectfully submitted,

/ Young Seok Koo 76,255 /

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Electronic Acknowledgement Receipt

EFS ID:	39631338
Application Number:	16121546
International Application Number:	
Confirmation Number:	9775
Title of Invention:	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET
First Named Inventor/Applicant Name:	Geonjung KO
Customer Number:	158747
Filer:	Young Seok Koo/Azatuhi Chinaryan
Filer Authorized By:	Young Seok Koo
Attorney Docket Number:	B-9587CON 631613-2
Receipt Date:	04-JUN-2020
Filing Date:	04-SEP-2018
Time Stamp:	17:29:22
Application Type:	Utility under 35 USC 111(a)

Payment information:

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		2020-06-04_631613_Response_to_Non-Final_OA_3-5-2020.pdf	88784 1881fd9d1775454d6974743b1456fa334da1f631	yes	11

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment/Req. Reconsideration-After Non-Final Reject	1	1
	Claims	2	5
	Applicant Arguments/Remarks Made in an Amendment	6	11
Warnings:			
Information:			
	Total Files Size (in bytes):	88784	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/121,546	Filing Date 09/04/2018	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	06/04/2020	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 16	Minus	** 20	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0		x $460 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/STEFANIE A BRYCE/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/121,546	09/04/2018	Geonjung KO	B-9587CON 631613-2	9775

158747 7590 03/05/2020

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4525 Wilshire Boulevard
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LOS ANGELES, CA 90010

EXAMINER	
TANG, KIET G	

ART UNIT	PAPER NUMBER
2469	

NOTIFICATION DATE	DELIVERY MODE
03/05/2020	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):

LA_MAIL@la.ladas.com
achinaryan@la.ladas.com
ykoo@la.ladas.com

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No. 16/121,546	Applicant(s) KO et al.	
	Examiner KIET TANG	Art Unit 2469	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 05/23/2019.

☐ 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) 21-36 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) 21-36 is/are rejected.

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

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

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

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

11)☑ The drawing(s) filed on 09/04/2018 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 09/04/2018, 06/14/2019, 09/20/2019, 12/18/2019

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

4) ☐ Other: _____.

DETAILED ACTION

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 21-36 are pending.

3. Claims 1-20 have been cancelled.

Claim Objections

4. **Claims 21, 23, 25, 26, 29, 31 and 33** are objected to because of the following informalities:

5. Claim 21 recites the limitation "the terminal" in lines 1-2. For clarity and consistency, it is suggested to revise as “the wireless communication terminal”.

6. Claims 21 and 29 recite the acronym “PLCP” without initially defining what it stands for.

7. Claims 23, 25, 31 and 33 recite the acronym “MAC” without initially defining what it stands for.

8. Claim 26 contains a typographical error. Claim 26 recites "The wireless communication terminal of claim 1" in line 1. Claim 1 has been cancelled.

Claim Rejections - 35 USC § 112

9. The following is a quotation of 35 U.S.C. 112(b):

(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. **Claim 29 is rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite** for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

11. Claim 29 recites “the transceiver” in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

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

13. 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.

14. **Claims 21, 24, 29 and 32 are rejected under 35 U.S.C. 102(a)(2) as being anticipated by NOH et al. (Pub. No.: US 20170094685 A1), hereinafter NOH.**

15. **With respect to claim 21, NOH** teaches A wireless communication terminal communicating wirelessly, the terminal comprising:

a transceiver ([0010], transceiver); and

a processor ([0010], processor),

wherein the processor is configured to receive a PLCP Processing Data Unit (PPDU) by using the transceiver (figure 1, [0010, 0040], a STA receives a PPDU), and not to perform an operation based on a Basic Service Set (BSS) color when signaling information indicates that the operation based on the BSS color is not allowed (figure 1, [0040], not to set an Intra-BSS (NAV) when the BSS color indicated in the HE-SIG-A field does not match the BSS color of the BSS associated with the receiving STA, the receiving STA regards the PPDU as an inter-BSS PPDU),

wherein the BSS color is an identifier of a BSS (figure 1, [0040], The BSS color helps identify a BSS associated with the STA that transmitted the PPDU),

wherein the signaling information is transmitted from a base wireless communication terminal to which the wireless communication terminal is associated

(figure 1, [0030, 0040], the signaling information is transmitted from a base wireless communication terminal / access point to which the wireless communication terminal/STA is associated).

16. **With respect to claim 24**, **NOH** teaches wherein the processor is configured to signal that the operation based on the BSS color is not allowed when the wireless communication terminal recognizes that the BSS color collision has occurred (figure 1, [0040], the operation based on the BSS color is not allowed when the wireless communication terminal/STA recognizes that the BSS color collision/ does not match the BSS color), wherein the BSS color collision represents that different BSSs correspond to the same BSS color (figure 1, [0040], If the BSS color indicated in the HE-SIG-A field matches the BSS color of the BSS associated with the receiving STA, the receiving STA regards the PPDU as an intra-BSS PPDU and sets/updates its NAV using the duration indicated in the TXOP duration field of the HE-SIG-A field, if this new NAV is greater than the existing NAV (e.g., current NAV value). If the BSS color indicated in the HE-SIG-A field does not match the BSS color of the BSS associated with the receiving STA, the receiving STA regards the PPDU as an inter-BSS PPDU).

17. **With respect to claim 29**, **NOH** teaches An operation method of a wireless communication terminal communicating wirelessly, the method comprising: receiving a PLCP Processing Data Unit (PPDU) by using the transceiver (figure 1, [0010, 0040], a STA receives a PPDU); and

not performing an operation based on a Basic Service Set (BSS) color when signaling information indicates that the operation based on the BSS color is not allowed (figure 1, [0040], not to set an Intra-BSS (NAV) when the BSS color indicated in the HE-SIG-A field does not match the BSS color of the BSS associated with the receiving STA, the receiving STA regards the PPDU as an inter-BSS PPDU),

wherein the BSS color is an identifier of a BSS (figure 1, [0040], The BSS color helps identify a BSS associated with the STA that transmitted the PPDU),

wherein the signaling information is transmitted from a base wireless communication terminal to which the wireless communication terminal is associated (figure 1, [0030, 0040], the signaling information is transmitted from a base wireless communication terminal / access point to which the wireless communication terminal/STA is associated).

18. **With respect to claim 32**, this claim recites the wireless communication terminal of claim 24, and it is rejected for at least the same reasons.

Claim Rejections - 35 USC § 103

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

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

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

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

21. This application currently names joint inventors. In considering patentability of the claims the examiner presumes that the subject matter of the various claims was commonly owned as of the effective filing date of the claimed invention(s) absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and effective filing dates of each claim that was not commonly owned as of the effective filing date of the later invention in order for the examiner to consider the applicability of 35 U.S.C. 102(b)(2)(C) for any potential 35 U.S.C. 102(a)(2) prior art against the later invention.

22. **Claims 22 and 30 are rejected under 35 U.S.C. 103 as being unpatentable over NOH, in view of KIM et al. (Pub. No.: US 20180324859 A1), hereinafter KIM.**

23. Patent No.: Pub. No.: US 20180324859 A1 is a translation of Pub. No.: WO/2017/074024.

24. **With respect to claim 22**, **NOH** teaches wherein the processor is configured not to set an Intra-BSS Network Vector Allocation (NAV) by using the BSS color indicated by a signaling field of the PPDU when the signaling information indicates that the operation based on the BSS color is not allowed (figure 1, [0040], not to set an Intra-BSS (NAV) when the BSS color indicated in the HE-SIG-A field does not match the BSS color of the BSS associated with the receiving STA, the receiving STA regards the PPDU as an inter-BSS PPDU).

25. **NOH** does not explicitly teach wherein the Intra-BSS NAV is different from a Basic NAV and is a NAV which is set based on the Intra-BSS PPDU, wherein the Basic NAV is set based on an Inter-BSS PPDU or a PPDU which is not able to be identified as the Inter-BSS PPDU or the Intra-BSS PPDU.

26. However, **KIM** teaches wherein the Intra-BSS NAV is different from a Basic NAV and is a NAV which is set based on the Intra-BSS PPDU ([0183], The inter-BSS NAV may be referred to as a non-intra-BSS NAV, a regular NAV or a basic NAV), wherein the Basic NAV is set based on an Inter-BSS PPDU ([0183], The inter-BSS NAV is an NAV updated by receiving a frame transmitted by an STA of the inter-BSS).

27. Therefore, it would have been obvious to one of the ordinary skills in the art before the effective filing data of the claimed invention to combine the teachings of **KIM,** wherein the Intra-BSS NAV is different from a Basic NAV and is a NAV which is set

based on the Intra-BSS PPDU, wherein the Basic NAV is set based on an Inter-BSS PPDU or a PPDU which is not able to be identified as the Inter-BSS PPDU or the Intra-BSS PPDU, into the teachings of **NOH**, in order for the NAV to be managed more accurately and efficiently (**KIM,** [0014]).

28. **With respect to claim 30**, this claim recites the wireless communication terminal of claim 22, and it is rejected for at least the same reasons.

29. **Claims 23 and 31 are rejected under 35 U.S.C. 103 as being unpatentable over NOH, in view of KIM, and further in of CHUN et al. (Pub. No.: US 20170367078 A1), hereinafter CHUN.**

30. Patent No.: Pub. No.: US 20170367078 A1 is a translation of Pub. No.: WO/2016/099140.

31. **With respect to claim 23**, **NOH** teaches wherein the PPDU includes a TXOP Duration field in the signaling field of the PPDU (figure 1, [0040], the receiving STA regards the PPDU as an intra-BSS PPDU and sets/updates its NAV using the duration indicated in the TXOP duration field of the HE-SIG-A field), wherein the TXOP Duration field indicates information used for setting the Intra- BSS NAV and the Basic NAV ([0039-0040], the receiving STA sets/updates its NAV using the duration indicated in the TXOP duration field), wherein the duration field indicates information used for setting

the Intra-BSS NAV and the Basic NAV ([0041], the STA sets/updates its NAV using the duration indicated in a duration field).

32. **NOH** does not explicitly teach the Basic NAV. However, **KIM** teaches the Basic NAV ([0183], The inter-BSS NAV may be referred to as a non-intra-BSS NAV, a regular NAV or a basic NAV).

33. Therefore, it would have been obvious to one of the ordinary skills in the art before the effective filing data of the claimed invention to combine the teachings of **KIM,** the Basic NAV, into the teachings of **NOH**, in order for the NAV to be managed more accurately and efficiently (**KIM,** [0014]).

34. The combination of **NOH** and **KIM** does not explicitly teach a MAC frame which includes a duration field.

35. However, **CHUN** teaches a MAC frame which includes a duration field ([0408], a trigger frame is transmitted in the MAC frame format of a legacy system, a legacy STA may read the duration field), and wherein the processor is configured not to use the TXOP Duration field for setting the Intra-BSS NAV or the Basic NAV when the wireless communication terminal gets valid signaling field of the MAC frame ([0408], If a trigger frame is transmitted in the MAC frame format of a legacy system, a legacy STA may read the duration field of a MAC header within the trigger frame and perform NAV setting).

36. Therefore, it would have been obvious to one of the ordinary skills in the art before the effective filing data of the claimed invention to combine the teachings of **CHUN,** a MAC frame which includes a duration field, and wherein the processor is configured not to use the TXOP Duration field for setting the Intra-BSS NAV or the Basic NAV when the wireless communication terminal gets valid signaling field of the MAC frame, into the teachings of **NOH** and **KIM**, in order for transmitting data for supporting a data transmission of multi-user and a device for supporting the same (**CHUN,** [0001]).

37. **With respect to claim 31**, this claim recites the wireless communication terminal of claim 23, and it is rejected for at least the same reasons.

38. **Claims 25 and 33 are rejected under 35 U.S.C. 103 as being unpatentable over NOH, in view of CHUN.**

39. **With respect to claim 25**, **NOH** teaches wherein the processor is configured to determine that BSS color collision has occurred based on address fields of MAC frame (figure 1, [0038], when a STA receives a PPDU which results in that the STA determines the wireless medium is busy, the STA decodes the PPDU and checks the contents in the BSS color field of the HE-SIG-A field or the MAC address in the MAC header to determine whether the PPDU is an intra-BSS PPDU or an inter-BSS PPDU with respect to the STA).

40. **NOH** does not explicitly teach a MAC frame which includes a duration field.

41. However, **CHUN** teaches address fields of MAC frame ([0173], the MAC address of an STA that sends a corresponding MAC frame).

42. Therefore, it would have been obvious to one of the ordinary skills in the art before the effective filing data of the claimed invention to combine the teachings of **CHUN,** address fields of MAC frame, into the teachings of **NOH,** in order for transmitting data for supporting a data transmission of multi-user and a device for supporting the same (**CHUN,** [0001]).

43. **With respect to claim 33**, this claim recites the wireless communication terminal of claim 25, and it is rejected for at least the same reasons.

44. **Claims 26 and 34 are rejected under 35 U.S.C. 103 as being unpatentable over NOH, in view of OTERI et al. (Pub. No.: US 20190021106 A1), hereinafter OTERI.**

45. **With respect to claim 26**, **NOH** teaches wherein the operation based on the BSS color as set forth above.

46. **NOH** does not explicitly teach wherein the operation based on the BSS color includes entering a doze state of a power save operation based on a Basic Service Set (BSS) color indicated by a signaling field of the PPDU, wherein the power save operation is an operation for the wireless communication terminal to enter the doze state until an end of a received PPDU which is an Intra-BSS PPDU.

47. However, **OTERI** teaches wherein the operation based on the BSS color includes entering a doze state of a power save operation based on a Basic Service Set (BSS) color indicated by a signaling field of the PPDU, wherein the power save operation is an operation for the wireless communication terminal to enter the doze state until an end of a received PPDU which is an Intra-BSS PPDU ([0072]).

48. Therefore, it would have been obvious to one of the ordinary skills in the art before the effective filing data of the claimed invention to combine the teachings of **OTERI,** wherein the operation based on the BSS color includes entering a doze state of a power save operation based on a Basic Service Set (BSS) color indicated by a signaling field of the PPDU, wherein the power save operation is an operation for the wireless communication terminal to enter the doze state until an end of a received PPDU which is an Intra-BSS PPDU, into the teachings of **NOH,** in order to enhance the quality of service (QoS) experienced by wireless users in many usage scenarios, such as high-density deployments of APs and STAs (**OTERI,** [0063]).

49. **With respect to claim 34**, this claim recites the wireless communication terminal of claim 26, and it is rejected for at least the same reasons.

50. **Claims 27-28 and 35-36 are rejected under 35 U.S.C. 103 as being unpatentable over NOH, in view of SEOK (Pub. No.: US 20160249397 A1), hereinafter SEOK.**

51. **With respect to claim 27**, **NOH** teaches wherein the processor is configured not to perform a spatial reuse operation when the BSS color indicated by the (figure 1, [0010, 0040], not to perform a spatial reuse operation when the BSS color matches).

52. **NOH** does not explicitly teach indicated by the signaling field of the PPDU is a predetermined value.

53. However, **SEOK** teaches indicated by the signaling field of the PPDU is a predetermined value ([0311], On the other hand, if the associated AP is a legacy AP that does not support HE capabilities, the AP does not provide a COLOR parameter and thus a predetermined value (e.g., 0) may be determined to be the first COLOR parameter).

54. Therefore, it would have been obvious to one of the ordinary skills in the art before the effective filing data of the claimed invention to combine the teachings of **SEOK,** indicated by the signaling field of the PPDU is a predetermined value, into the

teachings of **NOH,** in order for dynamic channel sensing for direct link in a High Efficiency WLAN (HEW) (**SEOK,** [0003]).

55. **With respect to claim 28**, **NOH** teaches wherein the predetermined value is 0 ([0311], a predetermined value (e.g., 0)).

56. **With respect to claim 35**, this claim recites the wireless communication terminal of claim 27, and it is rejected for at least the same reasons.

57. **With respect to claim 36**, this claim recites the wireless communication terminal of claim 28, and it is rejected for at least the same reasons.

Conclusion

58. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KIET TANG whose telephone number is (571)270-7193. The examiner can normally be reached on M-F 8:00-5:00.

59. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, IAN MOORE can be reached on (571) 272-3085. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

60. 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.

/KIET TANG/
Primary Examiner, Art Unit 2469

Notice of References Cited	Application/Control No. 16/121,546	Applicant(s)/Patent Under Reexamination KO et al.	
	Examiner KIET TANG	Art Unit 2469	Page 1 of 1

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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20170094685-A1	03-2017	NOH; Yujin	H04W72/042	1/1
*	B	US-20180324859-A1	11-2018	KIM; Jeongki	H04W74/0816	1/1
*	C	US-20170367078-A1	12-2017	CHUN; Jinyoung	H04L5/0044	1/1
*	D	US-20190021106-A1	01-2019	OTERI; Oghenekome	H04W72/1284	1/1
*	E	US-20160249397-A1	08-2016	SEOK; Yongho	H04W74/0808	1/1
	F					
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*		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	
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/121,546	KO et al.
	Examiner	Art Unit
	KIET TANG	2469

CPC - Searched*		
Symbol	Date	Examiner
H04W72/0453 or H04W48/18 or H04W74/002 or H04W84/12 or H04W88/06 or H04W24/02 or H04W74/0841 or H04W74/0825 or H04W28/06 or H04L27/2601 or H04B7/2612	03/02/2020	KT

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
Inventor and assignee search in East and PALM	03/02/2020	KT

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

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/121,546	KO et al.
	Examiner	**Art Unit**
	KIET TANG	2469

✓	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	03/02/2020								
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June 14, 2019

Form PTO-1449 (Modified) Page 1 of 1	ATTY DOCKET NO. B-9587CON 631613-2	U.S. SERIAL NO. 16/121,546
LIST OF PATENTS AND PUBLICATIONS STATEMENT	APPLICANT WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	FILING DATE OR 371 (C) DATE September 4, 2018
		GROUP NO. 2464

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	ISSUE/PUBL. DATE	NAME	CLASS	SUB-CLASS	REMARKS
	1.	2015/0110093	Apr. 23, 2015	Asterjadhi et al.			

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EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY	CLASS	SUB-CLASS	TRANSLATION
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	3.	2014-17866	Jan. 30, 2014	JP			Espacenet
	4.	2015-167417	Sept. 24, 2015	JP			Espacenet

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	6.	Office Action dated March 19, 2019 for Japanese Application No. 2018-520532 and its English translation provided by Applicant's foreign council
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	8.	Matthew Fischer et al.: "CID 205 BSSID Color Bits". September 18, 2013, XP055421527, IEEE-SA mentor, Piscataway, NJ USA, Retrieved from the Internet: URL:https://mentor.ieee.org/802.11/dcn/13/11-13-1207-01-00ah-partial-aid-color-bits.pptx [retrieved on 2017-11-03]
	9.	JOHN SON (WILUS INSTITUTE): "Further Considerations on Enhanced CCA for 11ax; 11-14-0847-01-00ax-further-considerations-on-enhanced-cca-for-11ax", IEEE DRAFT; 11-14-0847-01-00AX-FURTHER-CONSIDERATIONS-ON-ENHANCED-CCA-FOR-11AX, IEEE-SA MENTOR. PISCATAWAY, NJ USA, vol. 802.11 ax, no. 1, July 15, 2014, pages 1+12, XP068069563 [retrieved on 2014-07-15]
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EXAMINER	*DATE CONSIDERED*
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APPLICANTS

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**** CONTINUING DATA ***************************

This application is a CON of PCT/KR2017/002407 03/06/2017

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REPUBLIC OF KOREA 10-2016-0057597 05/11/2016
REPUBLIC OF KOREA 10-2016-0114821 09/07/2016

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10/10/2018

Foreign Priority claimed	35 USC 119(a-d) conditions met	Verified and Acknowledged	Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
☑ Yes ☐ No	☑ Yes ☐ No	/KIET G TANG/ Examiner's Signature	☐ Initials	KOREA, REPUBLIC OF	37	20	3

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TITLE

WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET

FILING FEE RECEIVED	FEES: Authority has been given in Paper	
1720	No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____

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		❑ Credit

December 18, 2019

Form PTO-1449 (Modified) Page 1 of 1	ATTY DOCKET NO. B-9587CON 631613-2	U.S. SERIAL NO. 16/121,546
LIST OF PATENTS AND PUBLICATIONS STATEMENT	APPLICANT WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	FILING DATE OR 371 (C) DATE September 4, 2018
		GROUP NO. 2469

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EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	ISSUE/PUBL. DATE	NAME	CLASS	SUB-CLASS	REMARKS
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	2.	2016/0374087	Dec. 22, 2016	Liu et al.			
	3.	2017/0289987	Oct. 5, 20017	SEOK			
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OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT
	10.	Office Action dated September 25, 2019 for U.S. Patent Application No. 15/953,404
	11.	Notice of Allowance dated December 4, 2019 for U.S. Patent Application No. 16/000,883

EXAMINER	*DATE CONSIDERED*
/KIET TANG/	02/29/2020

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September 4, 2018

Form PTO-1449 (Modified) Page 1 of 1	ATTY DOCKET NO. B-9587CON 631613-2	U.S. SERIAL NO. N/A
LIST OF PATENTS AND PUBLICATIONS STATEMENT	APPLICANT WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. and SK TELECOM CO., LTD.	FILING DATE OR 371 © DATE Concurrently Herewith
		GROUP NO. N/A

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EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	ISSUE/PUBL. DATE	NAME	CLASS	SUB-CLASS	FILING DATE or 102 (e) DATE, IF APPROPRIATE
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	8.	WILUS. "BSS Color Settings for a Multiple BSSID Set", doc.: IEEE 802.11-16/0042rl, pp. 1-11, 18 January 2016

EXAMINER	*DATE CONSIDERED*
/KIET TANG/	02/29/2020

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September 20, 2019

Form PTO-1449 (Modified) Page 1 of 1	ATTY DOCKET NO. B-9587CON 631613-2	U.S. SERIAL NO. 16/121,546
LIST OF PATENTS AND PUBLICATIONS STATEMENT	APPLICANT WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	FILING DATE OR 371 (C) DATE September 4, 2018
		GROUP NO. 2469

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EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY	CLASS	SUB-CLASS	TRANSLATION

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT
	10.	Office Action dated June 27, 2019 for U.S. Patent Application No. 16/000,883 (now published as US 2018/0295567)

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/KIET TANG/	02/29/2020

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EAST Search History

EAST Search History (Prior Art) /K.T./ /K.T./ /K.T./

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"16121546"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/02/29 01:07
S2	4	"16000883"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/02/29 01:08
S3	9	("20160353275" | "20160374087" | "20170006661" | "20170041798" | "20170105143" | "20170251432" | "20170289987" | "20170294949" | "20190028898").PN.	US-PGPUB; USPAT	OR	ON	2020/02/29 23:36
S4	9	("20130148609" | "20140050210" | "20150124774" | "20150341750" | "20150359008" | "20160081132" | "20160088558" | "20160150569" | "20170006661").PN.	US-PGPUB; USPAT	OR	ON	2020/02/29 23:37
S5	1	("20150110093").PN.	US-PGPUB; USPAT	OR	ON	2020/02/29 23:37
S6	1	("20150264617").PN.	US-PGPUB; USPAT	OR	ON	2020/02/29 23:37
S7	54	((("WILUS") near3 ("INSTITUTE") near3 ("OF") near3 ("STANDARDS") near3 ("AND") near3 ("TECHNOLOGY") near3 ("INC"))).AS,AANM.	USPAT	OR	ON	2020/02/29 23:41
S8	643	((("SK") near3 ("TELECOM") near3 ("CO") near3 ("LTD"))).AS,AANM.	USPAT	OR	ON	2020/02/29 23:42
S9	72	((("KO") near3 ("Geonjung"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2020/02/29 23:42
S10	177	((("SON") near3 ("Juhyung"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2020/02/29 23:42
S11	57	((("AHN") near3 ("Woojin"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2020/02/29 23:42
S12	346	((("KWAK") near3 ("Jinsam"))).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2020/02/29 23:42
S13	2920	((Basic and Service and Set) (BSS)).clm.	USPAT	OR	ON	2020/02/29 23:43
S14	9	S13 and S7	US-PGPUB;	OR	ON	2020/02/29

			USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			23:44
S15	7	S13 and S8	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/02/29 23:46
S16	7	S13 and S9	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/02/29 23:47
S17	9	S13 and S10	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/02/29 23:48
S18	3	S13 and S11	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/02/29 23:48
S19	25	S13 and S12	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/02/29 23:48
S20	6840	((Basic and Service and Set) (BSS)).clm.	US-PGPUB; USPAT	OR	ON	2020/02/29 23:50
S21	9	S20 and S7	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/02/29 23:50
S22	7	S20 and S8	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/02/29 23:50
S23	24	S20 and S9	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/02/29 23:50
S24	32	S20 and S10	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2020/02/29 23:51

			IBM_TDB			
S25	1003	((Basic adj Service adj Set) (BSS)) with color	US-PGPUB; USPAT	OR	ON	2020/02/29 23:53
S26	132	(((Basic adj Service adj Set) (BSS)) with color) same allow$4	US-PGPUB; USPAT	OR	ON	2020/02/29 23:58
S27	69	(((Basic adj Service adj Set) (BSS)) with color) with allow$4	US-PGPUB; USPAT	OR	ON	2020/02/29 23:58
S28	29	S27 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/02/29 23:59
S29	3	"15278597" and S27	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:18
S30	64	S26 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:47
S31	46975	(H04W72/0453).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:48
S32	37679	(H04W48/18).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:48
S33	9334	(H04W74/002).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:48
S34	94064	(H04W84/12).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:48
S35	78040	(H04W88/06).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:48
S36	54043	(H04W24/02).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2020/03/01 00:48

			IBM_TDB			
S37	1997	(H04W74/0841).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:49
S38	1054	(H04W74/0825).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:49
S39	32698	(H04W28/06).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:49
S40	16880	(H04L27/2601).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:49
S41	1195	(H04B7/2612).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:49
S42	3	S30 and S31	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:49
S43	0	S30 and S32	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:50
S44	1	S30 and S33	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:50
S45	42	S30 and S34	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:51
S46	1	S30 and S35	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2020/03/01 00:55

			IBM_TDB			
S47	1	S30 and S36	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:55
S48	0	S30 and S37	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:55
S49	0	S30 and S38	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:55
S50	6	S30 and S39	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:55
S51	6	S30 and S39	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:56
S52	0	S30 and S41	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:56
S53	68763	(H04W74$4).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:58
S54	8	S28 and S53	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 00:58
S55	1566585	(H04W$6).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 01:00
S56	27	S28 and S55	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2020/03/01 01:00

			IBM_TDB			
S57	315049	(H04W72/0453 or H04W48/18 or H04W74/002 or H04W84/12 or H04W88/06 or H04W24/02 or H04W74/0841 or H04W74/0825 or H04W28/06 or H04L27/2601 or H04B7/2612).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 01:00
S58	31	Basic adj NAV	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 23:45
S59	23	Basic adj NAV with inter$bss	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 23:46
S60	5	S59 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/01 23:46
S61	315	(mac adj frame) with Duration adj field	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/02 00:26
S62	287	S61 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/02 00:26
S63	315052	(H04W72/0453 or H04W48/18 or H04W74/002 or H04W84/12 or H04W88/06 or H04W24/02 or H04W74/0841 or H04W74/0825 or H04W28/06 or H04L27/2601 or H04B7/2612).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/02 00:26
S64	217	S62 and S63	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/02 00:26
S65	46976	(H04W72/0453).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/02 00:26
S66	8	S62 and S65	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2020/03/02 00:26

			IBM_TDB			
S67	5	(((Basic adj Service adj Set) (BSS)) with color) with (mac adj frame)	US-PGPUB; USPAT	OR	ON	2020/03/02 01:29
S68	1	S67 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/02 01:29
S69	439	address adj field$1 with (mac adj frame)	US-PGPUB; USPAT	OR	ON	2020/03/02 01:32
S70	392	S69 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/02 01:32
S71	5	S70 and S65	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/02 01:32
S72	17	(((Basic adj Service adj Set) (BSS)) with color) same (mac adj frame)	US-PGPUB; USPAT	OR	ON	2020/03/02 01:35
S73	1	S72 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/02 01:36
S74	292	(((Basic adj Service adj Set) (BSS)) with color) and (mac adj frame)	US-PGPUB; USPAT	OR	ON	2020/03/02 01:38
S75	188	S74 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/02 01:38
S76	167	S75 and S63	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/02 01:38
S77	27	S75 and S65	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/02 01:38
S78	13	(((Basic adj Service adj Set) (BSS)) with color) with (power adj save adj mode)	US-PGPUB; USPAT	OR	ON	2020/03/02 01:57
S79	5	S78 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT;	OR	ON	2020/03/02 01:57

			IBM_TDB			
S80	14	predetermined adj value with BSS adj color	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/02 02:27
S81	4	S80 AND (@AD<"20160304" OR @RLAD<"20160304")	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2020/03/02 02:27

3/2/2020 3:05:23 AM
C:\Users\ktang2\Documents\EAST\Workspaces\16 121 546.wsp

Form PTO-1449 (Modified) Page 1 of 1	ATTY DOCKET NO. B-9587CON 631613-2	U.S. SERIAL NO. 16/121,546
LIST OF PATENTS AND PUBLICATIONS STATEMENT	APPLICANT WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	FILING DATE OR 371 (C) DATE September 4, 2018
		GROUP NO. 2469

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	ISSUE/PUBL. DATE	NAME	CLASS	SUB-CLASS	REMARKS
	1.	2017/0251432	Aug. 31, 2017	PARK et al.			
	2.	2016/0374087	Dec. 22, 2016	Liu et al.			
	3.	2017/0289987	Oct. 5, 20017	SEOK			
	4.	2017/0105143	Apr. 13, 2017	SEOK			
	5.	2019/0028898	Jan. 24, 2019	KO et al.			
	6.	2016/0353275	Dec. 1, 2016	Liu et al.			
	7.	2017/0006661	Jan. 5, 2017	Huang et al.			
	8.	2017/0294949	Oct. 12, 2017	Zhang et al.			
	9.	2017/0041798	Feb. 9, 2017	LI et al.			

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY	CLASS	SUB-CLASS	TRANSLATION

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT
	10.	Office Action dated September 25, 2019 for U.S. Patent Application No. 15/953,404
	11.	Notice of Allowance dated December 4, 2019 for U.S. Patent Application No. 16/000,883

EXAMINER	*DATE CONSIDERED*

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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	Examiner: TANG, KIET G
Serial No.: 16/121,546	Art Unit: 2469
Filing or 371 (c) Date: September 4, 2018	Conf. No.: 9775
For: "WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET"	Our Ref: B-9587CON 631613-2
Date: December 18, 2019	Re: ***Information Disclosure Statement***

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir/Madam:

This information disclosure statement is filed in accordance with 37 C.F.R. §§ 1.56, 1.97 and 1.98 to disclose information that may be relevant to the above-identified patent application. The Applicant requests the Examiner consider the documents listed on the enclosed form PTO-1449 (modified) in the examination of this application.

The filing of this Information Disclosure Statement (IDS) shall not be construed as a representation that a search has been made (37 C.F.R. 1.97(g)), an admission that the information cited is, or is considered to be, material to patentability, or that no other material information exists.

The filing of this Information Disclosure Statement shall not be construed as an admission against interest in any manner (37 C.F.R § 1.97(h)).

If any additional fee is required for this filing, the Applicant requests the Examiner contact a practitioner associated with the Customer Number listed below for authorization.

This information disclosure statement also includes the statements marked below. Failure to mark a statement should not be construed as a negative assertion.

Timing and Fees

This IDS is being filed:

[ ] Concurrently with the application, and no fee is due.

[ ] Within three months of the filing of the national application, other than a continued prosecution application under § 1.53(d), and no fee is due.

[ ] Within three months of the date of entry of the national stage as set forth in § 1.491 in an international application, and no fee is due.

[x] Before the mailing of a first Office Action on the merits, and no fee is due.

[ ] Before the mailing of a first Office Action after the filing of a request for continued examination under§ 1.114, and no fee is due.

[ ] After the periods described above, and before a final Office Action under § 1.113, a Notice of Allowance under § 1.311, or an action that otherwise closes prosecution in the application, and is

- [ ] accompanied by the fee set forth in § 1.17(p), or
- [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(1): That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement; or
- [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(2): That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

[ ] After the periods described above, and is accompanied by the fee set forth in § 1.17(p), and is

- [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(1), that each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement; or

- [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(2), that no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

[ ] Concurrently with a Request for Continued Examination, and no additional fee is due for this IDS.

Items Disclosed

At least one item listed on the enclosed form PTO-1449 (modified) was

[x] Cited in an Office Action for a related application, the application number of the related application and the issue date of the Office Action are provided below and the Office Action is enclosed.

Office Action dated September 25, 2019 for U.S. Patent Application No. 15/953,404

Notice of Allowance dated December 4, 2019 for U.S. Patent Application No. 16/000,883

[ ] Cited in an International Search Report (ISR) or an International Preliminary Report on Patentability (IPRP) or a Written Opinion (WO) of the International Searching Authority (ISA) for the related PCT Application, the PCT application number and the issue date of the ISR/IPRP/WO are provided below and the ISR/IPRP/WO is enclosed.

Additional Information

[ ] Translations of the foreign-language documents are also enclosed as machine-translations, human-translations, or counterpart applications as noted. Machine translations were provided by the Japanese Patent Office, ESPACENET, Google Documents, Patent Fetcher® /ESPACENET, Google Translate or Google Translator Toolkit as noted and with OCR by Adobe Acrobat 9 or ABBYY PDF Transformer 3 if needed.

[ ] English-language abstracts of foreign-language documents are provided.

[x] Documents listed on the enclosed ISR/IPRP/WO or the Office Action have relevance at least as described therein.

[ ] The documents with the following reference numbers were described in the specification of the present application; omission of a reference from this list does not indicate that it was not discussed in the specification of the present application.

[ ] At least one of the references cited in the Office Action listed on the attached PTO-1449 (modified) were previously submitted in an IDS or cited by the Examiner for the present application on _____ and therefore are not submitted in this IDS.

[ ] Other:

I hereby certify that this document is being transmitted to the Patent and Trademark Office via electronic filing.

December 18, 2019
(Date of Transmission)

Azatuhi Chinaryan
(Name of Person Transmitting)

/ Azatuhi Chinaryan /
(Signature)

Respectfully submitted,

/ Young Seok Koo 76,255 /

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Electronic Acknowledgement Receipt

EFS ID:	38079900
Application Number:	16121546
International Application Number:	
Confirmation Number:	9775
Title of Invention:	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET
First Named Inventor/Applicant Name:	Geonjung KO
Customer Number:	158747
Filer:	Young Seok Koo/Azatuhi Chinaryan
Filer Authorized By:	Young Seok Koo
Attorney Docket Number:	B-9587CON 631613-2
Receipt Date:	18-DEC-2019
Filing Date:	04-SEP-2018
Time Stamp:	21:55:39
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		2019-12-18_631613_IDS.pdf	151981 bec8f078bd5a8da163e846f25c4114c79a067162	yes	4

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Information Disclosure Statement (IDS) Form (SB08)	4	4
	Transmittal Letter	1	3

Warnings:					
Information:					
2	Other Reference-Patent/App/Search documents	Ref1_US15953404_1stOA.pdf	469515 56cc1e970ceb0257334af3bbbce965e35aa34bd7	no	14
Warnings:					
Information:					
3	Other Reference-Patent/App/Search documents	Ref11_US16000883_NOA.pdf	362163 85c28f73343c343aca08fb425b577540203cf778	no	6
Warnings:					
Information:					
		Total Files Size (in bytes):	983659		

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.

Form PTO-1449 (Modified) Page 1 of 1	ATTY DOCKET NO. B-9587CON 631613-2	U.S. SERIAL NO. 16/121,546
LIST OF PATENTS AND PUBLICATIONS STATEMENT	APPLICANT WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	FILING DATE OR 371 (C) DATE September 4, 2018
		GROUP NO. 2469

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	ISSUE/PUBL. DATE	NAME	CLASS	SUB-CLASS	REMARKS
	1.	2017/0006661	Jan. 5, 2017	Huang et al.			
	2.	2013/0148609	Jun. 13, 2013	RAM et al.			
	3.	2016/0150569	May 26, 2016	Benveniste			
	4.	2016/0088558	Mar. 24, 2016	CHU et al.			
	5.	2015/0359008	Dec. 10, 2015	WANG et al.			
	6.	2016/0081132	Mar. 17, 2016	LEE et al.			
	7.	2015/0341750	Nov. 26, 2015	Hayes et al.			
	8.	2015/0124774	May 7, 2015	KAUSHIK et al.			
	9.	2014/0050210	Feb. 20, 2014	Waters et al.			

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY	CLASS	SUB-CLASS	TRANSLATION

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT
	10.	Office Action dated June 27, 2019 for U.S. Patent Application No. 16/000,883 (now published as US 2018/0295567)

EXAMINER	*DATE CONSIDERED*

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

Electronic Acknowledgement Receipt

EFS ID:	37234424
Application Number:	16121546
International Application Number:	
Confirmation Number:	9775
Title of Invention:	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET
First Named Inventor/Applicant Name:	Geonjung KO
Customer Number:	158747
Filer:	Young Seok Koo/Azatuhi Chinaryan
Filer Authorized By:	Young Seok Koo
Attorney Docket Number:	B-9587CON 631613-2
Receipt Date:	20-SEP-2019
Filing Date:	04-SEP-2018
Time Stamp:	22:34:31
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		2019-09-20_631613_IDS.pdf	151350 a394af7a4df4b9c0ddb39f0ad150a9519147f5c8	yes	4

	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Transmittal Letter		1	3	
	Information Disclosure Statement (IDS) Form (SB08)		4	4	
Warnings:					
Information:					
2	Other Reference-Patent/App/Search documents	Ref1_US16000883_1stOA_6-27-19.pdf	325018 a85a043cb6b7ee2d102e0755bea599d584d41aea	no	9
Warnings:					
Information:					
		Total Files Size (in bytes):	476368		

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	Examiner: TANG, KIET G
Serial No.: 16/121,546	Art Unit: 2469
Filing or 371 (c) Date: September 4, 2018	Conf. No.: 9775
For: "WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET"	Our Ref: B-9587CON 631613-2
Date: September 20, 2019	Re: ***Information Disclosure Statement***

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir/Madam:

This information disclosure statement is filed in accordance with 37 C.F.R. §§ 1.56, 1.97 and 1.98 to disclose information that may be relevant to the above-identified patent application. The Applicant requests the Examiner consider the documents listed on the enclosed form PTO-1449 (modified) in the examination of this application.

The filing of this Information Disclosure Statement (IDS) shall not be construed as a representation that a search has been made (37 C.F.R. 1.97(g)), an admission that the information cited is, or is considered to be, material to patentability, or that no other material information exists.

The filing of this Information Disclosure Statement shall not be construed as an admission against interest in any manner (37 C.F.R § 1.97(h)).

If any additional fee is required for this filing, the Applicant requests the Examiner contact a practitioner associated with the Customer Number listed below for authorization.

This information disclosure statement also includes the statements marked below. Failure to mark a statement should not be construed as a negative assertion.

Timing and Fees

This IDS is being filed:

[ ] Concurrently with the application, and no fee is due.

[ ] Within three months of the filing of the national application, other than a continued prosecution application under § 1.53(d), and no fee is due.

[ ] Within three months of the date of entry of the national stage as set forth in § 1.491 in an international application, and no fee is due.

[x] Before the mailing of a first Office Action on the merits, and no fee is due.

[ ] Before the mailing of a first Office Action after the filing of a request for continued examination under§ 1.114, and no fee is due.

[ ] After the periods described above, and before a final Office Action under § 1.113, a Notice of Allowance under § 1.311, or an action that otherwise closes prosecution in the application, and is

- [ ] accompanied by the fee set forth in § 1.17(p), or
- [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(1): That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement; or
- [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(2): That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

[ ] After the periods described above, and is accompanied by the fee set forth in § 1.17(p), and is

- [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(1), that each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement; or

- [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(2), that no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

[ ] Concurrently with a Request for Continued Examination, and no additional fee is due for this IDS.

Items Disclosed

At least one item listed on the enclosed form PTO-1449 (modified) was

[x] Cited in an Office Action for a related application, the application number of the related application and the issue date of the Office Action are provided below and the Office Action is enclosed.

Office Action dated June 27, 2019 for U.S. Patent Application No. 16/000,883

[ ] Cited in an International Search Report (ISR) or an International Preliminary Report on Patentability (IPRP) or a Written Opinion (WO) of the International Searching Authority (ISA) for the related PCT Application, the PCT application number and the issue date of the ISR/IPRP/WO are provided below and the ISR/IPRP/WO is enclosed.

Additional Information

[ ] Translations of the foreign-language documents are also enclosed as machine-translations, human-translations, or counterpart applications as noted. Machine translations were provided by the Japanese Patent Office, ESPACENET, Google Documents, Patent Fetcher® /ESPACENET, Google Translate or Google Translator Toolkit as noted and with OCR by Adobe Acrobat 9 or ABBYY PDF Transformer 3 if needed.

[ ] English-language abstracts of foreign-language documents are provided.

[x] Documents listed on the enclosed ISR/IPRP/WO or the Office Action have relevance at least as described therein.

[ ] The documents with the following reference numbers were described in the specification of the present application; omission of a reference from this list does not indicate that it was not discussed in the specification of the present application.

[ ] At least one of the references cited in the Office Action listed on the attached PTO-1449 (modified) were previously submitted in an IDS or cited by the Examiner for the present application on _____ and therefore are not submitted in this IDS.

[ ] Other:

I hereby certify that this document is being transmitted to the Patent and Trademark Office via electronic filing.

September 20, 2019
(Date of Transmission)

Azatuhi Chinaryan
(Name of Person Transmitting)

/ Azatuhi Chinaryan /
(Signature)

Respectfully submitted,

/ Young Seok Koo 76,255 /

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Form PTO-1449 (Modified) Page 1 of 1	ATTY DOCKET NO. B-9587CON 631613-2	U.S. SERIAL NO. 16/121,546
LIST OF PATENTS AND PUBLICATIONS STATEMENT	APPLICANT WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	FILING DATE OR 371 (C) DATE September 4, 2018
		GROUP NO. 2464

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	ISSUE/PUBL. DATE	NAME	CLASS	SUB-CLASS	REMARKS
	1.	2015/0110093	Apr. 23, 2015	Asterjadhi et al.			

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY	CLASS	SUB-CLASS	TRANSLATION
	2.	2004-525586	Aug. 19, 2004	JP			Espacenet
	3.	2014-17866	Jan. 30, 2014	JP			Espacenet
	4.	2015-167417	Sept. 24, 2015	JP			Espacenet

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT
	5.	International Preliminary Report on Patentability (Chapter I) for PCT/KR2017/002407 issued on September 4, 2018 and its English translation from WIPO
	6.	Office Action dated March 19, 2019 for Japanese Application No. 2018-520532 and its English translation provided by Applicant's foreign council
	7.	Extended European Search Report dated April 23, 2019 for European Application No. 16857801.1
	8.	Matthew Fischer et al.: "CID 205 BSSID Color Bits". September 18, 2013, XP055421527, IEEE-SA mentor, Piscataway, NJ USA, Retrieved from the Internet: URL:https://mentor.ieee.org/802.11/dcn/13/11-13-1207-01-00ab-partial-aid-color-bits.pptx [retrieved on 2017-11-03]
	9.	JOHN SON (WILUS INSTITUTE): "Further Considerations on Enhanced CCA for 11ax; 11-14-0847-01-00ax-further-considerations-on-enhanced-cca-for-11ax", IEEE DRAFT; 11-14-0847-01-00AX-FURTHER-CONSIDERATIONS-ON-ENHANCED-CCA-FOR-11AX, IEEE-SA MENTOR. PISCATAWAY, NJ USA, vol. 802.11 ax, no. 1, July 15, 2014, pages 1+12, XP068069563 [retrieved on 2014-07-15]
	10.	ROBERT STACEY (INTEL): "Spec Framework; 11-15-0132-09-00ax-spec-framework", IEEE DRAFT; 11-15-0132-09-00AX-SPEC-FRAMEWORK, IEEE-SA MENTOR, PISCATAWAY, NJ USA, vol. 802.11ax, no. 9, September 22, 2015, pages 1-22, XP068097995, [retrieved on 2015-09-22]

	11.	ALFRED ASTERJADHI: Identifiers in HE PPDUs for power saving", IEEE DRAFT; 11-15-1122-00-00AX-IDENTIFIERS-IN-HE-PPDUS-FOR-POWER-SAVING, IEEE-SA MENTOR, PISCATAWAY, NJ USA, vol. 802.11ax September 12, 2015, pages 1-18, XP068098373, Retrieved from the Internet: URL: https://mentor.ieee.org/802.11/dcn/15/11-15-1122-00-00ax-identifiers-in-he-ppdus-for-power-saving.pptx

EXAMINER	*DATE CONSIDERED*

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

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference WILP170023WO	**FOR FURTHER ACTION**	See item 4 below
International application No. PCT/KR2017/002407	International filing date *(day/month/year)* 06 March 2017 (06.03.2017)	Priority date *(day/month/year)* 04 March 2016 (04.03.2016)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC.		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 10 sheets, including this cover sheet.

   In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44*bis*.3(c) and 93*bis*.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44*bis* .2).

	Date of issuance of this report 04 September 2018 (04.09.2018)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Authorized officer Kihwan Moon e-mail: pct.team1@wipo.int

Form PCT/IB/373 (January 2004)

PATENT COOPERATION TREATY

TRANSLATION

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	13.07.2017
Applicant's or agent's file reference: WILP170023WO	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/KR2017/002407	06.03.2017	04.03.2016

International Patent Classification (IPC) or both national classification and IPC
H04W74/00(2009.01)i, H04W74/08(2009.01)i, H04W84/12(2009.01)i, H04W28/06(2009.01)i, H04B7/26(2006.01)i, H04L27/26(2006.01)i, H04W 28/04(2009.01)i, H04W24/02(2009.01)i

Applicant
WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I — Basis of the opinion
- ☐ Box No. II — Priority
- ☐ Box No. III — Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV — Lack of unity of invention
- ☒ Box No. V — Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI — Certain documents cited
- ☐ Box No. VII — Certain defects in the international application
- ☐ Box No. VIII — Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/KR	Date of completion of this opinion	Authorized officer
Facsimile No.		Telephone No.

Form PCT/ISA/237 (cover sheet) (January 2015)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/KR2017/002407

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

☒ the international application in the language in which it was filed

☐ a translation of the international application into _____ , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:

a. ☐ forming part of the international application as filed:

☐ in the form of an Annex C/ST.25 text file.

☐ on paper or in the form of an image file.

b. ☐ furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.

c. ☐ furnished subsequent to the international filing date for the purposes of international search only:

☐ in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).

☐ on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/KR2017/002407

Box No. V **Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-20	YES
	Claims	None	NO
Inventive step (IS)	Claims	1-5, 7-16, 20	YES
	Claims	6, 17-19	NO
Industrial applicability (IA)	Claims	1-20	YES
	Claims	None	NO

2. Citations and explanations:

Reference is made to the following documents:

D1: WILUS, "BSS Color Settings for a Multiple BSSID Set", doc.: IEEE 802.11-16/0042r1, pp. 1-11, 18 January 2016

D2: WO 2015-112780 A1 (MEDIATEK SINGAPORE PTE. LTD.) 30 July 2015

D3: WO 2016-021792 A1 (LG ELECTRONICS INC.) 11 February 2016

D4: WO 2015-120488 A1 (MEDIATEK INC.) 13 August 2015

D5: US 2015-0264617 A1 (NOKIA CORPORATION) 17 September 2015

2.1 Novelty and Inventive Step

2.1.1 Claims 1-5

The invention as set forth in claim 1 is different from the inventions disclosed in the cited documents in that the former relates to "a wireless communication terminal which transmits a predesignated value as a BSS color when

the wireless communication terminal fails to receive information for signalling of the BSS color". Further, said difference would not be obvious to a person skilled in the art even in view of the cited documents. Therefore, the invention as set forth in claim 1 is novel and involves an inventive step (PCT Article 33(2) and (3)).

Claims 2-5 are dependent claims referring to claim 1, and are thus novel and involve an inventive step (PCT Article 33(2) and (3)).

2.1.2 Claims 6-16

Document D1, which is the closest prior art to the invention as set forth in claim 6, discloses "a wireless communication terminal comprising features of: receiving a frame by an STA (see D1: slide 7); and determining whether the frame is an inter-BSS frame or an intra-BSS frame (see D1: slide 7), and performing channel access (see D1: slide 8)".
There is a difference in that document D1 does not explicitly disclose the feature set forth in claim 6 wherein "an intra-BSS PPDU indicates a PPDU transmitted from a BSS identical to a BSS including the wireless communication terminal, and an inter-BSS PPDU indicates a PPDU transmitted from a BSS different from the BSS including the wireless communication terminal". However, said difference could be easily derived by a person skilled in the art from the feature disclosed in document D1 wherein "an intra-BSS frame indicates a frame transmitted in the same multiple BSSID set (see D1: slide

7), and an inter-BSS frame is a different frame from that corresponding to MAC addresses of VAPs of the STA (see D1: slide 7)". Therefore, the invention as set forth in claim 6 lacks an inventive step in view of document D1 (PCT Article 33(3)).

The invention as set forth in claim 7 is different from the inventions disclosed in the cited documents in that the former further includes a feature wherein "when a PPDU satisfies both an inter-BSS PPDU condition and an intra-BSS PPDU condition, the PPDU is identified as the inter-BSS PPDU". Further, said difference would not be obvious to a person skilled in the art even in view of the cited documents. Therefore, the invention as set forth in claim 7 is novel and involves an inventive step (PCT Article 33(2) and (3)).

The invention as set forth in claim 8 is different from the inventions disclosed in the cited documents in that the former further includes a feature wherein "when it is impossible to identify whether the PPDU is an inter-BSS PPDU or an intra-BSS PPDU, the processor sets a basic NAV, which is not an intra-BSS NAV, on the basis of the PPDU, the intra-BSS NAV is set on the basis of a PPDU transmitted from the same BSS as that for the wireless communication terminal, and the basic NAV is set on the basis of a PPDU transmitted from a BSS that is different from the BSS for the wireless communication terminal". Further, said difference would not be obvious to a person skilled in the art even in view of the cited documents. Therefore, the invention as set forth in claim 8 is novel and involves an inventive step (PCT Article 33(2) and

(3)).

The invention as set forth in claim 9 is different from the inventions disclosed in the cited documents in that the former further includes a feature wherein "when the wireless communication terminal is unable to identify whether the PPDU is an intra-BSS PPDU or an inter-BSS PPDU on the basis of the BSS color, the processor does not set an intra-BSS NAV on the basis of the BSS color and TXOP Duration field of HE-SIG A field of the PPDU, and sets the intra-BSS NAV on the basis of the PPDU transmitted from the same BSS as that for the wireless communication terminal". Further, said difference would not be obvious to a person skilled in the art even in view of the cited documents. Therefore, the invention as set forth in claim 9 is novel and involves an inventive step (PCT Article 33(2) and (3)).

Claims 10 and 11 are dependent claims referring directly or indirectly to claim 9, and are thus novel and involve an inventive step (PCT Article 33(2) and (3)).

The invention as set forth in claim 12 is different from the inventions disclosed in the cited documents in that the former further includes a feature wherein "when the wireless communication terminal is unable to identify whether the PPDU is an intra-BSS PPDU or an inter-BSS PPDU on the basis of the BSS color, the processor does not enter a power save mode on the basis of the BSS color and the PPDU". Further, said difference would not be obvious to a person skilled in the art even in view of the cited documents. Therefore, the invention as set

forth in claim 12 is novel and involves an inventive step (PCT Article 33(2) and (3)).

The invention as set forth in claim 13 is different from the inventions disclosed in the cited documents in that the former further includes a feature wherein "when the wireless communication terminal is an AP, and the PPDU is a PPDU on the basis of a trigger transmitted from a wireless communication terminal which is not triggered by the wireless communication terminal, the PPDU is determined as an inter-BSS PPDU". Further, said difference would not be obvious to a person skilled in the art even in view of the cited documents. Therefore, the invention as set forth in claim 13 is novel and involves an inventive step (PCT Article 33(2) and (3)).

The invention as set forth in claim 14 is different from the inventions disclosed in the cited documents in that the former further includes a feature wherein "when the wireless communication terminal is an AP, and the PPDU is a PPDU including a trigger frame, the processor determines the PPDU as an inter-BSS PPDU". Further, said difference would not be obvious to a person skilled in the art even in view of the cited documents. Therefore, the invention as set forth in claim 14 is novel and involves an inventive step (PCT Article 33(2) and (3)).

Claims 15 and 16 are dependent claims referring directly or indirectly to claim 14, and are thus novel and involve an inventive step (PCT Article 33(2) and (3)).

2.1.3 Claims 17-20

Box No. V **Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

Document D1, which is the closest prior art to the invention as set forth in claim 17, discloses "a wireless communication terminal including a feature of receiving a PPDU (see D1: slide 2)".
There is a difference in that document D1 does not explicitly disclose the feature set forth in claim 17 wherein "when the BSS color indicated by the PPDU has a predesignated value, an operation on the basis of the BSS color is not performed". However, said difference could be easily derived by a person skilled in the art from the feature disclosed in document D1 wherein "on the basis of the BSS color of the received PPDU, the STA enters a doze state without transmitting a frame (see D1: slide 5)". Therefore, the invention as set forth in claim 17 lacks an inventive step in view of document D1 (PCT Article 33(3)).

The additional technical feature set forth in claim 18 could be easily derived from the feature, disclosed in document D1, of "performing a spatial reuse operation on the basis of the BSS color of the received PPDU (see D1: slide 2)". Therefore, the invention as set forth in claim 18 lacks an inventive step in view of document D1 (PCT Article 33(3)).

The additional technical feature set forth in claim 19 could be easily derived from the feature disclosed in document D1 wherein "the frame detected on the basis of the BSS color is determined as an inter-BSS frame or an intra-BSS frame (see D1: slide 4)". Therefore, the invention as set forth in claim 19 lacks an inventive

step in view of document D1 (PCT Article 33(3)).

The invention as set forth in claim 20 is different from the inventions disclosed in the cited documents in that the former further includes a feature wherein "the predesignated value is a reserved value that is not used for a BSS color when the AP selects the BSS color". Further, said difference would not be obvious to a person skilled in the art even in view of the cited documents. Therefore, the invention as set forth in claim 20 is novel and involves an inventive step (PCT Article 33(2) and (3)).

2.2 Industrial Applicability

The invention as set forth in claims 1-20 is industrially applicable (PCT Article 33(4)).

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference WILP170023WO	**FOR FURTHER ACTION**	See item 4 below
International application No. PCT/KR2017/002407	International filing date *(day/month/year)* 06 March 2017 (06.03.2017)	Priority date *(day/month/year)* 04 March 2016 (04.03.2016)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC.		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

   In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44*bis*.3(c) and 93*bis*.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44*bis* .2).

	Date of issuance of this report 04 September 2018 (04.09.2018)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Authorized officer Kihwan Moon e-mail: pct.team1@wipo.int

Form PCT/IB/373 (January 2004)

특허협력조약

발신: 국제조사기관

수신:
임국일

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PCT

국제조사기관의 견해서

(PCT규칙 43의2.1)

발송일 *(일/월/년)*	2017년 07월 13일 (13.07.2017)
출원인 또는 대리인의 서류참조기호 WILP170023WO	**추가적인 조치** 아래 2를 참조

국제출원번호	국제출원일 *(일/월/년)*	우선일 *(일/월/년)*
PCT/KR2017/002407	2017년 03월 06일 (06.03.2017)	2016년 03월 04일 (04.03.2016)

국제특허분류(IPC)
H04W 74/00(2009.01)i, H04W 74/08(2009.01)i, H04W 84/12(2009.01)i, H04W 28/06(2009.01)i, H04B 7/26(2006.01)i, H04L 27/26(2006.01)i, H04W 28/04(2009.01)i, H04W 24/02(2009.01)i

출원인
주식회사 윌러스표준기술연구소

1. 본 견해서는 다음 기재란에 관한 내용을 포함합니다.

- ☒ 제1기재란 견해서의 기초
- ☐ 제2기재란 우선권
- ☐ 제3기재란 신규성, 진보성 및 산업상이용가능성에 관한 견해 부작성
- ☐ 제4기재란 발명의 단일성 결여
- ☒ 제5기재란 신규성, 진보성 또는 산업상이용가능성에 관한 견해(PCT규칙 43의2.1(a)(i)), 이를 뒷받침하는 인용문헌 및 설명
- ☐ 제6기재란 특이 인용문헌
- ☐ 제7기재란 국제출원의 흠결
- ☐ 제8기재란 국제출원에 관한 의견

2. **추가적인 조치**

국제예비심사가 청구되면, 본 견해서는 국제예비심사기관("IPEA")의 견해서로 간주될 것입니다. 다만, 출원인이 본 기관 이외의 기관을 IPEA로 선택하고, 그 선택된 IPEA가 PCT규칙 66.1의2(b)에 따라 본 국제조사기관의 견해서가 위와 같이 간주되지 않을 것임을 국제사무국에 통보한 경우에는 그러하지 않습니다.

본 견해서가 상기와 같이 IPEA의 견해서로 간주되는 경우, 출원인은 서식 PCT/ISA/220의 발송일로부터 3월 또는 우선일부터 22월 중 늦게 만료되는 날 이전에 의견서 및 보정서(해당하는 경우)를 IPEA에 제출할 수 있습니다.

다른 선택사항에 대하여는 서식 PCT/ISA/220에 대한 안내문을 참조하십시오.

ISA/KR의 명칭 및 우편주소	본 견해서의 완료일	심사관
대한민국 특허청 (35208) 대전광역시 서구 청사로 189, 4동 (둔산동, 정부대전청사) 팩스번호 +82-42-481-8578	2017년 07월 13일 (13.07.2017)	이성영 전화번호 +82-42-481-3535

서식 PCT/ISA/237 (표지) (2015년 1월)

국제조사기관의 견해서

국제출원번호
PCT/KR2017/002407

제1기재란 본 견해서의 기초

1. **언어**와 관련하여, 본 견해서는 아래에 기초하여 작성되었습니다.

☒ 출원시의 언어로 된 국제출원

☐ 국제조사를 위하여 _____ 로 번역되어 제출된 국제출원의 번역문
(PCT규칙 12.3(a) 및 23.1(b))

2. ☐ 본 견해서는 PCT규칙 91에 따라 당해 기관이 허가하였거나 당해 기관에 통보된 **명백한 잘못의 정정**을 고려하여 작성되었습니다(PCT규칙 43의2.1(a)).

3. ☐ 국제출원에 개시된 핵산염기 및/또는 아미노산 서열과 관련하여, 본 견해서는 아래에 기초하여 작성되었습니다.

a. ☐ 아래의 형태로 출원시 국제출원의 일부를 구성하는 서열목록

☐ 부록 C/ST.25 텍스트 파일

☐ 서면 혹은 이미지 파일

b. ☐ PCT 규칙 13의3.1(a)에 따라 국제출원과 함께 국제조사만을 목적으로 부록 C/ST.25 텍스트 파일의 형태로 제출된 서열목록

c. ☐ 국제조사만을 목적으로 국제출원일 이후에 아래 형태로 제출된 서열목록

☐ 부록 C/ST.25 텍스트 파일 (규칙 13의3.1(a))

☐ 서면 혹은 이미지 파일 (규칙 13의3.1(b) 및 시행세칙 713)

4. ☐ 추가로 서열목록에 대하여 하나 이상의 버전이나 사본이 제출된 경우, 후속 버전 또는 추가된 사본에 기재되어 있는 정보가 출원시 출원의 일부를 구성하는 정보와 동일하거나 또는 출원시의 개시범위를 벗어나지 않는다는 진술서가 제출되었습니다.

5. 추가 의견:

국제조사기관의 견해서

국제출원번호
PCT/KR2017/002407

제5기재란 신규성, 진보성 또는 산업상이용가능성에 관한 견해(PCT규칙 43의2.1(a)(i)), 이를 뒷받침하는 인용문헌 및 설명

1. 견해

신규성 (N)	청구항	1-20	있음
	청구항	없음	없음
진보성 (IS)	청구항	1-5,7-16,20	있음
	청구항	6,17-19	없음
산업상 이용가능성 (IA)	청구항	1-20	있음
	청구항	없음	없음

2. 인용문헌 및 설명:

참고한 인용문헌은 다음과 같습니다.

D1: WILUS, 'BSS Color Settings for a Multiple BSSID Set', doc.: IEEE 802.11-16/0042r1, pp. 1-11, 2016.01.18
D2: WO 2015-112780 A1 (MEDIATEK SINGAPORE PTE. LTD.) 2015.07.30
D3: WO 2016-021792 A1 (엘지전자 주식회사) 2016.02.11
D4: WO 2015-120488 A1 (MEDIATEK INC.) 2015.08.13
D5: US 2015-0264617 A1 (NOKIA CORPORATION) 2015.09.17

2.1 신규성 및 진보성
2.1.1 청구항 제1항-제5항
청구항 제1항에 기재된 발명은 '무선 통신 단말이 BSS 컬러를 시그널링하는 정보를 수신하지 못한 경우, 미리 지정된 값을 BSS 컬러로 전송하는 무선 통신 단말'인 점에서 상기 인용문헌에 기재된 발명과 차이가 있으며, 상기 차이는 상기 인용문헌을 고려해 보아도 통상의 지식을 가진 자에게 자명하지도 않습니다. 따라서, 청구항 제1항에 기재된 발명은 신규성 및 진보성이 있습니다 (PCT 제33조(2) 및 (3)).

청구항 제2항-제5항은 청구항 제1항을 인용하고 있는 종속항이므로, 신규성 및 진보성이 있습니다(PCT 제33조(2) 및 (3)).

2.1.2 청구항 제6항-제16항
청구항 제6항에 기재된 발명과 가장 근접한 인용문헌 D1에는 'STA이 프레임을 수신하는 것(D1: 슬라이드 7 참조); 및 상기 프레임이 Inter-BSS 프레임인지 Intra-BSS 프레임인지를 결정하고(D1: 슬라이드 7 참조), 채널 액세스를 수행하는 것(D1: 슬라이드 8 참조)을 포함하는 무선 통신 단말'이 기재되어 있습니다.
다만, 청구항 제6항의 특징인 'Intra-BSS PPDU는 무선 통신 단말이 포함된 BSS와 동일한 BSS에서 전송된 PPDU를 나타내고, inter-BSS PPDU는 상기 무선 통신 단말이 포함

추가 기재란에 계속

추가 기재란

이전 기재란의 공간이 충분하지 아니한 경우.
제5 기재란의 연속

된 BSS와 다른 BSS에서 전송되는 PPDU를 나타내는 것'이 상기 인용문헌 D1에 명시적으로 기재되어 있지 않다는 점에서 차이가 있으나, 이러한 차이는 통상의 지식을 가진 자에게 상기 인용문헌 D1의 'intra-BSS 프레임은 동일한 멀티플 BSSID 셋에서 전송된 프레임을 나타내고(D1: 슬라이드 7 참조), inter-BSS 프레임은 STA의 VAPs의 MAC 주소와 다른 프레임인 것(D1: 슬라이드 7 참조)'으로부터 용이하게 도출 가능합니다. 따라서 청구항 제6항에 기재된 발명은 인용문헌 D1에 의하여 진보성이 없습니다(PCT 제33조(3)).

청구항 제7항에 기재된 발명은 'PPDU가 Inter-BSS PPDU 조건과 Intra-BSS PPDU 조건을 모두 만족하는 경우, 상기 PPDU를 Inter-BSS PPDU로 식별하는 것'을 더 포함한다는 점에서 상기 인용문헌들에 기재된 발명과 차이가 있으며, 상기 차이는 상기 인용문헌을 고려해 보아도 통상의 지식을 가진 자에게 자명하지도 않습니다. 따라서 청구항 제7항에 기재된 발명은 신규성 및 진보성이 있습니다(PCT 제33조(2) 및 (3)).

청구항 제8항에 기재된 발명은 '프로세서는, PPDU가 Inter-BSS PPDU인지 Intra-BSS PPDU인지 식별할 수 없는 경우, 상기 PPDU를 기초로 Intra-BSS NAV가 아닌 basic NAV를 설정하고, 상기 Intra-BSS NAV는 무선 통신 단말과 동일한 BSS에서 전송된 PPDU를 기초로 설정되고, 상기 Basic NAV는 상기 무선 통신 단말과 다른 BSS에서 전송된 PPDU를 기초로 설정되는 것'을 더 포함한다는 점에서 상기 인용문헌들에 기재된 발명과 차이가 있으며, 상기 차이는 상기 인용문헌을 고려해 보아도 통상의 지식을 가진 자에게 자명하지도 않습니다. 따라서 청구항 제8항에 기재된 발명은 신규성 및 진보성이 있습니다(PCT 제33조(2) 및 (3)).

청구항 제9항에 기재된 발명은 '프로세서는 무선 통신 단말이 BSS 컬러를 기초로 PPDU가 Intra-BSS PPDU인지 Inter-BSS PPDU인지 식별할 수 없는 경우, 상기 BSS 컬러 및 PPDU의 HE-SIG-A 필드의 TXOP Duration 필드를 기초로 Intra-BSS NAV를 설정하지 않는 상기 Intra-BSS NAV는 상기 무선 통신 단말과 동일한 BSS에서 전송된 PPDU를 기초로 설정되는 것'을 더 포함한다는 점에서 상기 인용문헌들에 기재된 발명과 차이가 있으며, 상기 차이는 상기 인용문헌을 고려해 보아도 통상의 지식을 가진 자에게 자명하지도 않습니다. 따라서 청구항 제9항에 기재된 발명은 신규성 및 진보성이 있습니다(PCT 제33조(2) 및 (3)).

청구항 제10항 및 제11항은 청구항 제9항을 직, 간접적으로 인용하고 있는 종속항이므로, 신규성 및 진보성이 있습니다(PCT 제33조(2)와 (3)).

다음 페이지에 계속

추가 기재란

이전 기재란의 공간이 충분하지 아니한 경우.
이전 기재란의 연속

청구항 제12항에 기재된 발명은 '무선 통신 단말이 BSS 컬러를 기초로 PPDU가 Intra-BSS PPDU인지 Inter-BSS PPDU인지 식별할 수 없는 경우, 상기 BSS 컬러 및 상기 PPDU를 기초로 파워 세이브 모드에 진입하지 않는 것'을 더 포함한다는 점에서 상기 인용문헌들에 기재된 발명과 차이가 있으며, 상기 차이는 상기 인용문헌을 고려해 보아도 통상의 지식을 가진 자에게 자명하지도 않습니다. 따라서 청구항 제12항에 기재된 발명은 신규성 및 진보성이 있습니다(PCT 제33조(2) 및 (3)).

청구항 제13항에 기재된 발명은 '무선 통신 단말이 AP이고, PPDU가 상기 무선 통신 단말이 트리거링하지 않은 무선 통신 단말로부터 전송된 트리거를 기초로 하는 PPDU인 경우, 상기 PPDU를 Inter-BSS PPDU로 판단되는 것'을 더 포함한다는 점에서 상기 인용문헌들에 기재된 발명과 차이가 있으며, 상기 차이는 상기 인용문헌을 고려해 보아도 통상의 지식을 가진 자에게 자명하지도 않습니다. 따라서 청구항 제13항에 기재된 발명은 신규성 및 진보성이 있습니다(PCT 제33조(2) 및 (3)).

청구항 제14항에 기재된 발명은 '프로세서는 무선 통신 단말이 AP이고, PPDU가 트리거 프레임을 포함하는 PPDU인 경우, 상기 PPDU를 Inter-BSS PPDU로 판단하는 것'을 더 포함한다는 점에서 상기 인용문헌들에 기재된 발명과 차이가 있으며, 상기 차이는 상기 인용문헌을 고려해 보아도 통상의 지식을 가진 자에게 자명하지도 않습니다. 따라서 청구항 제14항에 기재된 발명은 신규성 및 진보성이 있습니다(PCT 제33조(2) 및 (3)).

청구항 제15항 및 제16항은 청구항 제14항을 직, 간접적으로 인용하고 있는 종속항이므로, 신규성 및 진보성이 있습니다(PCT 제33조(2)와 (3)).

2.1.3 청구항 제17항-제20항
청구항 제17항에 기재된 발명과 가장 근접한 인용문헌 D1에는 'PPDU를 수신하는 것(D1: 슬라이드 2 참조)를 포함하는 무선 통신 단말'이 기재되어 있습니다.
다만, 청구항 제17항의 특징인 'PPDU가 나타내는 BSS 컬러가 미리 지정된 값일 경우, 상기 BSS 컬러를 기초로 하는 동작을 수행하지 않는 것'이 상기 인용문헌 D1에 명시적으로 기재되어 있지 않다는 점에서 차이가 있으나, 이러한 차이는 통상의 지식을 가진 자에게 상기 인용문헌 D1의 'STA은 수신된 PPDU의 BSS 컬러에 기초해서, 프레임을 전송하지 않고, doze 상태로 진입하는 것(D1: 슬라이드 5 참조)'으로부터 용이하게 도출 가능합니다. 따라서 청구항 제17항에 기재된 발명은 인용문헌 D1에 의하여 진보성이 없습니다(PCT 제33조(3)).

다음 페이지에 계속

추가 기재란

이전 기재란의 공간이 충분하지 아니한 경우.
이전 기재란의 연속

청구항 제18항에 추가된 기술적 특징은 인용문헌 D1의 '수신된 PPDU의 BSS 컬러에 기초해서 spatial reuse 동작을 수행하는 것(D1: 슬라이드 2 참조)'으로부터 용이하게 도출할 수 있습니다. 따라서 청구항 제18항에 기재된 발명은 인용문헌 D1에 의해서 진보성이 없습니다(PCT 제33조(3)).

청구항 제19항에 추가된 기술적 특징은 인용문헌 D1의 'BSS 컬러에 기초해서 검출된 프레임을 inter 혹은 intra-BSS 프레임으로 판단하는 것(D1: 슬라이드 4 참조)'으로부터 용이하게 도출할 수 있습니다. 따라서 청구항 제19항에 기재된 발명은 인용문헌 D1에 의해서 진보성이 없습니다(PCT 제33조(3)).

청구항 제20항에 기재된 발명은 '미리 지정된 값은 AP가 BSS 컬러 선택 시 BSS 컬러로 사용되지 않는 리저브드(reserved) 값인 것'을 더 포함한다는 점에서 상기 인용문헌들에 기재된 발명과 차이가 있으며, 상기 차이는 상기 인용문헌을 고려해 보아도 통상의 지식을 가진 자에게 자명하지도 않습니다. 따라서 청구항 제20항에 기재된 발명은 신규성 및 진보성이 있습니다(PCT 제33조(2) 및 (3)).

2.2 산업상 이용가능성
청구항 제1항-제20항에 기재된 발명은 산업상 이용가능합니다(PCT 제33조(4)).

Electronic Acknowledgement Receipt

EFS ID:	36310621
Application Number:	16121546
International Application Number:	
Confirmation Number:	9775
Title of Invention:	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET
First Named Inventor/Applicant Name:	Geonjung KO
Customer Number:	158747
Filer:	Young Seok Koo
Filer Authorized By:	
Attorney Docket Number:	B-9587CON 631613-2
Receipt Date:	14-JUN-2019
Filing Date:	04-SEP-2018
Time Stamp:	23:58:06
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		2019-06-14_631613_IDS.pdf	159035 5946ba7a65a13bac22e2801fb7713c50d0f9d828	yes	5

	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Transmittal Letter		1	3	
	Information Disclosure Statement (IDS) Form (SB08)		4	5	
Warnings:					
Information:					
2	Foreign Reference	Ref2_JP2004-525586.pdf	1594325 823bcc032244ecf8e8ded3f81d7ecd06fa1d1c38	no	54
Warnings:					
Information:					
3	Foreign Reference	Ref3_JP2014-17866.pdf	620495 21228be8a8b20f969c084a8837084297b488f2ce	no	28
Warnings:					
Information:					
4	Foreign Reference	Ref4_JP2015-167417.pdf	1238378 0ba992c17b39495e0b153b5e93e1bb39a8017c1d	no	68
Warnings:					
Information:					
5	Other Reference-Patent/App/Search documents	Ref_PCTKR2017002407_IPRP.pdf	635432 1f3130ce4c52c1afd6a6a905f885f27dddc7774c	no	17
Warnings:					
Information:					
6	Other Reference-Patent/App/Search documents	Ref8_JP2018-520532_1stOA.pdf	139827 fd7de26e05b356d05632c2378f603ca2f05a3764	no	5
Warnings:					
Information:					
7	Other Reference-Patent/App/Search documents	Ref9_EP168578011_ESR.pdf	627165 827f28f94da56d0b2bb023f59e4bb02ff177499d	no	12
Warnings:					

Information:					
8	Non Patent Literature	Ref10_CID-205-BSSID.pdf	1319492 36334e53ea5ff025eff4642c0bd40268d8b0de85	no	20
Warnings:					
Information:					
9	Non Patent Literature	Ref11_Further_Considerations.pdf	777521 f6f30c2601c3b6a1f9d303aaee1113c09ae246c3	no	12
Warnings:					
Information:					
10	Non Patent Literature	Ref12_Spec_Framework.pdf	2097150 37563ad0a45fa8a6b55d9d7676b361c8d60bad0d	no	22
Warnings:					
Information:					
11	Non Patent Literature	Ref13_Identifiers.pdf	898379 e9ca773230c4f8d94faa959d05663b79d5288f10	no	18
Warnings:					
Information:					
			Total Files Size (in bytes):	10107199	

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	Examiner: NGO, RICKY QUOC
Serial No.: 16/121,546	Art Unit: 2464
Filing or 371 (c) Date: September 4, 2018	Conf. No.: 9775
For: "WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET"	Our Ref: B-9587CON 631613-2
Date: June 14, 2019	Re: ***Information Disclosure Statement***

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir/Madam:

This information disclosure statement is filed in accordance with 37 C.F.R. §§ 1.56, 1.97 and 1.98 to disclose information that may be relevant to the above-identified patent application. The Applicant requests the Examiner consider the documents listed on the enclosed form PTO-1449 (modified) in the examination of this application.

The filing of this Information Disclosure Statement (IDS) shall not be construed as a representation that a search has been made (37 C.F.R. 1.97(g)), an admission that the information cited is, or is considered to be, material to patentability, or that no other material information exists.

The filing of this Information Disclosure Statement shall not be construed as an admission against interest in any manner (37 C.F.R § 1.97(h)).

If any additional fee is required for this filing, the Applicant requests the Examiner contact a practitioner associated with the Customer Number listed below for authorization.

This information disclosure statement also includes the statements marked below. Failure to mark a statement should not be construed as a negative assertion.

Timing and Fees

This IDS is being filed:

[ ] Concurrently with the application, and no fee is due.

[ ] Within three months of the filing of the national application, other than a continued prosecution application under § 1.53(d), and no fee is due.

[ ] Within three months of the date of entry of the national stage as set forth in § 1.491 in an international application, and no fee is due.

[x] Before the mailing of a first Office Action on the merits, and no fee is due.

[ ] Before the mailing of a first Office Action after the filing of a request for continued examination under§ 1.114, and no fee is due.

[ ] After the periods described above, and before a final Office Action under § 1.113, a Notice of Allowance under § 1.311, or an action that otherwise closes prosecution in the application, and is

- [ ] accompanied by the fee set forth in § 1.17(p), or
- [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(1): That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement; or
- [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(2): That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

[ ] After the periods described above, and is accompanied by the fee set forth in § 1.17(p), and is

- [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(1), that each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement; or

- [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(2), that no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

[ ] Concurrently with a Request for Continued Examination, and no additional fee is due for this IDS.

Items Disclosed

At least one item listed on the enclosed form PTO-1449 (modified) was

[x] Cited in an Office Action for a related application, the application number of the related application and the issue date of the Office Action are provided below and the Office Action is enclosed.

Office Action dated March 19, 2019 for Japanese Application No. 2018-520532

Extended European Search Report dated April 23, 2019 for European Application No. 16857801.1

[x] Cited in an International Search Report (ISR) or an International Preliminary Report on Patentability (IPRP) or a Written Opinion (WO) of the International Searching Authority (ISA) for the related PCT Application, the PCT application number and the issue date of the ISR/IPRP/WO are provided below and the ISR/IPRP/WO is enclosed.

International Preliminary Report on Patentability (Chapter I) for PCT/KR2017/002407 issued on September 4, 2018

Additional Information

[x] Translations of the foreign-language documents are also enclosed as machine-translations, human-translations, or counterpart applications as noted. Machine translations were provided by the Japanese Patent Office, ESPACENET, Google Documents, Patent Fetcher® /ESPACENET, Google Translate or Google Translator Toolkit as noted and with OCR by Adobe Acrobat 9 or ABBYY PDF Transformer 3 if needed.

[x] English-language abstracts of foreign-language documents are provided.

[x] Documents listed on the enclosed ISR/IPRP/WO or the Office Action have relevance at least as described therein.

[ ] The documents with the following reference numbers were described in the specification of the present application; omission of a reference from this list does not indicate that it was not discussed in the specification of the present application.

[x] At least one of the references cited in the Office Action listed on the attached PTO-1449 (modified) were previously submitted in an IDS or cited by the Examiner for the present application on September 4, 2018 and therefore are not submitted in this IDS.

[ ] Other:

I hereby certify that this document is being transmitted to the Patent and Trademark Office via electronic filing.

June 14, 2019
(Date of Transmission)

Azatuhi Chinaryan
(Name of Person Transmitting)

/ Azatuhi Chinaryan /
(Signature)

Respectfully submitted,

/ Young Seok Koo 76,255 /

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(323) 934-2300 voice

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE ***Patent***

Applicant: WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. et al.	)	***Re.: Preliminary Amendment***
	)	Group: 2464
USSN: 16/121,546	)	Examiner: NGO, RICKY QUOC
Filing Date: September 4, 2018	)	Our Ref.: B-9587CON 631613-2
For: "WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET"	)	Date: May 23, 2019

PRELIMINARY AMENDMENT

Sir:

Prior to examination of the above-identified U.S. patent application, please enter the following amendments and remarks into the prosecution history of the above-identified U.S. patent application without prejudice or disclaimer.

Amendments to the Claims begin on page 2 of this paper

Remarks begin on page 6 of this paper.

AMENDMENTS TO THE CLAIMS

Please amend the claims to read as indicated in the following list of claims:

Listing of claim

1-20. (Cancelled).

21. (New) A wireless communication terminal communicating wirelessly, the terminal comprising:

a transceiver; and

a processor,

wherein the processor is configured to receive a PLCP Processing Data Unit (PPDU) by using the transceiver, and not to perform an operation based on a Basic Service Set (BSS) color when signaling information indicates that the operation based on the BSS color is not allowed,

wherein the BSS color is an identifier of a BSS,

wherein the signaling information is transmitted from a base wireless communication terminal to which the wireless communication terminal is associated.

22. (New) The wireless communication terminal of claim 21, wherein the processor is configured not to set an Intra-BSS Network Vector Allocation (NAV) by using the BSS color indicated by a signaling field of the PPDU when the signaling information indicates that the operation based on the BSS color is not allowed,

wherein the Intra-BSS NAV is different from a Basic NAV and is a NAV which is set based on the Intra-BSS PPDU,

wherein the Basic NAV is set based on an Inter-BSS PPDU or a PPDU which is not able to be identified as the Inter-BSS PPDU or the Intra-BSS PPDU.

23. (New) The wireless communication terminal of claim 22, wherein the PPDU includes a TXOP Duration field in the signaling field of the PPDU and a MAC frame which includes a duration field,

wherein the TXOP Duration field indicates information used for setting the Intra-BSS NAV and the Basic NAV,

wherein the duration field indicates information used for setting the Intra-BSS NAV and the Basic NAV,

wherein the processor is configured not to use the TXOP Duration field for setting the Intra-BSS NAV or the Basic NAV when the wireless communication terminal gets valid signaling field of the MAC frame.

24. (New) The wireless communication terminal of claim 21, wherein the processor is configured to signal that the operation based on the BSS color is not allowed when the wireless communication terminal recognizes that the BSS color collision has occurred,

wherein the BSS color collision represents that different BSSs correspond to the same BSS color.

25. (New) The wireless communication terminal of claim 24, wherein the processor is configured to determine that BSS color collision has occurred based on address fields of MAC frame.

26. (New) The wireless communication terminal of claim 1, wherein the operation based on the BSS color includes entering a doze state of a power save operation based on a Basic Service Set (BSS) color indicated by a signaling field of the PPDU,

wherein the power save operation is an operation for the wireless communication terminal to enter the doze state until an end of a received PPDU which is an Intra-BSS PPDU.

27. (New) The wireless communication terminal of claim 21, wherein the processor is configured not to perform a spatial reuse operation when the BSS color indicated by the signaling field of the PPDU is a predetermined value.

28. (New) The wireless communication terminal of claim 27, wherein the predetermined value is 0.

29. (New) An operation method of a wireless communication terminal communicating wirelessly, the method comprising:

receiving a PLCP Processing Data Unit (PPDU) by using the transceiver; and

not performing an operation based on a Basic Service Set (BSS) color when signaling information indicates that the operation based on the BSS color is not allowed,

wherein the BSS color is an identifier of a BSS,

wherein the signaling information is transmitted from a base wireless communication terminal to which the wireless communication terminal is associated.

30. (New) The method of claim 29, wherein the method further comprises not setting an Intra-BSS Network Vector Allocation (NAV) by using the BSS color indicated by a signaling field of the PPDU when the signaling information indicates that the operation based on the BSS color is not allowed,

wherein the Intra-BSS NAV is different from a Basic NAV and is a NAV which is set based on the Intra-BSS PPDU,

wherein the Basic NAV is set based on an Inter-BSS PPDU or a PPDU which is not able to be identified as the Inter-BSS PPDU or the Intra-BSS PPDU.

31. (New) The method of claim 29, wherein the PPDU includes a TXOP Duration field in the signaling field of the PPDU and a MAC frame which includes a duration field,

wherein the TXOP Duration field indicates information used for setting the Intra-BSS NAV and the Basic NAV,

wherein the duration field indicates information used for setting the Intra-BSS NAV and the Basic NAV,

wherein the method further comprises not using the TXOP Duration field for setting the Intra-BSS NAV or the Basic NAV when the wireless communication terminal gets valid signaling field of the MAC frame.

32. (New) The method of claim 29, wherein the method further comprises signal that the operation based on the BSS color is not allowed when the wireless communication terminal recognizes that the BSS color collision has occurred,

wherein the BSS color collision represents that different BSSs correspond to the same BSS color.

33. (New) The method of claim 32, wherein the signaling that a BSS color collision has occurred comprises determining that BSS color collision has occurred based on address fields of MAC frame.

34. (New) The method of claim 29, wherein the operation based on the BSS color includes entering a doze state of a power save operation based on a Basic Service Set (BSS) color indicated by the signaling field of the PPDU,

wherein the power save operation is an operation for the wireless communication terminal to enter the doze state until an end of a received PPDU which is an Intra-BSS PPDU.

35. (New) The method of claim 29, wherein the method further comprises not performing a spatial reuse operation when the BSS color indicated by the signaling field of the PPDU is a predetermined value.

36. (New) The method of claim 35, wherein the predetermined value is 0.

REMARKS

In this Preliminary Amendment, claims 1-20 are cancelled and new claims 21-36 are added. No new matter is presented as a result of these amendments.

Amendment of the subject application is respectfully requested.

* * *

No Disclaimers or Disavowals

Although the present communication may include alterations to the application or claims, or may contain characterizations of claim scope or referenced art, the Applicant is not conceding that any previously pending claims are unpatentable in view of the cited reference(s). Rather, any alterations or characterizations are being made to facilitate expeditious prosecution of this application. The Applicant reserves the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution. Accordingly, reviewers of this or any parent child or related prosecution history shall not reasonably infer that the Applicant has made any disclaimers or disavowals of any subject matter supported by the present application.

I hereby certify that this document is being transmitted to the Patent and Trademark Office via electronic filing.

May 23, 2019
(Date of Transmission)

Azatuhi Chinaryan
(Name of Person Transmitting)

/ Azatuhi Chinaryan /
(Signature)

Respectfully submitted,

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Electronic Acknowledgement Receipt

EFS ID:	36103352
Application Number:	16121546
International Application Number:	
Confirmation Number:	9775
Title of Invention:	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET
First Named Inventor/Applicant Name:	Geonjung KO
Customer Number:	158747
Filer:	Young Seok Koo/Azatuhi Chinaryan
Filer Authorized By:	Young Seok Koo
Attorney Docket Number:	B-9587CON 631613-2
Receipt Date:	23-MAY-2019
Filing Date:	04-SEP-2018
Time Stamp:	18:13:17
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		2019-05-23_631613_Preliminary_Amendment.pdf	109296 bb356f0c5a45b44db41a6ade8f75409a446559b5	yes	6

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Preliminary Amendment	1	1
	Claims	2	5
	Applicant Arguments/Remarks Made in an Amendment	6	6
Warnings:			
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	Total Files Size (in bytes):	109296	

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PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/121,546	Filing Date 09/04/2018	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $100 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $460 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	05/23/2019	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 16	Minus	** 20	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0		x $460 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/CORALIA BETANCOURT/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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www.uspto.gov

APPLICATION NUMBER	PATENT NUMBER	GROUP ART UNIT	FILE WRAPPER LOCATION
16/121,546		2464	

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Correspondence Address/Fee Address Change

The following fields have been set to Customer Number 158747 on 01/31/2019

- **Correspondence Address**

The address of record for Customer Number 158747 is:

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UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/121,546	09/04/2018	Geonjung KO	B-9587CON 631613-2

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36716
LADAS & PARRY
5670 WILSHIRE BOULEVARD, SUITE 2100
LOS ANGELES, CA 90036-5679

PUBLICATION NOTICE

OC000000105160778

Title:WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET

Publication No.US-2019-0021091-A1
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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

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별첨 사본은 아래 출원의 원본과 동일함을 증명함.

This is to certify that the following application annexed hereto is a true copy from the records of the Korean Intellectual Property Office.

출 원 번 호 : 10-2016-0114821
Application Number

출 원 년 월 일 : 2016년 09월 07일
Filing Date Sep. 07, 2016

출 원 인 : 주식회사 윌러스표준기술연구소
Applicant(s) WILUS Institute of Standards and Technology Inc.

2018년 10월 29일

특 허 청
COMMISSIONER

제출 일자 : 2016-09-07

【서지사항】

【서류명】 특허출원서

【참조번호】 160119HEW

【출원구분】 특허출원

【출원인】

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【특허고객번호】 1-2013-022334-3

【대리인】

【성명】 임국일

【대리인번호】 9-2014-000874-4

【포괄위임등록번호】 2014-036557-3

【발명의 국문명칭】 BSS 컬러 충돌이 발생했을 때 잘못된 동작을 방지하기 위한 방법, 장치 및 시스템

【발명의 영문명칭】 METHOD, APPARATUS, AND SYSTEM FOR PREVENTING INAPPOROPRIATE OPERATIONS WHEN BSS COLOR COLLISION OCCURRED

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【주민등록번호】 740908-1XXXXXX
【우편번호】 16021
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【국적】 KR
【출원언어】 국어
【이 발명을 지원한 국가연구개발사업】
【과제고유번호】 R0166-16-1030
【부처명】 미래창조과학부
【연구관리 전문기관】 정보통신기술진흥센터

제출 일자 : 2016-09-07

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

【기여율】 1/1

【주관기관】 (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】	87 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 : 2016-09-07

【발명의 설명】

【발명의 명칭】

BSS 컬러 충돌이 발생했을 때 잘못된 동작을 방지하기 위한 방법, 장치 및 시스템{METHOD, APPARATUS, AND SYSTEM FOR PREVENTING INAPPOROPRIATE OPERATIONS WHEN BSS COLOR COLLISION OCCURRED}

【기술분야】

<1> 본 발명은 BSS 컬러 관련 동작에서 잘못된 동작을 방지하는 방법으로서, 더욱 상세하게는 무선랜에서 BSS 컬러 충돌이 발생했을 때 잘못된 동작을 방지하기 위한 다양한 방법, 장치 및 시스템에 관한 것이다.

【배경기술】

<2> 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 기기들을 가정이나 기업 또는 특정 서비스 제공지역에서 무선으로 인터넷에 접속할 수 있도록 하는 기술이다.

<3> IEEE(Institute of Electrical and Electronics Engineers) 802.11은 2.4GHz 주파수를 이용한 초기의 무선랜 기술을 지원한 이래, 다양한 기술의 표준을 실용화 또는 개발 중에 있다. 먼저, 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.

<4> 그리고 무선랜에서 취약점으로 지적되어온 통신 속도에 대한 한계를 극복하기 위하여 제정된 기술 규격으로서 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 수 있다.

<5> 무선랜의 보급이 활성화되고 또한 이를 이용한 어플리케이션이 다양화됨에 따라, IEEE 802.11n이 지원하는 데이터 처리 속도보다 더 높은 처리율(Very High Throughput, VHT)을 지원하기 위한 새로운 무선랜 시스템에 대한 필요성이 대두되

었다. 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. 이론적으로, 이 규격에 따르면 다중 스테이션의 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 2.4GHz/5GHz 대신 60GHz 밴드를 사용해 데이터를 전송하는 방식으로 IEEE 802.11ad가 있다. IEEE 802.11ad는 빔포밍 기술을 이용하여 최대 7Gbps의 속도를 제공하는 전송규격으로서, 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.

<6> 한편, 최근에는 802.11ac 및 802.11ad 이후의 차세대 무선랜 표준으로서, 고밀도 환경에서의 고효율 및 고성능의 무선랜 통신 기술을 제공하기 위한 논의가 계속해서 이루어지고 있다. 즉, 차세대 무선랜 환경에서는 고밀도의 스테이션과 AP(Access Point)의 존재 하에 실내/외에서 높은 주파수 효율의 통신이 제공되어야 하며, 이를 구현하기 위한 다양한 기술들이 필요하다.

【발명의 내용】

【해결하려는 과제】

<7> 본 발명은 전술한 바와 같이 고밀도 환경에서의 고효율/고성능의 무선랜 통신을 제공하기 위한 목적을 가지고 있다.

【과제의 해결 수단】

<8> 본 발명의 실시예에 따르면 무선랜을 위한 장치, 시스템 및 무선랜 통신 방법이 제공될 수 있다.

【발명의 효과】

<9> 본 발명의 실시예에 따르면, 맥 헤더에 컨트롤 정보를 효율적으로 포함시킬 수 있는 방법을 제공한다. 본 발명은 무선랜을 이용하는 스테이션 내지 액세스 포인트, 셀룰러 통신을 이용하는 스테이션 내지 기지국 등 다양한 통신 디바이스에 사용 가능하다.

【도면의 간단한 설명】

<10> 도 1은 본 발명의 일 실시예에 따른 무선랜 시스템을 나타낸 도면.

도 2는 본 발명의 다른 실시예에 따른 무선랜 시스템을 나타낸 도면.

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

도 4는 본 발명의 일 실시예에 따른 액세스 포인트의 구성을 나타낸 블록도.

도 5는 본 발명의 일 실시예에 따른 intra-PPDU power save를 나타낸 도면.

도 6은 본 발명의 일 실시예에 따른 BSS color collision이 발생한 경우 intra-PPDU power save를 나타낸 도면.

도 7은 본 발명의 일 실시예에 따른 BSS color collision이 발생한 경우 프레임 교환을 나타낸 도면.

도 8은 본 발명의 일 실시예에 따른 BSS color collision을 인지한 이후 프레임 교환을 나타낸 도면.

도 9는 본 발명의 일 실시예에 따른 BSS color collision이 발생한 경우 프레임 교환을 나타낸 도면.

도 10은 본 발명의 일 실시예에 따른 BSS color collision을 인지한 이후 프레임 교환을 나타낸 도면.

도 11은 본 발명의 일 실시예에 따른 BSS color collision 감지 과정을 나타낸 도면.

도 12는 본 발명의 일 실시예에 따른 CTS frame 또는 Ack frame의 MAC 포맷을 나타낸 도면.

도 13은 본 발명의 일 실시예에 따른 NAV 셋팅을 나타낸 도면.

도 14는 본 발명의 일 실시예에 따른 11a 패킷 구조를 나타낸 도면.

도 15는 본 발명의 일 실시예에 따른 레거시 패킷의 Service field 구성을 나타낸 도면.

도 16은 본 발명의 일 실시예에 따른 NAV 셋팅을 나타낸 도면.

도 17은 본 발명의 일 실시예에 따른 VHT-SIG-A의 Partial AID 및 Group ID 셋팅을 나타낸 표.

도 18은 본 발명의 일 실시예에 따른 VHT SU DL PPDU 수신을 나타낸 도면.

도 19는 본 발명의 일 실시예에 따른 HE-SIG-B 필드의 인코딩 구조(encoding structure) 구성을 나타낸 도면.

도 20은 본 발명의 일 실시예에 따른 파워 세이브를 나타낸 도면.

도 21은 본 발명의 일 실시예에 따른 파워 세이브를 나타낸 도면.

도 22는 본 발명의 일 실시예에 따른 intra-BSS, inter-BSS frame 판단을 나타낸 도면.

도 23은 본 발명의 일 실시예에 따른 intra-BSS frame, inter-BSS frame 판단을 나타낸 도면.

【발명을 실시하기 위한 구체적인 내용】

<11> 본 명세서에서 사용되는 용어는 본 발명에서의 기능을 고려하면서 가능한 현재 널리 사용되는 일반적인 용어를 선택하였으나, 이는 당 분야에 종사하는 기술자의 의도, 관례 또는 새로운 기술의 출현 등에 따라 달라질 수 있다. 또한 특정 경우는 출원인이 임의로 선정한 용어도 있으며, 이 경우 해당되는 발명의 설명 부분에서 그 의미를 기재할 것이다. 따라서 본 명세서에서 사용되는 용어는, 단순한 용어의 명칭이 아닌 그 용어가 가진 실질적인 의미와 본 명세서의 전반에 걸친 내용을 토대로 해석되어야 함을 밝혀두고자 한다.

<12> 명세서 전체에서, 어떤 구성이 다른 구성과 "연결" 되어 있다고 할 때, 이는 "직접적으로 연결" 되어 있는 경우뿐 아니라, 그 중간에 다른 구성요소를 사이

에 두고 "전기적으로 연결"되어 있는 경우도 포함한다. 또한 어떤 구성이 특정 구성요소를 "포함"한다고 할 때, 이는 특별히 반대되는 기재가 없는 한 다른 구성요소를 제외하는 것이 아니라 다른 구성요소를 더 포함할 수 있는 것을 의미한다. 이에 더하여, 특정 임계값을 기준으로 "이상" 또는 "이하"라는 한정 사항은 실시예에 따라 각각 "초과" 또는 "미만"으로 적절하게 대체될 수 있다.

<13> 도 1은 본 발명의 일 실시예에 따른 무선랜 시스템을 도시하고 있다. 무선랜 시스템은 하나 또는 그 이상의 베이직 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.

<14> 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.

<15> 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 비 액세스 포인트(Non-AP) 스테

이션뿐만 아니라 액세스 포인트(AP)를 모두 포함한다. 또한, 본 명세서에서는 스테이션과 AP 등의 무선랜 통신 디바이스를 모두 포함하는 개념으로서 '단말' 이라는 용어가 사용될 수 있다. 무선 통신을 위한 스테이션은 프로세서(Processor)와 트랜시버(transceiver)를 포함하고, 실시예에 따라 유저 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 수행할 수 있다. 그리고, 트랜시버는 상기 프로세서와 기능적으로 연결되어 있으며 스테이션을 위하여 무선 네트워크를 통해 프레임을 송수신한다.

<16> 액세스 포인트(Access Point, AP)는 자신에게 결합된(associated) 스테이션을 위하여 무선 매체를 경유하여 분배시스템(DS)에 대한 접속을 제공하는 개체이다. 인프라스트럭쳐 BSS에서 비 AP 스테이션들 사이의 통신은 AP를 경유하여 이루어지는 것이 원칙이지만, 다이렉트 링크가 설정된 경우에는 비AP 스테이션들 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.

<17> 복수의 인프라스트럭쳐 BSS는 분배 시스템(DS)을 통해 상호 연결될 수 있다. 이때, 분배 시스템을 통하여 연결된 복수의 BSS를 확장 서비스 세트(Extended Service Set, ESS)라 한다.

<18> 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.

<19> 도 2에 도시된 BSS-3는 독립 BSS이며 AP를 포함하지 않기 때문에, 모든 스테이션(STA-6, STA-7)이 AP와 접속되지 않은 상태이다. 독립 BSS는 분배 시스템으로의 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.

<20> 도 3은 본 발명의 일 실시예에 따른 스테이션(100)의 구성을 나타낸 블록도이다.

<21> 도시된 바와 같이, 본 발명의 실시예에 따른 스테이션(100)은 프로세서(110), 네트워크 인터페이스 카드(NIC, 120), 유저 인터페이스부(140), 디스플레이 유닛(150) 및 메모리(160)를 포함할 수 있다.

<22> 먼저, 네트워크 인터페이스 카드(120)는 무선랜 접속을 수행하기 위한 모듈이며, 스테이션(100)을 위한 패킷 전송과 수신을 수행한다. 네트워크 인터페이스 카드(120)는 스테이션(100)에 내장되거나 외장으로 구비될 수 있으며, 실시예에 따라 서로 다른 주파수 밴드를 이용하는 적어도 하나의 네트워크 인터페이스 카드 모듈을 포함할 수 있다. 이를 테면, 상기 네트워크 인터페이스 카드는 2.4GHz, 5GHz 및 60GHz 등의 서로 다른 주파수 밴드의 네트워크 인터페이스 카드 모듈을 포함할

수 있다. 일 실시예에 따르면, 스테이션(100)은 6GHz 이상의 주파수 밴드를 이용하는 네트워크 인터페이스 카드 모듈과, 6GHz 이하의 주파수 밴드를 이용하는 네트워크 인터페이스 카드 모듈을 구비할 수 있다. 각각의 네트워크 인터페이스 카드 모듈은 해당 네트워크 인터페이스 카드 모듈이 지원하는 주파수 밴드의 무선랜 규격에 따라 AP 또는 외부 스테이션과 무선 통신을 수행할 수 있다. 네트워크 인터페이스 카드(120)는 스테이션(100)의 성능 및 요구 사항에 따라 한 번에 하나의 네트워크 인터페이스 카드 모듈만을 동작시키거나 동시에 다수의 네트워크 인터페이스 카드 모듈을 함께 동작시킬 수 있다. 스테이션(100)이 복수의 네트워크 인터페이스 카드 모듈을 포함할 경우, 각 네트워크 인터페이스 카드 모듈은 각각 독립된 형태로 구비될 수도 있으며, 하나의 칩으로 통합되어 구비될 수도 있다.

<23> 다음으로, 유저 인터페이스부(140)는 스테이션(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 스테이션(100)을 제어할 수 있다. 또한, 유저 인터페이스부(140)는 다양한 출력 수단을 이용하여 프로세서(110)의 명령에 기초한 출력을 수행할 수 있다.

<24> 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 스테이션(100)에서 사용되는 제어 프로그램 및 그에 따른 각종 데이터를 저장한다. 이러한 제어 프로그램에는 스테이션

(100)이 AP 또는 외부 스테이션과 접속을 수행하는데 필요한 접속 프로그램이 포함될 수 있다.

<25> 본 발명의 프로세서(110)는 다양한 명령 또는 프로그램을 실행하고, 스테이션(100) 내부의 데이터를 프로세싱 할 수 있다. 또한, 상기 프로세서(110)는 상술한 스테이션(100)의 각 유닛들을 제어하며, 유닛들 간의 데이터 송수신을 제어할 수 있다. 본 발명의 실시예에 따르면, 프로세서(110)는 메모리(160)에 저장된 AP와의 접속을 위한 프로그램을 실행하고, AP가 전송한 통신 설정 메시지를 수신할 수 있다. 또한, 프로세서(110)는 통신 설정 메시지에 포함된 스테이션(100)의 우선 조건에 대한 정보를 판독하고, 스테이션(100)의 우선 조건에 대한 정보에 기초하여 AP에 대한 접속을 요청할 수 있다. 이에 대한 구체적인 실시예는 추후 기술하기로 한다.

<26> 도 3에 도시된 스테이션(100)은 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 상기 스테이션(100)의 일부 구성들, 이를 테면 유저 인터페이스부(140) 및 디스플레이 유닛(150) 등은 스테이션(100)에 선택적으로 구비될 수 있다.

<27> 도 4는 본 발명의 일 실시예에 따른 AP(200)의 구성을 나타낸 블록도이다.

<28> 도시된 바와 같이, 본 발명의 실시예에 따른 AP(200)는 프로세서(210), 네트워크 인터페이스 카드(220) 및 메모리(260)를 포함할 수 있다. 도 4에서 AP(200)

의 구성 중 도 3의 스테이션(100)의 구성과 동일하거나 상응하는 부분에 대해서는 중복적인 설명을 생략하도록 한다.

<29> 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, 상기 AP(200)의 네트워크 인터페이스 카드(220) 또한 서로 다른 주파수 밴드를 이용하는 복수의 네트워크 인터페이스 카드 모듈을 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 네트워크 인터페이스 카드 모듈과, 6GHz 이하의 주파수 밴드를 이용하는 네트워크 인터페이스 카드 모듈을 구비할 수 있다. 각각의 네트워크 인터페이스 카드 모듈은 해당 네트워크 인터페이스 카드 모듈이 지원하는 주파수 밴드의 무선랜 규격에 따라 스테이션과 무선 통신을 수행할 수 있다. 상기 네트워크 인터페이스 카드(220)는 AP(200)의 성능 및 요구 사항에 따라 한 번에 하나의 네트워크 인터페이스 카드 모듈만을 동작시키거나 동시에 다수의 네트워크 인터페이스 카드 모듈을 함께 동작시킬 수 있다.

<30> 다음으로, 메모리(260)는 AP(200)에서 사용되는 제어 프로그램 및 그에 따른 각종 데이터를 저장한다. 이러한 제어 프로그램에는 스테이션의 접속을 관리하는 접속 프로그램이 포함될 수 있다. 또한, 프로세서(210)는 AP(200)의 각 유닛들을 제어하며, 유닛들 간의 데이터 송수신을 제어할 수 있다. 본 발명의 실시예에 따

르면, 프로세서(210)는 메모리(260)에 저장된 스테이션과의 접속을 위한 프로그램을 실행하고, 하나 이상의 스테이션에 대한 통신 설정 메시지를 전송할 수 있다. 이때, 통신 설정 메시지에는 각 스테이션의 접속 우선 조건에 대한 정보가 포함될 수 있다. 또한, 프로세서(210)는 스테이션의 접속 요청에 따라 접속 설정을 수행한다. 이에 대한 구체적인 실시예는 추후 기술하기로 한다.

<32> 본 발명의 일 실시예에 따르면 HE PPDU는 HE-SIG-A에 포함된 BSS identifier인 BSS color(BSS 컬러)를 통해 PPDU가 어느 BSS가 송신한 것인지, 혹은 같은 BSS가 송신한 것인지, 혹은 다른 BSS가 송신한 것인지 등을 파악할 수 있다. 또한 PPDU가 어느 BSS가 송신한 것인지, 혹은 같은 BSS가 송신한 것인지, 혹은 다른 BSS가 송신한 것인지 등을 파악하는 데에 있어서 MAC header를 참조할 수도 있다. MAC header의 Address 필드 중에 BSSID가 있으면 같은 BSS가 송신한 것으로 파악할 수 있고, Address 필드 중에 BSSID가 없으면 다른 BSS가 송신했거나 어떤 BSS가 송신했는지 알 수 없는 것으로 파악할 수 있다.

<34> 본 발명의 일 실시예에 따르면 OBSS들이 같은 BSS color를 사용하는 경우가 있을 수 있다. 이 상황을 아래에서 BSS color collision(BSS color 충돌)이라고 부르겠다.

<36> Intra-PPDU Power Save

<37> 도 5는 본 발명의 일 실시예에 따른 intra-PPDU power save를 나타낸 도면이다.

<38> 도 5를 참조하면 STA가 PPDU를 detection(감지)했을 때 PPDU가 특정 조건을 만족시킬 때 doze state로 들어갈 수 있다.

<39> 본 발명의 일 실시예에 따르면

<40> An HE non-AP STA that is in awake state (see 11.2.2.2 (STA Power Management modes)) and has dot11IntraPPDUPowerSaveOptionActivated equal to true operates in intra-PPDU power save mode.

<41> An HE non-AP STA that is in intra-PPDU power save mode may enter the doze state until the end of a received PPDU when one of the following conditions is met:

<42> - The PPDU is an HE MU PPDU with:

<43> ===The value of the RXVECTOR parameter BSS_COLOR equal to the BSS color of the BSS with which the STA is associated and,

<44> ===The value of the RXVECTOR parameter UL_FLAG is equal to 0 and,

<45> ===The values obtained from the RXVECTOR parameter STA_ID_LIST do not match the identifier of the STA or the broadcast identifier(s) intended for the STA

<46> - The PPDU is an HE MU PPDU, HE SU PPDU, or HE extended range SU PPDU with:

<47> ===The value of the RXVECTOR parameter BSS_COLOR equal to the BSS color of the BSS with which the STA is associated and,

<48> ===The value of the RXVECTOR parameter UL_FLAG is equal to 1

<49> - The PPDU is an HE trigger-based PPDU with:

<50> ===The value of the RXVECTOR parameter BSS_COLOR equal to the BSS color of the BSS with which the STA is associated

<51> An HE STA that is in intra-PPDU power save mode and has entered doze state shall continue to operate its NAV timer and consider the medium busy during doze state and shall transition into awake state at the end of the PPDU.

<52> NOTE - The STA can contend for access to the medium immediately on the expiry of the NAV timer.

<54> Awake state에 있고 dot11IntraPPDUPowerSaveOptionActivated가 true로 되어 있는 HE non-AP STA는 intra-PPDU power save mode로 작동한다.

<55> Intra-PPDU power save mode에 있는 HE non-AP STA는 다음 조건 중 하나를 만족할 때 수신한 PPDU의 끝까지 doze state로 들어갈 수 있다.

<56> - PPDU가 HE MU PPDU이고

<57> ===RXVECTOR parameter BSS_COLOR 값이 그 STA가 association된 BSS의 BSS color와 같고,

<58> ===RXVECTOR parameter UL_FLAG 값이 0이고,

<59> ===RXVECTOR parameter STA_ID_LIST 값들이 그 STA의 identifier와 일치하지 않거나 그 STA에게 intend된 broadcast identifier(s)가 아닐 때.

<60> - PPDU가 HE MU PPDU, HE SU PPDU, 또는 HE extended range SU PPDU이고,

<61> ===RXVECTOR parameter BSS_COLOR 값이 그 STA가 association된 BSS의 BSS color와 같고,

<62> ===RXVECTOR parameter UL_FLAG 값이 1일 때

<63> - PPDU가 HE trigger-based PPDU이고,

<64> ===RXVECTOR parameter BSS_COLOR 값이 그 STA가 association된 BSS의 BSS color과 같을 때

<66> Intra-PPDU power save mode에 있고 doze state에 들어간 HE STA는 NAV timer를 계속 작동시켜야 하고 doze state동안 medium 상태를 busy로 판단해야 하고, 그 PPDU의 끝에서 awake state로 바뀌어야 한다.

<67> NAV timer가 expire 되면 STA는 medium access를 위해 즉시 경쟁할 수 있다.

<69> 도 6은 본 발명의 일 실시예에 따른 BSS color collision이 발생한 경우 intra-PPDU power save를 나타낸 도면이다.

<70> 도 6과 앞서 설명한 Intra-PPDU power save를 참조하면 STA는 수신한 PPDU가 특정 조건을 만족할 때 doze state로 들어갈 수 있다. 만약 도 6과 같이 inter-BSS가 intra-BSS(또는 MYBSS)와 같은 BSS color를 사용할 경우, inter-BSS frame을 수신하여 BSS color가 같음을 확인했고 앞서 설명한 조건을 만족시킬 때 doze state로 들어갈 수 있다. 또한 inter-BSS frame 동안 doze state로 들어가게 되면 그동안 그 STA에 intend된 frame을 수신할 수 없는 문제가 발생한다.

<71> 본 발명의 일 실시예에 따르면 언급한 문제를 해결하기 위해 BSS color collision을 인지한 뒤부터는 같은 BSS color의 PPDU를 수신했을 때 intra-PPDU power save mode에 있는 STA가 doze state로 들어가지 않을 수 있다. 또는 수신한 프레임이 Intra-BSS인지 Inter-BSS인지 판단할 수 없는 경우에 intra-PPDU power save mode에 있는 STA가 doze state로 들어가지 않을 수 있다. 또는 BSS color collision을 인지한 뒤에 dot11IntraPPDUPowerSaveOptionActivated를 false로 설정할 수 있다. 또는 BSS color collision을 인지하면 BSS color에 기반한 동작을 하지 않을 수 있다. 또는 BSS color collision을 인지하면 같은 BSS color에 기반한 동작을 하지 않을 수 있다. 또는 BSS color collision을 인지한 뒤부터는 어떤 시간까지 같은 BSS color의 PPDU를 수신했을 때 intra-PPDU power save mode에 있는 STA가 doze state로 들어가지 않을 수 있다. 또는 BSS color collision을 인지한 뒤에 어떤 시간까지 intra-PPDU power save mode로 동작하지 않을 수 있다. 언급한

어떤 시간은 예를 들면 BSS color collision이 해결되는 시간일 수 있다. 일 실시예로 특정 reserve된 BSS color(예를 들면 0)으로 동작하여 BSS color operation을 제한할 수 있고 그때까지일 수 있다. 또한 언급한 어떤 시간은 현재의 association이 끊어지는 시간일 수 있다. 또는 BSS color collision을 인지한 뒤에 STA는 doze state에 들어가지 않을 수 있다.

<73> Updating two NAVs

<74> 본 발명의 일 실시예에 따르면 STA는 다수의 NAV를 사용할 수 있다. 한가지 실시예로 STA는 2개의 NAV를 사용할 수 있다.

<75> Mandatory or optional support of two NAVs is TBD.

<76> For the two NAVs maintained by a HE STA, one is identified as Intra-BSS NAV, and the second one is identified as regular NAV.

<77> A STA that receives at least one valid frame in a PSDU and identifies the frame as Intra-BSS can update its Intra-BSS NAV with the information from any valid Duration field in the PSDU.

<78> A STA that receives at least one valid frame in a PSDU and identifies the frame as Inter-BSS can update its regular NAV with the information from any valid Duration field in the PSDU.

<79> A STA that receives at least one valid frame in a PSDU and cannot

identify the frame as Intra-BSS or Inter-BSS can update its regular NAV with the information from any valid Duration field in the PSDU.

<80> A STA that receives a valid HE-SIG-A in a HE PPDU and identifies the HE-SIG-A as Intra-BSS can update its Intra-BSS NAV with the information from the TXOP Duration field in the HE-SIG-A.

<81> A STA that receives a valid HE-SIG-A in a HE PPDU and identifies the HE-SIG-A as Inter-BSS can update its regular NAV with the information from the TXOP Duration field in the HE-SIG-A.

<82> When the received frame's RA is equal to the STA's own MAC address, the STA shall not update its Intra-BSS NAV or regular NAV with the information from the Duration field.

<83> When a STA receives both a valid HE-SIG-A in a HE PPDU and a valid frame in the PSDU of the HE PPDU, the STA shall not update its Intra-BSS NAV or regular NAV with the information from the TXOP Duration field in the HE-SIG-A.

<84> For all other received frames that are identified by the STA as Intra-BSS, the STA shall update its Intra-BSS NAV when the received value of the Duration field is greater than the STA's current Intra-BSS NAV value.

<85> For all other received frames that are identified by the STA as Inter-

BSS or cannot be identified as Intra-BSS or Inter-BSS, the STA shall update its regular NAV when the received value of the Duration field is greater than the STA's current regular NAV value.

<86> For all other received HE-SIG-As that are identified by the STA as Intra-BSS, the STA shall update its Intra-BSS NAV when the received value of the TXOP Duration field is greater than the STA's current Intra-BSS NAV value.

<87> For all other received HE-SIG-As that are identified by the STA as Inter-BSS, the STA shall update its Inter-BSS NAV when the received value of the TXOP Duration field is greater than the STA's current regular NAV value.

<89> 2개의 NAV 지원은 mandatory일 수 있고, 또는 optional일 수 있다.

<90> STA가 유지하는 2개의 NAV에 대해서, 하나의 NAV는 Intra-BSS NAV이고, 다른 하나는 regular NAV일 수 있다.

<91> PSDU에서 적어도 하나의 valid frame을 수신하고 그것을 Intra-BSS로 판단하는 STA는 PSDU의 어떠한 valid Duration 필드 정보로부터 그것의 Intra-BSS NAV를 업데이트할 수 있다.

<92> PSDU에서 적어도 하나의 valid frame을 수신하고 그것을 Inter-BSS로 판단하는 STA는 PSDU의 어떠한 valid Duration 필드 정보로부터 그것의 regular NAV를 업

데이트할 수 있다.

<93> PSDU에서 적어도 하나의 valid frame을 수신하고 그것을 Intra-BSS인지 Inter-BSS인지 판단할 수 없는 STA는 PSDU의 어떠한 valid Duration 필드 정보로부터 그것의 regular NAV를 업데이트할 수 있다.

<94> HE PPDU의 valid HE-SIG-A를 수신하고 HE-SIG-A를 Intra-BSS로 판단하는 STA는 HE-SIG-A의 TXOP Duration 필드 정보로부터 그것의 Intra-BSS NAV를 업데이트할 수 있다.

<95> HE PPDU의 valid HE-SIG-A를 수신하고 HE-SIG-A를 Inter-BSS로 판단하는 STA는 HE-SIG-A의 TXOP Duration 필드 정보로부터 그것의 regular NAV를 업데이트할 수 있다.

<96> 수신한 프레임의 RA가 STA의 MAC address와 일치할 때 STA는 Duration 필드 정보로부터 그것의 Intra-BSS NAV 또는 regular NAV를 업데이트하면 안된다.

<97> STA가 HE PPDU의 valid HE-SIG-A와 HE PPDU의 PSDU의 valid frame을 모두 받았을 때 STA는 HE-SIG-A의 TXOP Duration 필드 정보로부터 그것의 Intra-BSS NAV 또는 regular NAV를 업데이트하면 안된다.

<98> STA에 의해 Intra-BSS로 판단되는 모든 다른 received frames에 대해, 수신한 Duration 필드의 값이 STA의 현재 Intra-BSS NAV 값보다 클 때 그것의 Intra-BSS NAV를 업데이트 해야 한다.

<99> STA에 의해 Inter-BSS로 판단되거나 Intra-BSS인지 Inter-BSS인지 판단할 수

없는 모든 다른 received frames에 대해, 수신한 Duration 필드의 값이 STA의 현재 regular NAV 값보다 클 때 그것의 regular NAV를 업데이트 해야 한다.

<100> STA에 의해 Intra-BSS로 판단되는 모든 다른 HE-SIG-As에 대해, 수신한 TXOP Duration 필드의 값이 STA의 현재 Intra-BSS NAV 값보다 클 때 STA는 그것의 Intra-BSS NAV를 업데이트 해야 한다.

<101> STA에 의해 Inter-BSS로 판단되는 모든 다른 HE-SIG-As에 대해, 수신한 TXOP Duration 필드의 값이 STA의 현재 regular NAV 값보다 클 때 STA는 그것의 Inter-BSS NAV(또는 regular NAV)를 업데이트 해야 한다.

<103> Truncation of TXOP

<104> An HE STA that receives a CF-End frame should not reset its NAV if:

<105> - The CF-End did not originate from the STA's associated BSS or any BSS of a multi-BSSID set that the STA's associated BSS belongs to and the most recent NAV update was due to a PPDU originating from the STA's associated BSS or any BSS of a multi-BSSID set that the STA's associated BSS belongs to.

<106> - The CF-End originated from the STA's associated BSS or any BSS of a multi-BSSID set that the STA's associated BSS belongs to and the most recent NAV update was not due to a PPDU originating from the STA's associated BSS

or any BSS of a multi-BSSID set that the STA's associated BSS belongs to.

<108> CF-End 프레임을 수신하는 HE STA는 다음의 경우에 그것의 NAV를 리셋하면 안된다.

<109> - CF-End가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 오지 않았고, 가장 최근의 NAV가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 온 PPDU에 의해 셋팅되었을 때

<110> - CF-End가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 왔고, 가장 최근의 NAV가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 오지 않은 PPDU에 의해 셋팅되었을 때

<112> A NAV is considered in virtual CS for a STA that is polled from a Trigger frame for UL MU transmission unless one of the following conditions is met:

<113> - The NAV was set by a frame originating from the AP sending the Trigger frame

<114> - The response generated by the STA contains an Ack frame or a BlockAck

frame and the duration of the HE trigger-based PPDU is less than a TBD value

<115> - The NAV was set by a frame originating from an intra-BSS STA

<116> - The CS Required subfield in the Trigger frame is 0

<117> - Other condition TBD

<119> 다음 조건들 중 하나도 만족되지 않을 때 UL MU transmission을 위한 Trigger frame에 의해 poll 된 STA는 virtual CS에서 NAV를 고려한다.

<120> - NAV가 Trigger frame을 보낸 AP가 보낸 frame에 의해 셋팅되었을 때

<121> - STA가 보낼 response가 Ack frame이나 BlockAck frame을 포함하고 HE trigger-based PPDU의 duration이 TBD 값보다 작을 때

<122> - NAV가 intra-BSS STA가 보낸 frame에 의해 셋팅되었을 때

<123> - Trigger frame의 CS Required subfield가 0일 때

<124> - 그 외 TBD 조건

<126> 도 7은 본 발명의 일 실시예에 따른 BSS color collision이 발생한 경우 프레임 교환을 나타낸 도면이다.

<127> 도 7을 참조하면 STA는 Inter-BSS 프레임을 수신하고 Inter-BSS 프레임의 BSS color가 Intra-BSS와 같기 때문에 Intra-NAV 셋팅을 할 수 있다. 예를 들면 수신한 프레임이 SU UL PPDU이거나 MU PPDU인데 STA가 디코딩해야할 STA의 own STAID

나 broadcast ID, multicast ID를 포함하고 있지 않거나 Trigger-based PPDU인 경우에 STA는 그 프레임이 자신에게 오는 프레임이 아니라고 판단하고 MAC decoding을 하지 않거나 MAC decoding을 할 수 없어서 HE-SIG-A의 TXOP Duration 필드로부터 NAV 셋팅을 할 수 있다. 그런데 수신한 프레임이 실제로는 Inter-BSS 프레임이지만 Inter-BSS가 같은 BSS color를 사용하기 때문에 수신한 프레임을 Intra-BSS 프레임으로 판단하는 경우가 발생할 수 있다. 그러한 경우에 two NAVs를 사용하는 STA의 경우에 Inter-BSS 프레임으로부터 Intra-NAV를 셋팅할 수 있다. 그러한 상태에서 STA가 Intra-BSS AP로부터 그 STA를 트리거하는 Trigger frame을 수신한 경우 셋팅되어있는 NAV가 intra-BSS STA가 보낸 frame에 의해 셋팅된 것이라 판단할 수 있기 때문에 Trigger frame에 NAV를 고려하지 않고 Trigger frame에 응답할 수 있고, 그러한 경우에 OBSS에 interference를 유발할 수 있다.

<129> 도 8은 본 발명의 일 실시예에 따른 BSS color collision을 인지한 이후 프레임 교환을 나타낸 도면이다.

<130> 도 8을 참조하면 도 7에서 언급한 문제를 해결하기 위해 STA는 Inter-BSS frame으로부터 regular NAV(또는 inter-BSS NAV 또는 non-intra-BSS NAV)를 셋팅할 수 있다.

<131> 일 실시예로 STA가 BSS color collision을 인지한 후에 STA는 수신한 프레임의 BSS color가 Intra-BSS의 BSS color와 같을 때 HE-SIG-A의 TXOP Duration에 기반하여 Intra-BSS NAV를 업데이트하지 않을 수 있다. 또는 STA가 BSS color

collision을 인지한 후에 STA는 수신한 프레임이 Intra-BSS인지 Inter-BSS인지 판단할 수 없을 때 HE-SIG-A의 TXOP Duration에 기반하여 Intra-BSS NAV를 업데이트 하지 않을 수 있다. BSS color collision을 인지한 후에는 수신한 PPDU의 BSS color가 Intra-BSS의 BSS color와 같을 때 수신한 프레임이 Intra-BSS 프레임인지 Inter-BSS 프레임인지 HE-SIG-A 정보만 가지고 판단할 수 없게 된다. 이러한 경우에 STA가 BSS color collision을 인지한 이후 도면과 같이 Intra-BSS와 같은 BSS color를 쓰는 frame을 수신한 경우에 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 업데이트할 수 있다. 이때 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 업데이트하는 것은 MAC decoding을 할 수 없을 때로 제한할 수도 있다. Regular NAV가 셋팅되어 있는 때에 Intra-BSS AP로부터 Trigger frame을 수신하게 되면 NAV가 Intra-BSS의 프레임에 의해 셋팅되었다고 판단하지 않게 되고 NAV를 고려할 수 있다. 그리고 OBSS에 interference를 주지 않을 수 있게 된다.

<132> 또는 BSS color collision을 인지한 후에 STA는 RXVECTOR parameter BSS_COLOR 값에 따라 doze state로 들어가지 않을 수 있다.

<133> 또한 STA가 BSS color collision을 인지한 후에 STA가 수신한 프레임의 BSS color가 Intra-BSS의 BSS color와 같을 때 MAC decoding을 계속할 수 없는 경우에 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 업데이트할 수 있다.

<134> 또한 STA가 BSS color collision을 인지한 후에 STA가 수신한 프레임의 BSS color가 Intra-BSS의 BSS color와 같을 때 MAC decoding을 계속할 수 있는 경우에 MAC header의 MAC address에 기반하여 Intra-BSS NAV 또는 regular NAV를 업데이트

할 수 있다.

<135> 또다른 실시예로 STA가 BSS color collision을 인지한 후에 STA는 같은 BSS color에 기반한 operation들을 하지 않을 수 있다.

<136> 또다른 실시예로 STA가 BSS color collision을 인지한 후에 STA는 BSS color에 기반한 operation들을 하지 않을 수 있다.

<138> 도 9는 본 발명의 일 실시예에 따른 BSS color collision이 발생한 경우 프레임 교환을 나타낸 도면이다.

<139> 도 9을 참조하면 STA는 Inter-BSS 프레임을 수신하고 Inter-BSS 프레임의 BSS color가 Intra-BSS와 같기 때문에 regular NAV 셋팅이 안될 수 있다. 예를 들면 수신한 프레임이 SU UL PPDU이거나 MU PPDU인데 STA가 디코딩해야할 STA의 own STAID나 broadcast ID, multicast ID를 포함하고 있지 않거나 Trigger-based PPDU인 경우에 STA는 그 프레임이 자신에게 오는 프레임이 아니라고 판단하고 MAC decoding을 하지 않거나 MAC decoding을 할 수 없게 되고 HE-SIG-A의 TXOP Duration 필드에 기반하여 NAV 셋팅을 할 수 있다. 그런데 수신한 프레임이 실제로는 Inter-BSS 프레임이지만 Inter-BSS가 같은 BSS color를 사용하기 때문에 수신한 프레임을 Intra-BSS 프레임으로 판단하는 경우가 발생할 수 있다. 그러한 경우에 two NAVs를 사용하는 STA의 경우에 Inter-BSS 프레임으로부터 regular NAV 셋팅이 안될 수 있다. 도면을 참조하면 Intra-BSS STA가 Intra-BSS NAV를 셋팅할 수 있다.

Intra-BSS NAV가 셋팅되어 있을 때 STA가 Inter-BSS frame을 수신하고 그 수신한 프레임의 BSS color가 Intra-BSS의 BSS color와 같으면 수신한 프레임을 Intra-BSS로 판단하고 regular NAV를 셋팅하지 않을 수 있다(수신한 프레임의 TXOP Duration이 더 길면 Intra-BSS NAV를 업데이트하거나 수신한 프레임의 TXOP Duration이 더 짧으면 Intra-BSS NAV 업데이트를 하지 않을 수 있다.). 그러한 상태에서 STA가 Intra-BSS에서 보낸 CF-End를 수신하면 Intra-BSS NAV 를 리셋할 수 있다. 그러면 STA는 OBSS에 interference를 유발할 수 있다.

<141> 도 10은 본 발명의 일 실시예에 따른 BSS color collision을 인지한 이후 프레임 교환을 나타낸 도면이다.

<142> 도 10을 참조하면 도 8에서 언급한 문제를 해결하기 위해 STA는 Inter-BSS frame으로부터 regular NAV(또는 inter-BSS NAV 또는 non-intra-BSS NAV)를 셋팅할 수 있다.

<143> 일 실시예로 STA가 BSS color collision을 인지한 후에 STA는 수신한 프레임의 BSS color가 Intra-BSS의 BSS color와 같을 때 HE-SIG-A의 TXOP Duration에 기반하여 Intra-BSS NAV를 업데이트하지 않을 수 있다. 또는 STA가 BSS color collision을 인지한 후에 STA는 수신한 프레임이 Intra-BSS인지 Inter-BSS인지 판단할 수 없을 때 HE-SIG-A의 TXOP Duration에 기반하여 Intra-BSS NAV를 업데이트하지 않을 수 있다. BSS color collision을 인지한 후에는 수신한 PPDU의 BSS color가 Intra-BSS의 BSS color와 같을 때 수신한 프레임이 Intra-BSS 프레임인지

Inter-BSS 프레임인지 HE-SIG-A 정보만 가지고 판단할 수 없게 된다. 이러한 경우에 STA가 BSS color collision을 인지한 이후 도면과 같이 Intra-BSS와 같은 BSS color를 쓰는 frame을 수신한 경우에 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 업데이트할 수 있다. 이때 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 업데이트하는 것은 MAC decoding을 할 수 없을 때로 제한할 수도 있다. Regular NAV가 셋팅되어 있는 때에 regular NAV가 Intra-BSS의 프레임에 의해 셋팅되었다고 판단하지 않게 되고 Intra-BSS STA로부터 CF-End를 수신하게 되면 regular NAV를 리셋하지 않을 수 있다(Intra-BSS NAV도 셋팅되어있는 경우에는 Intra-BSS NAV만 리셋할 수 있다.). 그리고 OBSS에 interference를 주지 않을 수 있게 된다.

<144> 또한 STA가 BSS color collision을 인지한 후에 STA가 수신한 프레임의 BSS color가 Intra-BSS의 BSS color와 같을 때 MAC decoding을 계속할 수 없는 경우에 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 업데이트할 수 있다.

<145> 또한 STA가 BSS color collision을 인지한 후에 STA가 수신한 프레임의 BSS color가 Intra-BSS의 BSS color와 같을 때 MAC decoding을 계속할 수 있는 경우에 MAC header의 MAC address에 기반하여 Intra-BSS NAV 또는 regular NAV를 업데이트할 수 있다.

<146> 도면을 추가 설명하면 BSS color collision을 인식한 후에 STA가 Intra-BSS frame을 수신하면 BSS color만 보고서는 Intra-BSS 인지 Inter-BSS 인지 판단할 수 없게 된다. 그러한 경우 STA는 Intra-BSS NAV 또는 regular NAV를 설정하게 된다.

예를 들면 수신한 프레임의 MAC을 decoding할수 있거나 해야하는 경우 MAC header의 MAC address를 확인하여 Intra-BSS로 판단하고 Duration 필드에 기반하여 Intra-BSS NAV를 설정할 수 있고, MAC을 decoding할 수 없거나 할 필요가 없는 경우 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 설정할 수 있다. 이러한 상태에서 Intra-BSS와 같은 BSS color를 사용하는 Inter-BSS frame을 수신하면 MAC을 디코딩할 수 없거나 할 필요가 없는 경우에 수신한 프레임을 Intra-BSS라고 판단할 수 없으므로 regular NAV를 셋팅하거나 기존에 있던 regular NAV를 업데이트하거나 TXOP Duration이 기존에 있던 regular NAV보다 짧아서 업데이트하지 않을 수 있다. 즉, regular NAV가 남아있게 된다. 이러한 상태에서 Intra-BSS로부터 CF-End를 수신해도 그 CF-End가 regular NAV를 리셋하지는 못할 수 있다. 따라서 OBSS에 interference를 주지 않게 된다.

<147> 또다른 실시예로 STA가 BSS color collision을 인지한 후에 STA는 같은 BSS color에 기반한 operation들을 하지 않을 수 있다.

<148> 또다른 실시예로 STA가 BSS color collision을 인지한 후에 STA는 BSS color에 기반한 operation들을 하지 않을 수 있다.

<150> 또다른 실시예로 NAV가 Intra-BSS에 의해 셋팅되었는지 Inter-BSS에 의해 셋팅되었는지 판단할 수 없는 경우에 CF-End를 수신하면 그 NAV를 리셋하지 않을 수 있다.

<151> 또는 NAV가 Intra-BSS에 의해 셋팅되었는지 Inter-BSS에 의해 셋팅되었는지 판단할 수 없는 경우에 Inter-BSS로부터 CF-End를 수신하면 그 NAV를 리셋하지 않을 수 있다.

<153> 본 발명의 일 실시예에 따르면 CF-End 프레임을 수신하는 HE STA는 다음의 경우에 그것의 NAV를 리셋하지 않을 수 있다.

<154> - CF-End가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 오지 않았고, 가장 최근의 NAV가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 온 PPDU에 의해 셋팅되었을 때

<155> - CF-End가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 왔고, 가장 최근의 NAV가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 오지 않은 PPDU에 의해 셋팅되었을 때

<156> - 가장 최근의 NAV가 Intra-BSS에 의해 셋팅되었는지 Inter-BSS에 의해 셋팅되었는지 판단할 수 없을 때

<158> 또한 본 발명의 일 실시예에 따르면 CF-End 프레임을 수신하는 HE STA는 다음의 경우에 그것의 NAV를 리셋하지 않을 수 있다.

<159> - CF-End가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 오지 않았고, 가장 최근의 NAV가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 온 PPDU에 의해 셋팅되었을 때

<160> - CF-End가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 왔고, 가장 최근의 NAV가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 오지 않은 PPDU에 의해 셋팅되었을 때

<161> - CF-End가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 오지 않았고, 가장 최근의 NAV가 Intra-BSS에 의해 셋팅되었는지 Inter-BSS에 의해 셋팅되었는지 판단할 수 없을 때

<163> 도 11은 본 발명의 일 실시예에 따른 BSS color collision 감지 과정을 나타낸 도면이다.

<164> 도 11을 참조하면 STA는 패킷 수신 과정에서 BSS color collision 을 감지할 수 있다. 일 실시예로 STA는 패킷 수신 과정에서 MAC decoding을 할 수 있고 BSS color collision이 발생한 경우 MAC header의 MAC address로부터 BSS color collision을 감지할 수 있다.

<165> 예를 들면 STA가 HE SU PPDU를 수신한 경우, L-SIG signaling을 통해 SU

PPDU임을 판단하거나 L-SIG signaling과 HE-SIG-A의 modulation을 통해 extended range SU PPDU임을 판단할 수 있다. 그리고 HE-SIG-A의 BSS color 가 Intra-BSS의 BSS color와 같고 UL/DL flag가 DL을 가리키고 있는 경우 디코딩을 계속할 수 있다. HE-SIG-A의 BSS color 가 Intra-BSS의 BSS color와 같고 UL/DL flag가 UL을 가리키고 있는 경우 디코딩을 계속할 수도 있고 계속하지 않을 수도 있다. 디코딩을 계속하는 경우 MAC header의 MAC address 필드가 2개 이상 있는 경우 이 중 적어도 하나가 자신이 속한 BSSID나 자신이 속한 BSS가 속한 multi-BSSID set의 BSSID가 아닌 경우 BSS color collision이 발생한 것으로 판단할 수 있다.

<166> 또다른 예를 들면 STA가 HE MU PPDU를 수신한 경우, L-SIG signaling과 HE-SIG-A의 modulation을 통해 MU PPDU임을 판단할 수 있다. 그리고 HE-SIG-A의 BSS color가 Intra-BSS의 BSS color와 같고, HE-SIG-B에서의 STAID가 STA가 수신해야할 STAID(STA의 own STAID나 broadcast/multicast STAID)를 포함하고 있는 경우 디코딩을 계속할 수 있다. 디코딩을 계속하는 경우 MAC header의 MAC address 필드가 2개 이상 있는 경우 이 중 적어도 하나가 자신이 속한 BSSID나 자신이 속한 BSS가 속한 multi-BSSID set의 BSSID가 아닌 경우 BSS color collision이 발생한 것으로 판단할 수 있다.

<168> 본 발명의 일 실시예로 STA가 BSS color collision을 인지하거나 BSS color collision을 피할 수 없음을 인지하면 BSS color 값으로 특정 reserve된 값, 예를 들면 0,을 사용할 수 있다. 또한 BSS color 0값으로 셋팅되어있는 프레임을 수신하

는 intended recipient는 BSS color collision이나 BSS color collision을 피할 수 없음을 보고받은 것으로 할 수 있다.

<170> 본 발명의 일 실시예로 PPDU를 수신하는 STA가 BSS color 기반 operation을 하지 않도록 BSS color 값으로 특정 reserve된 값, 예를 들면 0,을 사용할 수 있다. 또한 이러한 BSS color 값을 사용하는 PPDU를 전송하기 위한 채널 엑세스 동작에서는 기존의 채널 엑세스(또는 Color code based CCA가 아닌 채널 엑세스 또는 detected frame이 intra-BSS frame인지 아닌지를 구분하여 다른 CCA level을 적용하지 않는 채널 엑세스)를 할 수 있다. 또한 Legacy PPDU를 전송할 때 PPDU를 수신하는 STA가 수신한 프레임이 intra-BSS인지 아닌지에 따른 operation을 하지 않도록 하는 시그날링을 포함시킬 수 있다. 예를 들면 MAC address의 BW signaling 기법을 사용할 수 있다. 또는 MAC header에서 기존에 특정 frame에서 고정된 값을 사용하거나 reserved인 필드를 사용하여 시그날링할 수 있다.

<172> 도 12는 본 발명의 일 실시예에 따른 CTS frame 또는 Ack frame의 MAC 포맷을 나타낸 도면이다.

<173> 도 12를 참조하면 CTS, Ack 프레임은 Frame Control, Duration, RA, FCS로 이루어질 수 있다. 또한 Frame Control, Duration, RA, FCS 각 필드는 2, 2, 6, 4 바이트로 이루어질 수 있다. 또한 본 실시예에서 Frame Control, Duration, RA 필

드가 MAC Header일 수 있다. 도 12를 참조하면 CTS 또는 Ack 프레임의 address 필드는 1개일 수 있다. 본 발명의 일 실시예에 따르면 RTS frame의 응답으로 보내지는 CTS frame의 경우에 RA 필드는 RTS frame의 TA 필드를 Individual/Group bit를 0으로 하여 셋팅할 수 있다. 또한 CTS frame이 frame exchange의 첫번째 프레임인 경우에 RA 필드는 transmitter의 MAC address로 셋팅할 수 있다. 또한 Ack frame의 RA 필드는 Ack frame 바로 이전의 individually addressed Data, Management, BlockAckReq, BlockAck, 또는 PS-Poll 프레임의 Address 2 필드로부터 nonbandwidth signaling TA 값으로 셋팅할 수 있다. 또한 RA 값을 수신자의 MAC address으로 셋팅할 수 있다.

<175> 도 13은 본 발명의 일 실시예에 따른 NAV 셋팅을 나타낸 도면이다.

<176> 앞서 설명한 것과 같이 STA는 다수의 NAV를 사용할 수 있고, 예를 들면 Intra-BSS NAV와 Regular NAV를 사용할 수 있다. 또한 도 13을 참조하면 STA가 MAC Header에 Address 필드가 1개만 있는 프레임을 수신한 경우 실제 그 프레임이 Intra-BSS 프레임이지만 그 프레임에 의해 Regular NAV를 설정할 수 있다. 또는 1개의 NAV를 사용하는 경우엔 마지막 설정된 NAV가 Intra-BSS frame에 의한 것이 아니라고 판단할 수 있다. 이하에 NAV를 설정할 수 있다고 기술한 것은 설정해야 하는 값으로 받은 길이가 현재 설정되어 있는 해당 NAV의 길이보다 길 때를 의미할 수 있다. 예를 들어 CTS frame 또는 Ack frame의 Address 필드가 1개만 있을 수 있다. 예를 들면 Address 필드가 1개만 있는 프레임을 수신한 경우 그 Address 필드

가 AP address 혹은 BSSID를 나타내고 있지 않아서 Intra-BSS 프레임으로 판단할 수 없고, 따라서 regular NAV를 설정할 수 있다. 또는 1개의 NAV를 사용하는 경우엔 NAV를 설정하고 그 NAV가 Intra-BSS frame에 의한 것이 아니라고 판단할 수 있다. 예를 들면 다운링크 CTS frame이 전송되는 경우, 그 프레임의 Address 필드에는 non-AP STA의 맥 어드레스가 적혀있을 수 있고, 이를 수신한 다른 STA는 그 프레임이 intra-BSS 프레임이라고 판단할 수 없을 수 있다. 그러한 경우 그 프레임에 의해 regular NAV를 설정할 수 있다. 또는 1개의 NAV를 사용하는 경우엔 NAV를 설정하고 그 NAV가 Intra-BSS frame에 의한 것이 아니라고 판단할 수 있다. 또다른 예로 Address 필드가 1개만 있는 프레임의 경우 그 프레임이 intra-BSS 프레임인지 inter-BSS 프레임인지 판단할 수 없는 경우가 발생할 수 있기 때문에 Address 필드가 1개만 있는 프레임에 의해서는 Address 값에 상관없이 regular NAV를 설정하도록 정의할 수도 있다. 이러한 경우의 예를 들면 업링크 또는 다운링크의 CTS frame을 수신한 STA는 그 프레임에 의해 regular NAV를 설정할 수 있다. 또는 1개의 NAV를 사용하는 경우엔 NAV를 설정하고 그 NAV가 Intra-BSS frame에 의한 것이 아니라고 판단할 수 있다. 이하에 two NAVs를 사용하는 상황에서 설명한 부분은 이에 한정되지 않고 1개의 NAV를 사용하는 경우에도 적용될 수 있다. 예를 들어 intra-BSS NAV를 설정하는 것은 NAV를 설정하고 그 NAV가 Intra-BSS frame에 의한 것이라고 판단하는 것이라 할 수 있다. 또는 regular NAV를 설정하는 것은 NAV를 설정하고 그 NAV가 Intra-BSS frame에 의한 것이 아니라고 판단하는 것이라 할 수 있다.

<177> 도면을 참조하면 같은 BSS의 STA 1과 STA 2가 RTS/CTS frame 교환을 하고 있

고, Intra-BSS STA 3은 그 RTS/CTS frame 교환 또는 프레임 교환의 일부를 수신할 수 있다. 예를 들면 Intra-BSS STA 3이 RTS frame을 수신한 경우 MAC Header의 address를 통해 그 프레임을 Intra-BSS 프레임으로 판단하고 Intra-BSS NAV를 설정할 수 있다. 또한 Intra-BSS STA 3이 CTS frame을 수신한 경우 위에서 설명한 것과 같이 그 프레임에 의해 regular NAV를 설정할 수 있다.

<178> 앞서 설명한 것처럼 CF-End를 수신했을 때 NAV reset하지 않을 수 있는 경우가 있고(Truncation of TXOP 부분), 예를 들어 intra-BSS STA 3이 intra-BSS CTS 프레임에 의해 regular NAV를 설정한 경우, NAV를 셋팅한 STA가 Intra-BSS의 STA이고 Intra-BSS STA가 전송한 CF-End를 수신했을지라도 regular NAV가 reset되지 않을 수 있다.

<179> 또다른 예로 Intra-BSS STA 3 이 RTS frame을 수신하지 못해서 Intra-BSS NAV가 셋팅되어 있지 않고, CTS frame을 수신해서 regular NAV가 셋팅된 경우, Inter-BSS의 CF-End 프레임을 수신하면 Regular NAV가 reset될 수 있고 Intra-BSS NAV가 설정되어 있지 않기 때문에 interference를 유발할 수 있다.

<180> 언급한 문제를 해결하기 위해 Address 필드가 1개 있는 프레임을 보낼 때 BSS identifier, 예를 들면 BSS Color,를 포함하는 새로운 포맷, 예를 들면 HE PPDU 포맷을 사용할 수 있지만 그러한 경우 새로운 포맷을 읽을 수 없는 레거시 STA의 경우에는 해당 프레임을 읽을 수 없는 문제가 발생할 수 있다.

<182> 도 14는 본 발명의 일 실시예에 따른 11a 패킷 구조를 나타낸 도면이다.

<183> 도 14를 참조하면 11a 패킷은 Short Training Field, Long Training Field, Signal Field, Data Field로 구성될 수 있다. 또한 Data Field는 Service 필드, PSDU, Tail 비트, 필요하면 Padding 비트를 포함할 수 있다. 이 중 Service Field는 Scrambler Initialization 비트를 포함할 수 있고, 이는 receiver에서 descrambler를 synchronize하는 데에 사용될 수 있다. 또한 Scrambler Initialization 비트는 7비트일 수 있고, Service Field의 B0부터 B6비트일 수 있다. 또한 Service Field는 B0부터 전송될 수 있다. 또한 Service Field에서 Reserved 필드가 있을 수 있고, 예를 들면 Scrambler Initialization 비트를 제외한 나머지 9비트가 Reserved로 남아있을 수 있다. Reserved 필드는 0으로 셋팅될 수 있고, 수신자는 이 값을 무시할 수 있다.

<184> 본 발명의 일 실시예로 도 13에서 언급한 문제를 해결하기 위해 11a 패킷 또는 레거시 패킷에 BSS identifier를 포함할 수 있다. 이때 BSS identifier로는 BSS Color, 제 2의 BSS Color, partial BSS Color, BSSID의 일부, BSSID 또는 BSSID 일부로부터 산출할 수 있는 값 등이 포함될 수 있다. 또한 본 발명의 일 실시예에 따르면 BSS identifier를 시그날링하는 위치는 레거시 패킷의 reserved fields 혹은 reserved fields의 조합일 수 있다. 또한 reserved fields는 Signal field, Service field 등에 존재할 수 있고 하나 이상의 필드의 reserved field들을 BSS identifier를 나타내는데에 사용할 수 있다.

<186> 도 15는 본 발명의 일 실시예에 따른 레거시 패킷의 Service field 구성을 나타낸 도면이다.

<187> 도 15를 참조하면 패킷의 Data field의 Service field에 BSS identifier를 포함할 수 있다. 이때 BSS identifier로는 BSS Color, 제 2의 BSS Color, partial BSS Color, VHT PPDU에 BSS identifier를 넣기 위한 AID 할당 룰에 따라 할당하는 AID 비트, BSSID의 일부, BSSID 또는 BSSID 일부로부터 산출할 수 있는 값 등이 포함될 수 있다. 예를 들면 도 14에서 나타낸 것 같은 기존 Service field의 Reserved field를 BSS identifier를 나타내는 데에 사용할 수 있다. 이때 receiver는 reserved field의 값들을 무시할 수 있기 때문에 새로운 표준의 STA가 기존에 reserved 였던 필드를 다른 용도로 활용하더라도 레거시 STA에 끼치는 영향을 없을 수 있다. 도 15를 참조하면 레거시 패킷의 Service field의 B7부터 B12까지의 비트를 이용하여 6비트의 BSS Color를 나타낼 수 있다.

<188> 일 실시예로 도 14와 도 15에서 설명한 레거시 패킷 또는 레거시 패킷의 Service field에 BSS identifier 혹은 BSS Color 등을 넣는 방법은 해당 레거시 패킷이 전달하는 MAC frame의 Address 필드가 1개만 있는 경우에만 한정하지 않아서 모든 레거시 패킷에 BSS identifier를 넣을 수 있다. 따라서 이를 참조하여 해당 프레임이 Intra-BSS 프레임인지 아닌지 판단할 수 있다.

<189> 또다른 실시예로 도 14와 도 15에서 설명한 레거시 패킷 또는 레거시 패킷의 Service field에 BSS identifier 혹은 BSS Color 등을 넣는 방법은 해당 레거시 패킷이 전달하는 MAC frame의 Address 필드가 1개만 있는 경우에만 사용하여 이 방법

을 사용하지 않는 프레임에 대해 기존의 Reserved field를 최대한 유지시킬 수 있고 미래에 사용을 위해 남겨둘 수 있다.

<191> 도 16은 본 발명의 일 실시예에 따른 NAV 셋팅을 나타낸 도면이다.

<192> 도 16을 참조하면 MAC Header의 Address 필드가 1개만 있는 패킷을 수신한 경우라도 Intra-BSS 프레임인지 Inter-BSS 프레임인지 확인할 수 있고, 이에 따라 Intra-BSS NAV 또는 regular NAV를 올바로 설정할 수 있다. 또는 설정된 NAV가 intra-BSS 프레임에 의한 것인지 아닌지 올바로 판단할 수 있다. 본 발명의 일 실시예에 따르면 도 13에서 설명한 문제를 해결하기 위해 도 14와 도 15에서 설명한 방법을 사용할 수 있고, 그러한 경우 레거시 포맷으로 전송되는 프레임을 수신하여 기존에는 intra-BSS 프레임인지 inter-BSS 프레임인지 판단할 수 없었던 상황에서도 레거시 패킷에 포함된 BSS identifier를 참조하여 intra-BSS 프레임인지 inter-BSS 프레임인지를 올바로 판단할 수 있고, 이에 따라 Intra-BSS NAV 혹은 regular NAV를 올바로 설정할 수 있다.

<193> 예를 들어 STA 1과 STA 2가 RTS/CTS frame exchange를 하는 경우에 Intra-BSS STA 3이 CTS Frame을 수신한 경우 CTS Frame이 레거시 패킷 포맷으로 전송되는 경우에도 BSS identifier를 참조하여 그 프레임을 Intra-BSS 프레임으로 판단할 수 있다. 즉, intra-BSS CTS frame에 의해 regular NAV를 셋팅하지 않을 수 있다. 또는 1개의 NAV를 사용하는 경우엔 NAV를 설정하고 그 NAV가 Intra-BSS frame에 의한 것이라고 판단할 수 있다. 따라서 이러한 상황에서 intra-BSS STA가 보낸 CF-End

프레임을 수신한 경우 NAV reset을 할 수 있다. 또한 inter-BSS STA가 보낸 CF-End 프레임을 수신한 경우 그 프레임에 의해 NAV reset이 되지 않을 수 있다.

<195> 도 17은 본 발명의 일 실시예에 따른 VHT-SIG-A의 Partial AID 및 Group ID 셋팅을 나타낸 표이다.

<196> 도 17을 참조하면 VHT-SIG-A의 Partial AID와 Group ID를 다음과 같이 셋팅할 수 있다. AP로 향하는 PPDU 또는 PSDU인 경우에 Partial AID로 BSSID[39:47]을 사용할 수 있다. 또한 Group ID는 0으로 셋팅할 수 있다.

<197> 또한 Mesh STA로 향하는 PPDU 또는 PSDU인 경우에 Partial AID로 RA[39:47]을 사용할 수 있다. 또한 Group ID는 0으로 셋팅할 수 있다.

<198> 또한 AP가 보내고 그에 association된 STA로 향하는 PPDU 또는 PSDU인 경우에 Partial AID로

<199> (dec(AID[0:8]) + dec(BSSID[44:47] XOR BSSID[40:43]) * 2^5) mod 2^9

<200> 을 사용할 수 있다. XOR은 bitwise exclusive OR operation을, mod X는 X-modulo operation을, dec(A[b:c])은 the cast to decimal operator where b is scaled by 2^0 and c by 2^(c-b)을 나타낼 수 있다. 또한 Group ID는 63으로 셋팅할 수 있다.

<201> 또한 DLS STA 또는 TDLS STA가 direct path로 보내고 DLS STA 또는 TDLS STA로 향하는 PPDU 또는 PSDU인 경우에 Partial AID로

<202> (dec(AID[0:8]) + dec(BSSID[44:47] XOR BSSID[40:43]) * 2^5) mod 2^9

<203> 을 사용할 수 있다. XOR은 bitwise exclusive OR operation을, mod X는 X-modulo operation을, dec(A[b:c])은 the cast to decimal operator where b is scaled by 2^0 and c by 2^(c-b)을 나타낼 수 있다. 또한 Group ID는 63으로 셋팅할 수 있다.

<204> 또한 그 외의 경우엔 Partial AID을 0, Group ID를 63으로 셋팅할 수 있다.

<206> 도 18은 본 발명의 일 실시예에 따른 VHT SU DL PPDU 수신을 나타낸 도면이다.

<207> 본 발명의 일 실시예에 따르면 STA는 수신한 프레임이 intra-BSS 프레임인지 inter-BSS 프레임인지 판단하여 그에 따른 Spatial reuse, NAV setting, NAV resetting, intra-PPDU power save 동작 등을 할 수 있다. 예를 들어 수신한 프레임이 inter-BSS 프레임인 경우 특정 조건 하에서 기존 minimum receive sensitivity level 혹은 CCA threshold 보다 큰 OBSS PD level을 사용하여 CCA 할 수 있다. 또다른 예로 수신한 프레임이 intra-BSS 프레임인지 아닌지에 따라 NAV를 셋팅할 수 있고, 그 NAV를 intra-BSS 프레임 혹은 intra-BSS 프레임이 아닌 프레임에 의해 셋팅된 것으로 판단할 수 있다. 또다른 예로 STA가 수신한 프레임이 intra-BSS 프레임이고, 그 프레임이 자신이 대상 수신자인 프레임이 아닌 경우 STA는 doze state로 들어갈 수 있다. 또한 이때 doze state로 들어가는 기간은 수신한

프레임이 끝나는 시간까지일 수 있다.

<208> 일 실시예에 따르면 수신한 프레임의 BSS Color가 자신의 BSS Color와 같은 경우 수신한 프레임을 intra-BSS 프레임으로 판단할 수 있다. 또는 수신한 프레임의 MAC Header의 RA 또는 TA가 association된 BSSID 혹은 association된 BSSID의 bandwidth signaling variant와 같은 경우 수신한 프레임을 intra-BSS 프레임으로 판단할 수 있다. 또는 수신한 프레임의 MAC Header의 RA 또는 TA가 association된 BSSID와 같은 multiple BSSID set에 있는 BSSID 혹은 그 BSSID의 bandwidth signaling variant와 같은 경우 수신한 프레임을 intra-BSS 프레임으로 판단할 수 있다.

<209> 일 실시예에 따르면 AP가 프레임을 수신했을 때 수신한 프레임이 DL 프레임이면 그 프레임을 inter-BSS 프레임으로 판단할 수 있다. BSS Color 비트는 주변의 다른 BSS와 같은 값을 사용하게 될 수도 있으므로 inter-BSS 프레임으로 판단할 수 있는 경우의 프레임을 inter-BSS 프레임으로 판단하면 intra-/inter-BSS 프레임 판단을 더 정확히 할 수 있다. 예를 들면 주변 BSS가 같은 BSS Color를 사용하는 경우, AP가 수신한 프레임의 HE-SIG-A의 BSS Color 또는 VHT-SIG-A의 partial BSS color(또는 partial AID의 일부)가 자신의 BSS의 것과 일치하여 intra-BSS 프레임임을 나타내고 있다 하더라도, 해당 패킷이 DL 패킷인 것을 확인하면 수신한 프레임이 inter-BSS 프레임인 것으로 판단할 수 있다.

<210> 본 발명의 일 실시예에 따르면 AP가 VHT PPDU를 수신했는데 VHT-SIG-A의 Group ID 필드가 63으로 셋팅되어 있으면 해당 프레임을 inter-BSS 프레임으로 판

단할 수 있다. 도 17에서 설명한 것과 같이 DL PPDU인 경우에 Group ID 필드가 63으로 셋팅될 수 있기 때문이다. 또다른 실시예로 DLS 또는 TDLS STA가 direct path로 DLS 또는 TDLS STA에 보내면서 Group ID 63을 셋팅하는 경우가 있을 수 있다면 AP는 해당 기능 또는 프로토콜의 사용 여부를 알 수 있고, DLS 또는 TDLS STA가 direct path로 DLS 또는 TDLS STA에 보내면서 Group ID로 63을 셋팅한 것이 아니라고 판단할 수 있는 경우에만 Group ID 63 값을 통한 Inter-BSS 프레임 판단을 할 수도 있다. 도 18을 참조하면 Inter-BSS AP가 자신과 association된 VHT STA에 VHT PPDU를 송신할 수 있고, AP가 이것을 수신하게 되면 VHT PPDU에 해당 PPDU가 DL PPDU임이 시그날링될 수 있으므로 수신한 PPDU를 inter-BSS 프레임으로 판단할 수 있다. 또다른 실시예로 VHT PPDU의 Partial AID 값이 자신의 BSS에서는 있을 수 없는 값일 경우 해당 PPDU를 Inter-BSS 프레임으로 판단할 수 있다. 또는 VHT PPDU의 Group ID와 Partial AID 값의 조합으로 해당 PPDU가 Intra-BSS 프레임인지 Inter-BSS 프레임인지를 판단할 수 있다.

<211> 또다른 예로 AP가 VHT MU PPDU를 수신한 경우 수신한 프레임을 inter-BSS 프레임으로 판단할 수 있다. VHT MU PPDU는 다운링크만 존재하기 때문에 AP가 수신한 경우 inter-BSS 프레임으로 판단할 수 있다. 일 실시예에 따르면 해당 프레임이 VHT PPDU인 것은 auto detection method로 알 수 있고, VHT-SIG-A의 Group ID가 0 또는 63이 아닌 경우 해당 프레임이 MU PPDU라는 것을 알 수 있다.

<212> 또다른 예로 AP가 HE PPDU를 수신한 경우 HE-SIG-A의 UL/DL flag(혹은 UL flag) 값이 다운링크를 지시(예를 들면 0 값)하고 있으면 해당 PPDU를 inter-BSS

프레임으로 판단할 수 있다. 또다른 실시예로 AP가 HE PPDU를 수신한 경우 해당 PPDU가 DLS 또는 TDLS STA에게 보내지지 않은 것이라 판단할 수 있는 경우에 HE-SIG-A의 UL/DL flag(혹은 UL flag) 값이 다운링크를 지시(예를 들면 0 값)하고 있으면 해당 PPDU를 inter-BSS 프레임으로 판단할 수 있다. 또다른 실시예로 AP가 HE PPDU를 수신한 경우 해당 PPDU가 IBSS의 멤버인 STA에게 보내지지 않은 것이라 판단할 수 있는 경우에 HE-SIG-A의 UL/DL flag(혹은 UL flag) 값이 다운링크를 지시(예를 들면 0 값)하고 있으면 해당 PPDU를 inter-BSS 프레임으로 판단할 수 있다. 일 실시예로 해당 PPDU가 DLS 또는 TDLS STA 또는 IBSS의 멤버인 STA에게 보내지지 않는 경우라는 것은 AP가 해당 기능이나 프로토콜의 사용 여부를 판단할 수 있으므로 알 수 있을 수 있다.

<213> 또다른 예로 AP가 자신이 trigger하지 않은 HE trigger-based PPDU를 수신한 경우 해당 PPDU를 inter-BSS 프레임으로 판단할 수 있다.

<215> 도 19는 본 발명의 일 실시예에 따른 HE-SIG-B 필드의 인코딩 구조(encoding structure) 구성을 나타낸 도면이다.

<216> HE MU PPDU는 프리앰블(preamble)에 HE-SIG-B 필드를 포함할 수 있고, HE-SIG-B 필드는 HE MU PPDU를 해석하는데에 필요한 정보들을 포함할 수 있다. 도 19(a)는 본 발명의 일 실시예에 따른 HE-SIG-B 필드의 인코딩 구조를 나타낸 도면인데, 이를 참조하면 HE-SIG-B 필드는 Common과 User-specific 블락으로 나누어진다. 또한 common 블락과 user-specific 블락들은 비트 도메인에서 나누어지며 20 MHz를

베이스로 인코딩될 수 있다. 이 중 Common 필드는 수신자가 되는 스테이션들이 PPDU를 받기 위해 공통으로 필요한 정보를 싣고 있을 수 있으며 그 정보로는 RU allocation 등이 있고 이를 통해 RU arrangement, MU-MIMO에서 사용자수 등을 알 수 있다. 또한 User-specific 필드는 common 필드에 속하지 않는 수신자가 되는 스테이들 각각에 따라 필요한 정보를 포함할 수 있다. Common 필드에서 RU allocation 정보를 따라 할당된 유저 순서대로 user-specific 필드가 나열될 수 있다. User-specific 정보로는 STAID; 한 RU에 싱글 유저가 할당된 경우 NSTS (Number of Spatial Streams), TxBF (transmit beamforming), MCS (Modulation and Coding Scheme), DCM (Dual Sub-Carrier Modulation) and Coding (Use of LDPC); 한 RU에 다수의 유저가 할당된 경우 Spatial Configuration Fields, MCS, DCM and Coding 등이 포함될 수 있다. User-specific 정보는 하나 이상의 Per-user 정보(또는 User Block)를 포함할 수 있다. Common 필드가 BCC 블락 하나를 이루고 user-specific 필드는 유저 2명에 대한 필드가 BCC 블락 하나를 이루며 가장 마지막 블락은 유저 1명에 대한 필드가 BCC 블락 하나를 이룰 수 있다. 각 BCC 블락마다 CRC와 Tail 비트가 포함될 수 있다. 그리고 HE-SIG-B 마지막에는 OFDM 심볼 바운더리(boundary)에 따라 패딩(Padding)이 붙을 수 있다.

<217> 도 19 (b)는 본 발명의 일 실시예에 따른 40MHz 이상의 대역폭을 사용할 경우 HE-SIG-B의 구성을 나타낸 도면인데, 이를 참조하면 HE-SIG-B는 20MHz 단위로 2개의 콘텐츠(HE-SIG-B content channel 1 and HE-SIG-B content channel 2)로 구성될 수 있다. 도면에서 각 사각형은 20MHz 서브밴드를 나타내고 있고, 1, 2는 각각

다른 정보를 포함할 수 있다. 40MHz, 80MHz, 160MHz에서 HE-SIG-B는 도면과 같이 1, 2가 반복되는 구조를 갖고 있을 수 있다. 각 20MHz의 HE-SIG-B는 해당 20MHz 밴드를 이용하는 RU에 대한 common, user-specific 필드를 포함할 수 있다. HE-SIG-B는 각 20MHz에서 최대 2개의 서로 다른 컨텐츠를 가질 수 있으므로 그 2개의 HE-SIG-B를 디코딩할 수 있으면 전체 대역폭의 MU PPDU 구성에 대한 정보를 알 수 있다.

<218> 본 발명의 일 실시예에 따르면 User-specific 필드의 STAID는 해당 Per-user content를 보고 해당 RU를 디코딩해야하는 STA 를 지시하는 데에 쓰일 수 있다. 해당 RU가 어느 한 STA에 addressed 되어 있으면 STAID는 해당 STA의 AID로 셋팅될 수 있다. 또한 single BSS AP인 경우에(multiple BSSID를 사용하지 않는 경우에) 해당 RU를 여러 STA가 받아야 하는 경우, 즉 broadcast인 경우 STAID는 0 값으로 셋팅될 수 있다. 또한 multiple BSS AP인 경우에(multiple BSSID를 사용하는 경우에) 해당 RU가 multiple BSS 중 하나의 BSS에만 broadcast하는 경우에 STAID는 multiple BSSID TIM operation을 따라 group addressed AID assignment 방법으로 할당된 AID 값으로 셋팅될 수 있다. 예를 들면 multiple BSSID set의 BSSID(0)부터 BSSID(N-1)까지가 AID 0부터 (N-1)에 해당할 수 있고 그 값을 이용해 해당 BSS에 broadcast할 수 있다. 또한 multiple BSS AP인 경우에(multiple BSSID를 사용하는 경우에 해당 RU가 multiple BSS 모두에 broadcast하는 경우에 STAID는 어떤 특정한 값, 예를 들면 group addressed AID assignment 방법으로 할당되지 않는 AID 값 중에서 셋팅될 수 있고, 예를 들면 2047 값으로 셋팅될 수 있다.

<219> 본 발명의 일 실시예에 따르면 하나의 HE MU PPDU에 한개 이상의 BSS 또는 STA에 broadcast(또는 groupcast, multicast) 되는 RU 다수개와 특정 STA에 unicast 되는 RU가 공존할 수 있다. 그러한 경우에 HE MU PPDU를 수신하는 STA가 자신에게 해당하는 RU를 올바로 찾아 디코딩할 수 있어야 한다. 일 실시예로 STA가 HE MU PPDU를 수신했을 때 HE-SIG-B의 Per user 정보들이 나타내는 STAID 중 STAID가 나타내는 그룹(1개 이상의 STA의 집합)의 hierarchy에 따라 적은 범위의 STA를 나타내는 STAID부터 찾아나가고 그러한 STAID가 존재할 때 해당 RU를 디코딩할 수 있다. 예를 들어 그룹1 < 그룹2 < ... < 그룹n 인 경우(그룹x < 그룹y: 그룹x가 그룹y에 포함됨을 나타냄), HE-SIG-B의 Per user 정보들의 STAID 중에서 다음 순서(우선 순위)에 의해 디코딩할 RU를 찾을 수 있다. 1) 그룹1의 STAID 2) 그룹2의 STAID ... n) 그룹n의 STAID.

<220> 본 발명의 일 실시예에 따르면 multiple BSSID를 사용하는 경우에 하나의 HE MU PPDU에 다수의 BSS에 broadcast(또는 groupcast, multicast) 되는 RU와 하나의 BSS에 broadcast(또는 groupcast, multicast) 되는 RU와 특정 STA에 unicast 되는 RU가 공존할 수 있다. 그러한 경우에 HE MU PPDU를 수신하는 STA가 자신에게 해당하는 RU를 올바로 찾아 디코딩할 수 있어야 한다.

<221> 따라서 본 발명의 일 실시예에 따르면 STA가 HE MU PPDU를 수신했을 때 HE-SIG-B의 Per user 정보들이 나타내는 STAID 중

<222> 1) 자신의 AID에 해당하는 것이 있으면 해당 Per user 정보에 따라 해당 RU를 디코딩할 수 있다.

<223> 2) 또한 자신의 AID에 해당하는 것이 없고, 자신이 association된 BSS에 broadcast하는 AID(STAID) 값에 해당하는 것이 있으면 해당 Per user 정보에 따라 해당 RU를 디코딩할 수 있다.

<224> 3) 또한 자신의 AID에 해당하는 것이 없고, 자신이 association된 BSS에 broadcast하는 AID(STAID) 값에 해당하는 것이 없고, 모든 BSS에 broadcast하는 AID(STAID) 값에 해당하는 것이 있으면 해당 Per user 정보에 따라 해당 RU를 디코딩할 수 있다.

<225> 4) 또한 자신의 AID에 해당하는 것이 없고, 자신이 association된 BSS에 broadcast하는 AID(STAID) 값에 해당하는 것이 없고, 모든 BSS에 broadcast하는 AID(STAID) 값에 해당하는 것이 없으면 디코딩해야하는 RU가 없는 것으로 판단할 수 있다.

<226> 위 단계는 위에서 설명한 STAID 설정 룰에 따라 설명하였지만 본 발명은 이에 한정되지 않고, AID(STAID) broadcast에 그룹 개념이 들어간 경우, 그룹의 hierarchy에 따라 위 단계를 확장할 수 있다. 예를 들면 모든 BSS에 broadcast하는 것은 아니지만 다수의 BSS에 broadcast하는 AID(STAID)가 존재하는 경우, 위 단계의 2), 3) 사이에 자신이 속한 그러한AID(STAID)가 있는지 확인하고 있다면 해당 RU를 디코딩할 수 있다. 또다른 예로 하나의 BSS나 다수의 BSS에 broadcast하는 것은 아니지만 다수의 STA에 broadcast하는 AID(STAID)가 존재하는 경우, 위 단계의 1), 2) 사이에 그 AID(STAID)가 있는지 확인하고 있다면 해당 RU를 디코딩할 수 있다. 또한 이 개념은 더 많은 단계로 확장될 수 있다.

<227> 본 발명의 일 실시예에 따르면 multiple BSSID를 사용하는 않는 경우에 하나의 HE MU PPDU에 모든 STA에 broadcast(또는 groupcast, multicast) 되는 RU와 모든 STA가 아닌 다수의 STA에 broadcast(또는 groupcast, multicast) 되는 RU와 특정 STA에 unicast 되는 RU가 공존할 수 있다. 그러한 경우에 HE MU PPDU를 수신하는 STA가 자신에게 해당하는 RU를 올바로 찾아 디코딩할 수 있어야 한다.

<228> 따라서 본 발명의 일 실시예에 따르면 STA가 HE MU PPDU를 수신했을 때 HE-SIG-B의 Per user 정보들이 나타내는 STAID 중

<229> 1) 자신의 AID에 해당하는 것이 있으면 해당 Per user 정보에 따라 해당 RU를 디코딩할 수 있다.

<230> 2) 또한 자신의 AID에 해당하는 것이 없고, 자신이 속한 그룹에 broadcast(또는 groupcast, multicast)하는 AID(STAID) 값에 해당하는 것이 있으면 해당 Per user 정보에 따라 해당 RU를 디코딩할 수 있다.

<231> 3) 또한 자신의 AID에 해당하는 것이 없고, 자신이 속한 그룹에 broadcast(또는 groupcast, multicast)하는 AID(STAID) 값에 해당하는 것이 없고, 모든 STA에 broadcast하는 AID(STAID) 값에 해당하는 것이 있으면 해당 Per user 정보에 따라 해당 RU를 디코딩할 수 있다.

<232> 4) 또한 자신의 AID에 해당하는 것이 없고, 자신이 속한 그룹에 broadcast(또는 groupcast, multicast)하는 AID(STAID) 값에 해당하는 것이 없고, 모든 STA에 broadcast하는 AID(STAID) 값에 해당하는 것이 없으면 디코딩해야하는 RU가 없

는 것으로 판단할 수 있다.

<233> 위 단계는 AID(STAID) broadcast에 그룹 개념이 들어간 경우를 이야기하고 있는데, 그룹의 hierarchy에 따라 위 단계를 확장할 수 있다. 예를 들면 STA 그룹2가 그룹1을 포함한다고 할 때, HE-SIG-B의 Per user 정보들의 STAID 중에서 다음 순서(우선 순위)에 의해 디코딩할 RU를 찾을 수 있다. 1) 자신의 AID 2) 그룹1의 AID(STAID) 3) 그룹2의 AID(STAID) 4) 모든 STA에 broadcast하는 AID(STAID). 또한 이 개념은 더 많은 단계로 확장될 수 있다.

<235> 다음으로 Intra-PPDU power save 동작을 설명한다.

<237> An HE non-AP STA has dot11IntraPPDUPowerSaveOptionActivated equal to true operates in intra-PPDU power save mode.

<239> An HE non-AP STA that is in intra-PPDU power save mode may enter the doze state until the end of a PPDU currently being received when one of the following conditions is met:

<240> - The PPDU is an HE MU PPDU where the RXVECTOR parameter BSS_COLOR is the BSS color of the BSS with which the STA is associated, the RXVECTOR parameter UL_FLAG is 0 and the RXVECTOR parameter STA_ID_LIST does not

include the identifier of the STA or the broadcast identifier(s) intended for the STA.

<241> - The PPDU is an HE MU PPDU, HE SU PPDU or HE extended range SU PPDU and one of the following conditions are true:

<242> === The RXVECTOR parameter BSS_COLOR is the BSS color of the BSS with which the STA is associated and the RXVECTOR parameter UL_FLAG is 1

<243> === The RXVECTOR parameter BSS_COLOR is the BSS color of the BSS with which the STA is associated, the RXVECTOR parameter UL_FLAG is 0 and a PHY-RXEND.indication(Unsup- portedRate) primitive was received

<244> - The PPDU is an HE trigger-based PPDU where the RXVECTOR parameter BSS_COLOR is the BSS color of the BSS with which the STA is associated

<245> - The PPDU is a VHT PPDU where the RXVECTOR parameter PARTIAL_AID is the BSSID[39:47] of the BSS with which the STA is associated and the RXVECTOR parameter GROUP_ID is 0.

<246> - The PPDU is a PPDU with:

<247> === An A-MPDU including TA or RA equal to the BSSID of the BSS with which the STA is associated and,

<248> === The RA is not the MAC address of the STA

<250> An HE STA that is in intra-PPDU power save mode and has entered doze state shall continue to operate its NAV timers and consider the medium busy during doze state and shall transition into awake state at the end of the PPDU.

<252> The STA can contend for access to the medium immediately on the expiry of the NAV timers.

<254> dot11IntraPPDUPowerSaveOptionActivated가 true로 설정된 HE non-AP STA는 intra-PPDU power save mode로 동작할 수 있다.

<256> intra-PPDU power save mode에 있는 HE non-AP STA는 아래 조건들(- 표시) 중 하나를 만족할 때 현재 수신하고 있는 PPDU의 끝까지 doze state로 들어갈 수 있다:

<257> - 그 PPDU가 HE MU PPDU이고 RXVECTOR parameter BSS_COLOR가 그 STA가 associate된 BSS의 BSS Color와 같고, RXVECTOR parameter UL_FLAG가 0이고, RXVECTOR parameter STA_ID_LIST가 그 STA의 identifier(예를 들면, 그 STA의 AID) 또는 그 STA가 수신해야할 broadcast identifier를 포함하고 있지 않는다.

<258> - 그 PPDU가 HE MU PPDU 또는 HE SU PPDU 또는 HE extended range SU PPDU이

고 아래 조건들(=== 표시) 중 하나를 만족한다:

<259> === RXVECTOR parameter BSS_COLOR가 그 STA가 associate된 BSS의 BSS color 이고, RXVECTOR parameter UL_FLAG가 1이다.

<260> === RXVECTOR parameter BSS_COLOR가 그 STA가 associate된 BSS의 BSS color 이고, RXVECTOR parameter UL_FLAG가 0이고, PHY-RXEND.indication(UnsupportedRate) primitive를 받았다.

<261> - 그 PPDU가 HE trigger-based PPDU이고, RXVECTOR parameter BSS_COLOR가 그 STA가 associate된 BSS의 BSS color이다.

<262> - 그 PPDU가 VHT PPDU이고, RXVECTOR parameter PARTIAL_AID가 그 STA가 associate된 BSS의 BSSID[39:47]과 같고, RXVECTOR parameter GROUP_ID가 0이다.

<263> - 그 PPDU가 다음 모두(=== 표시)를 갖고 있는 PPDU이다.

<264> === TA 또는 RA가 그 STA가 associate된 BSS의 BSSID와 같은 A-MPDU

<265> === 그 STA의 MAC address가 아닌 RA

<267> intra-PPDU power save mode에 있고, doze state로 들어간 HE STA는 NAV timers를 계속 동작시킬 수 있다. 그리고 doze state 동안 medium을 busy로 판단할 수 있다. 또한 그 PPDU의 끝에서 awake state로 바꿀 수 있다.

<269> 그 STA는 NAV timers가 끝났을 때 즉시 medium access를 위해 경쟁할 수 있

다.

<271> 도 20은 본 발명의 일 실시예에 따른 파워 세이브를 나타낸 도면이다.

<272> 앞서 설명한 것처럼 STA가 현재 수신하고 있는 PPDU가 TA 또는 RA가 그 STA가 associate된 BSS의 BSSID와 같은 A-MPDU, 그리고 그 STA의 MAC address가 아닌 RA를 갖고 있는 경우 그 PPDU의 끝까지 doze state로 들어갈 수 있다. 도 20을 참조하면 AP가 STA0과 association 되어있을 수 있고, AP가 STA1과 association 되어 있을 수 있다. 그리고 AP가 STA0에 전송하는 PPDU를 STA1이 수신할 수 있다. 이때 STA1이 valid frame을 수신하는 경우(MPDU의 FCS 성공) MAC header를 확인할 수 있고, MAC header의 RA 또는 TA가 자신이 association된 BSS의 BSSID와 같은 경우 해당 PPDU가 같은 BSS(intra-BSS)의 PPDU라고 판단할 수 있고(AP가 STA0에 전송하는 PPDU인 경우에 TA가 BSSID와 같을 수 있다.), RA가 STA1의 MAC address가 아닌 경우 STA1은 doze state로 들어갈 수 있다.

<273> 또한 STA0이 AP에 전송하는 PPDU를 STA1이 수신할 수 있다. 이때 STA1이 valid frame을 수신하는 경우(MPDU의 FCS 성공) MAC header를 확인할 수 있고, MAC header의 RA 또는 TA가 자신이 association된 BSS의 BSSID와 같은 경우 해당 PPDU가 같은 BSS(intra-BSS)의 PPDU라고 판단할 수 있고(STA0이 AP에 전송하는 PPDU인 경우에 RA가 BSSID와 같을 수 있다.), RA가 STA1의 MAC address가 아닌 경우 STA1은 doze state로 들어갈 수 있다.

<274> 이 실시예는 PPDU format에 상관 없이 적용될 수 있다. 따라서 본 실시예에 따라 PPDU format에 상관 없이 조건을 만족시키면 doze state로 들어갈 수 있다. 예를 들어 STA가 legacy PPDU format의 PPDU를 수신하는 경우 MAC header의 RA 또는 TA가 association된 BSS의 BSSID와 같고, RA가 그 STA의 MAC address가 아닌 경우, 그 STA는 doze state로 들어갈 수 있다. 또다른 예로 STA가 HE SU PPDU format 또는 HE extended range PPDU format의 PPDU를 수신하는 경우 MAC header의 RA 또는 TA가 association된 BSS의 BSSID와 같고, RA가 그 STA의 MAC address가 아닌 경우, 그 STA는 doze state로 들어갈 수 있다. 특히 STA가 HE SU PPDU format 또는 HE extended range PPDU format의 PPDU를 수신하고, RXVECTOR parameter UL_FLAG가 0(DL)로 설정되어 있는 경우 MAC header의 RA 또는 TA가 association된 BSS의 BSSID와 같고, RA가 그 STA의 MAC address가 아닌 경우, 그 STA는 doze state로 들어갈 수 있다.

<276> 그러나 STA가 수신하는 PPDU의 RA가 STA의 MAC address가 아니지만 STA가 수신해야 하는 frame이 있을 수 있다. 따라서 본 발명의 일 실시예에 따르면 STA가 수신하고 있는 PPDU가 TA 또는 RA가 그 STA가 associate된 BSS의 BSSID와 같은 A-MPDU, 그 STA의 MAC address가 아닌 RA를 갖고 있는 경우에 더하여 broadcast address가 아닌 RA를 갖고 있는 경우에 그 PPDU의 끝까지 doze state로 들어갈 수 있다. 즉, STA가 수신하고 있는 PPDU가 TA 또는 RA가 그 STA가 associate된 BSS의 BSSID와 같은 A-MPDU, 그 STA의 MAC address가 아니고 broadcast address가 아닌

RA를 갖고 있는 경우에 그 PPDU의 끝까지 doze state로 들어갈 수 있다. 즉, 다음 조건을 만족하는 경우 현재 수신하고 있는 PPDU의 끝까지 STA는 doze state로 들어갈 수 있다.

<277> - 그 PPDU가 다음 모두(=== 표시)를 갖고 있는 PPDU이다.

<278> === TA 또는 RA가 그 STA가 associate된 BSS의 BSSID와 같은 A-MPDU

<279> === 그 STA의 MAC address가 아니고 broadcast address가 아닌 RA

<281> 또한 추가적인 실시예로 RA는 그 STA의 MAC address와 broadcast address가 아닐 뿐만 아니라 그 STA가 속한(수신해야하는) multicast address 또는 group address가 아닐 때 doze state로 들어갈 수 있을 수 있다. 즉, 다음 조건을 만족하는 경우 현재 수신하고 있는 PPDU의 끝까지 STA는 doze state로 들어갈 수 있다.

<282> - 그 PPDU가 다음 모두(=== 표시)를 갖고 있는 PPDU이다.

<283> === TA 또는 RA가 그 STA가 associate된 BSS의 BSSID와 같은 A-MPDU

<284> === 그 STA의 MAC address가 아니고 broadcast address가 아니고 그 STA가 수신해야하는 multicast address가 아닌 RA

<286> 또는 다음 조건을 만족하는 경우 현재 수신하고 있는 PPDU의 끝까지 STA는 doze state로 들어갈 수 있다.

<287> - 그 PPDU가 다음 모두(=== 표시)를 갖고 있는 PPDU이다.

<288> === TA 또는 RA가 그 STA가 associate된 BSS의 BSSID와 같은 A-MPDU

<289> === 그 STA의 MAC address가 아니고 그 STA가 수신해야하는 address가 아닌 RA

<291> 예를 들면 Trigger frame이나 Multi-STA BlockAck variant BlockAck frame의 경우에 RA가 STA의 MAC address가 아니지만 수신해야 하는 프레임일 수 있다. Trigger frame의 수신자가 여러 STA인 경우, 즉 User Info fields가 여러개 있는 경우 RA는 broadcast address일 수 있다. 또한 Multi-STA BlockAck variant BlockAck frame의 수신자가 여러 STA인 경우, 즉 Per STA Info subfield들의 AID subfield 값이 여러가지인 경우 RA는 broadcast address일 수 있다. 또는 Multi-STA BlockAck variant BlockAck frame의 수신자가 1개의 STA인 경우에도 RA는 broadcast address일 수 있다(또는 그 1개 STA의 MAC address일 수 있다.).

<292> 따라서 일 실시예에 따르면 STA가 수신하고 있는 PPDU가 Trigger frame을 포함하고 TA 또는 RA가 그 STA가 associate된 BSS의 BSSID와 같은 A-MPDU, 그 STA의 MAC address가 아니고 broadcast address가 아닌 RA를 갖고 있는 경우에 그 PPDU의 끝까지 doze state로 들어갈 수 있다. 다음 조건을 만족하는 경우 현재 수신하고 있는 PPDU의 끝까지 STA는 doze state로 들어갈 수 있다.

<293> - 그 PPDU가 다음 모두(=== 표시)를 갖고 있는 PPDU이다.

<294> === TA 또는 RA가 그 STA가 associate된 BSS의 BSSID와 같은 A-MPDU

<295> === 그 STA의 MAC address가 아니고, 프레임이 Trigger frame인 경우 broadcast address도 아닌 RA

<297> 또다른 실시예에 따르면 STA가 수신하고 있는 PPDU가 Multi-STA BlockAck variant BlockAck frame을 포함하고 TA 또는 RA가 그 STA가 associate된 BSS의 BSSID와 같은 A-MPDU, 그 STA의 MAC address가 아니고 broadcast address가 아닌 RA를 갖고 있는 경우에 그 PPDU의 끝까지 doze state로 들어갈 수 있다. 다음 조건을 만족하는 경우 현재 수신하고 있는 PPDU의 끝까지 STA는 doze state로 들어갈 수 있다.

<298> - 그 PPDU가 다음 모두(=== 표시)를 갖고 있는 PPDU이다.

<299> === TA 또는 RA가 그 STA가 associate된 BSS의 BSSID와 같은 A-MPDU

<300> === 그 STA의 MAC address가 아니고, 프레임이 Multi-STA BlockAck variant BlockAck frame인 경우 broadcast address도 아닌 RA

<302> Trigger frame과 Multi-STA BlockAck variant BlockAck frame의 경우에도 앞선 실시예에서처럼 RA는 그 STA의 MAC address와 broadcast address가 아닐 뿐만 아니라 그 STA가 속한(수신해야하는) multicast address 또는 group address가 아닐 때 doze state로 들어갈 수 있을 수 있다.

<304> 도 21은 본 발명의 일 실시예에 따른 파워 세이브를 나타낸 도면이다.

<305> 본 발명의 일 실시예에 따르면 HE 표준은 multiple BSSID set을 지원할 수 있다. AP가 multiple BSSID set을 사용하여 물리적으로 1개의 AP가 여러 개의 AP로 동작할 수 있다. 따라서 multiple BSSID set에 속한 1개의 AP가 통신하는 중에 같은 multiple BSSID set에 속한 또다른 AP는 송신, 수신을 할 수 없을 수 있다. 따라서 multiple BSSID set에 속한 1개의 AP가 통신하는 중에 같은 multiple BSSID set에 속한 BSSID에 해당하는 BSS와 association된 STA들은 그동안 파워 세이브하는 것이 가능하다.

<306> 본 발명의 일 실시예에 따르면 다음 조건을 만족하는 경우 현재 수신하고 있는 PPDU의 끝까지 STA는 doze state로 들어갈 수 있다.

<307> - 그 PPDU가 다음 모두(=== 표시)를 갖고 있는 PPDU이다.

<308> === TA 또는 RA가 그 STA가 associate된 BSS의 BSSID가 속한 multiple BSSID set의 BSSID와 같은 A-MPDU

<309> === 그 STA의 MAC address가 아닌 RA

<311> 도 21을 참조하면 BSSID(0)과 BSSID(1)은 같은 multiple BSSID set에 속한 것일 수 있고, STA0이 BSSID(0)을 쓰는 AP와 association 되어 있고, STA1이 BSSID(1)을 쓰는 AP와 association 되어 있을 수 있다. 그리고 AP가 STA0에 전송하는 PPDU를 STA1이 수신할 수 있다. 이때 STA1이 valid frame을 수신하는 경우(MPDU

의 FCS 성공) MAC header를 확인할 수 있고, MAC header의 RA 또는 TA가 자신이 association된 BSS의 BSSID가 속한 multiple BSSID set의 BSSID와 같은 경우 해당 PPDU가 같은 BSS(intra-BSS)의 PPDU라고 판단할 수 있고(AP가 STA0에 전송하는 PPDU인 경우에 TA가 같을 수 있다.), RA가 STA1의 MAC address가 아닌 경우 STA1은 doze state로 들어갈 수 있다.

<313> 또한 STA0이 AP에 전송하는 PPDU를 STA1이 수신할 수 있다. 이때 STA1이 valid frame을 수신하는 경우(MPDU의 FCS 성공) MAC header를 확인할 수 있고, MAC header의 RA 또는 TA가 자신이 association된 BSS의 BSSID가 속한 multiple BSSID set의 BSSID와 같은 경우 해당 PPDU가 같은 BSS(intra-BSS)의 PPDU라고 판단할 수 있고(STA0이 AP에 전송하는 PPDU인 경우에 RA가 같을 수 있다.), RA가 STA1의 MAC address가 아닌 경우 STA1은 doze state로 들어갈 수 있다.

<315> 이 실시예는 PPDU format에 상관 없이 적용될 수 있다. 따라서 본 실시예에 따라 PPDU format에 상관 없이 조건을 만족시키면 doze state로 들어갈 수 있다. 예를 들어 STA가 legacy PPDU format의 PPDU를 수신하는 경우 MAC header의 RA 또는 TA가 자신이 association된 BSS의 BSSID가 속한 multiple BSSID set의 BSSID와 같고, RA가 그 STA의 MAC address가 아닌 경우, 그 STA는 doze state로 들어갈 수 있다. 또다른 예로 STA가 HE SU PPDU format 또는 HE extended range PPDU format의 PPDU를 수신하는 경우 MAC header의 RA 또는 TA가 자신이 association된 BSS의

BSSID가 속한 multiple BSSID set의 BSSID와 같고, RA가 그 STA의 MAC address가 아닌 경우, 그 STA는 doze state로 들어갈 수 있다. 특히 STA가 HE SU PPDU format 또는 HE extended range PPDU format의 PPDU를 수신하고, RXVECTOR parameter UL_FLAG가 0(DL)로 설정되어 있는 경우 MAC header의 RA 또는 TA가 자신이 association된 BSS의 BSSID가 속한 multiple BSSID set의 BSSID와 같고, RA가 그 STA의 MAC address가 아닌 경우, 그 STA는 doze state로 들어갈 수 있다.

<317> 또한 도 20에서 설명한 것과 같이 STA가 수신하는 PPDU의 RA가 STA의 MAC address가 아니지만 STA가 수신해야 하는 frame이 있을 수 있다. 따라서 본 발명의 일 실시예에 따르면 다음 조건을 만족하는 경우 현재 수신하고 있는 PPDU의 끝까지 STA는 doze state로 들어갈 수 있다.

<318> - 그 PPDU가 다음 모두(=== 표시)를 갖고 있는 PPDU이다.

<319> === TA 또는 RA가 그 STA가 associate된 BSS의 BSSID가 속한 multiple BSSID set의 다른 BSSID와 같은 A-MPDU

<320> === 그 STA의 MAC address가 아니고 broadcast address가 아닌 RA

<322> 또한 추가적인 실시예로 RA는 그 STA의 MAC address와 broadcast address가 아닐 뿐만 아니라 그 STA가 속한(수신해야하는) multicast address 또는 group address가 아닐 때 doze state로 들어갈 수 있을 수 있다. 즉, 다음 조건을 만족하

는 경우 현재 수신하고 있는 PPDU의 끝까지 STA는 doze state로 들어갈 수 있다.

<323> - 그 PPDU가 다음 모두(=== 표시)를 갖고 있는 PPDU이다.

<324> === TA 또는 RA가 그 STA가 associate된 BSS의 BSSID가 속한 multiple BSSID set의 다른 BSSID와 같은 A-MPDU

<325> === 그 STA의 MAC address가 아니고 broadcast address가 아니고 그 STA가 수신해야하는 multicast address가 아닌 RA

<327> 또는 다음 조건을 만족하는 경우 현재 수신하고 있는 PPDU의 끝까지 STA는 doze state로 들어갈 수 있다.

<328> - 그 PPDU가 다음 모두(=== 표시)를 갖고 있는 PPDU이다.

<329> === TA 또는 RA가 그 STA가 associate된 BSS의 BSSID가 속한 multiple BSSID set의 다른 BSSID와 같은 A-MPDU

<330> === 그 STA의 MAC address가 아니고 그 STA가 수신해야하는 address가 아닌 RA

<332> 예를 들면 Trigger frame이나 Multi-STA BlockAck variant BlockAck frame의 경우에 RA가 STA의 MAC address가 아니지만 수신해야 하는 프레임일 수 있다. Trigger frame의 수신자가 여러 STA인 경우, 즉 User Info fields가 여러개 있는 경우 RA는 broadcast address일 수 있다. 또한 Multi-STA BlockAck variant

BlockAck frame의 수신자가 여러 STA인 경우, 즉 Per STA Info subfield들의 AID subfield 값이 여러가지인 경우 RA는 broadcast address일 수 있다. 또는 Multi-STA BlockAck variant BlockAck frame의 수신자가 1개의 STA인 경우에도 RA는 broadcast address일 수 있다(또는 그 1개 STA의 MAC address일 수 있다.).

<334> 따라서 일 실시예에 따르면 다음 조건을 만족하는 경우 현재 수신하고 있는 PPDU의 끝까지 STA는 doze state로 들어갈 수 있다.

<335> - 그 PPDU가 다음 모두(=== 표시)를 갖고 있는 PPDU이다.

<336> === TA 또는 RA가 그 STA가 associate된 BSS의 BSSID가 속한 multiple BSSID set의 다른 BSSID와 같은 A-MPDU

<337> === 그 STA의 MAC address가 아니고, 프레임이 Trigger frame인 경우 broadcast address도 아닌 RA

<339> 또다른 실시예에 따르면 다음 조건을 만족하는 경우 현재 수신하고 있는 PPDU의 끝까지 STA는 doze state로 들어갈 수 있다.

<340> - 그 PPDU가 다음 모두(=== 표시)를 갖고 있는 PPDU이다.

<341> === TA 또는 RA가 그 STA가 associate된 BSS의 BSSID가 속한 multiple BSSID set의 다른 BSSID와 같은 A-MPDU

<342> === 그 STA의 MAC address가 아니고, 프레임이 Multi-STA BlockAck variant

BlockAck frame인 경우 broadcast address도 아닌 RA

<344> Trigger frame과 Multi-STA BlockAck variant BlockAck frame의 경우에도 앞선 실시예에서처럼 RA는 그 STA의 MAC address와 broadcast address가 아닐 뿐만 아니라 그 STA가 속한(수신해야하는) multicast address 또는 group address가 아닐 때 doze state로 들어갈 수 있을 수 있다.

<346> 또한 본 발명의 일 실시예에 따르면 multiple BSSID set의 BSSID 중 하나를 그대로 TA에 쓰면서 multiple BSSID set의 다수의 BSSID의 BSS들에 association된 STA들에 전송하는 프레임이 없을 수 있다. 이러한 경우 앞선 실시예들에서 RA field가 STA의 MAC address 또는 broadcast address인지 확인하는 조건이 없어질 수 있다.

<347> 예를 들면 multiple BSSID set의 다수의 BSSID의 BSS들에 association된 STA들을 트리거하는 Trigger frame을 전송하는 경우 TA field가 그 multiple BSSID set의 BSSID들 그대로가 아닌 값이 TA field에 사용될 수 있다. 또한 Multi-STA BlockAck variant BlockAck frame을 multiple BSSID set의 다수의 BSSID의 BSS들에 association된 STA들에 전송하는 경우가 없을 수 있다. 이러한 경우 일 실시예로 다음 조건을 만족하는 경우 현재 수신하고 있는 PPDU의 끝까지 STA는 doze state로 들어갈 수 있다.

<348> - 그 PPDU가 다음 모두(=== 표시)를 갖고 있는 PPDU이다.

<349> === TA 또는 RA가 그 STA가 associate된 BSS의 BSSID가 속한 multiple BSSID set의 다른 BSSID와 같은 A-MPDU

<351> 또다른 실시예로 multiple BSSID set의 다수의 BSSID의 BSS들에 association 된 STA들에 전송하는 프레임은 TA field에 BSSID(0), 즉 reference BSSID를 사용할 수 있다. 이러한 경우 TA가 reference BSSID인 경우 STA가 수신자일 가능성이 있을 수 있다. 따라서 일 실시예로 다음 조건을 만족하는 경우 현재 수신하고 있는 PPDU의 끝까지 STA는 doze state로 들어갈 수 있다.

<352> - 그 PPDU가 다음 모두(=== 표시)를 갖고 있는 PPDU이다.

<353> === TA 또는 RA가 그 STA가 associate된 BSS의 BSSID가 속한 multiple BSSID set의 다른 BSSID와 같은, 그러나 reference BSSID는 아닌 A-MPDU

<355> 본 발명은 도 20과 도 21의 실시예들 파워 세이브 가능한 조건들에서 'TA 또는 RA'라고 쓴 부분이 'TA'로 귀결될 수 있는 경우 'TA 또는 RA'라고 쓴 부분을 'TA'로 바꾼 실시예들도 포함한다. 예를 들면 RA가 broadcast address일 때 BSSID는 TA에 존재할 수 밖에 없을 수 있다.

<357> 다음은 intra-BSS, inter-BSS frame detection을 설명한다.

<359> An HE STA determines whether a received frame is an inter-BSS or an intra-BSS frame by using the RXVECTOR parameters (e.g., BSS_COLOR in HE PPDUs or GROUP_ID and PARTIAL_AID in VHT PPDUs) or MAC address.

<361> A frame received by the STA is an intra-BSS frame if one of the following conditions is true:

<362> - The RXVECTOR parameter BSS_COLOR in the received PPDU carrying the frame is the same as the BSS color announced by the AP to which the STA is associated

<363> - The RA field, TA field or BSSID field of the received frame with the Individual/Group bit forced to the value 0 is the same as the BSSID of AP to which the STA is associated

<364> - The AP to which the STA is associated is a member of a Multiple BSSID Set with two or more members and the RA field, TA field or BSSID field of the received frame with the Individual/Group bit forced to the value 0 is same as the BSSID of any member of the Multiple BSSID Set

<365> - The RXVECTOR parameter PARTIAL_AID in the received VHT PPDU with the

RXVECTOR parameter GROUP_ID equal to 0 is the same as the BSSID[39:47] of the AP to which the STA is associated

<366> - The value of RXVECTOR parameter PARTIAL_AID[8-N+1:8] in the received VHT PPDU with the RXVECTOR parameter GROUP_ID equal to 63 is the same as the Partial BSS Color announced by the AP to which the STA is associated when the value (N) of the Partial BSS Color Length field in the most recently received HE Operation element is not equal to 0.

<368> A frame received by the STA is an inter-BSS frame if one of the following conditions is true:

<369> - The RXVECTOR parameter BSS_COLOR of the PPDU carrying the frame is not 0 and does not match the BSS color announced by the AP to which the STA is associated

<370> - When the RXVECTOR parameter BSS_COLOR of the PPDU carrying the frame is not present:

<371> === The BSSID field of the received frame with Individual/Group bit forced to the value 0, if available, does not match the BSSID of AP to which the STA is associated

<372> === If the BSSID field is not available, both the RA and TA fields

exist, and none of the address fields of the received frame with Individual/Group bit forced to the value 0 match the BSSID of AP to which the STA is associated

<373> - The AP to which the STA is associated is a member of a Multiple BSSID Set with two or more members and the BSSID field of the received frame with Individual/Group bit forced to the value 0, if available, does not match the BSSID of any member of the Multiple BSSID Set

<374> - If the AP to which the STA is associated is a member of a Multiple BSSID Set with two or more members, the BSSID field is not available, both the RA and TA fields exist, and none of the address fields of the received frame with the Individual/Group bit forced to the value 0 match the BSSID of any member of the Multiple BSSID Set

<375> - The RXVECTOR parameter PARTIAL_AID of the received VHT PPDU frame with the RXVECTOR parameter GROUP_ID equal to 0 is different from the BSSID[39:47] of the AP to which the STA is associated

<376> - The value of RXVECTOR parameter PARTIAL_AID[8-N+1:8] in the received VHT PPDU with the RXVECTOR parameter GROUP_ID equal to 63 is different from the Partial BSS Color announced by the AP to which the STA is associated when the value (N) of the Partial BSS Color Length field in the most recently received HE Operation element is not equal to 0.

<377> - An HE AP receives either a VHT MU PPDU or an HE MU PPDU.

<379> If the received frame satisfies both intra-BSS and inter-BSS conditions the decision made by using the MAC address takes precedence over the decision made by using the RXVECTOR parameter BSS_COLOR.

<381> If the received frame does not satisfy any of the intra-BSS and inter-BSS conditions, then the frame connot be determined as intra-BSS or inter-BSS frame.

<383> 도 22는 본 발명의 일 실시예에 따른 intra-BSS, inter-BSS frame 판단을 나타낸 도면이다.

<384> 본 발명의 일 실시예로 inter-BSS frame 조건과 intra-BSS frame 조건 모두를 만족시키는 경우 inter-BSS frame으로 판단할 수 있다. 또다른 실시예로 inter-BSS frame 조건과 intra-BSS frame 조건 모두를 만족시키고 MAC address를 이용한 판단이 불가한 경우 inter-BSS frame으로 판단할 수 있다.

<385> 도 22를 참조하면 AP0가 association된 STA들에 HE MU PPDU를 전송할 수 있고, AP1이 이 PPDU를 수신할 수 있다. 또한 AP0과 AP1의 BSS가 같은 BSS color를 사용할 수 있다. 이러한 경우 AP1이 수신한 AP0으로부터의 HE MU PPDU는 HE-SIG-

A의 BSS color, 즉 RXVECTOR parameter BSS_COLOR를 통해 intra-BSS frame 조건을 만족시킬 것이고, AP가 HE MU PPDU를 수신했으니 inter-BSS frame 조건을 만족시킬 것이다. RXVECTOR parameter BSS_COLOR를 통한 intra-BSS frame 판단은 주변의 BSS와 BSS color가 겹칠 가능성 때문에 잘못 판단될 가능성이 있지만 AP가 HE MU PPDU(UL flag가 0, DL로 설정된 경우로 한정할 수 있다.)를 수신한 경우는 inter-BSS frame 판단이 확실하므로 최종적으로 inter-BSS frame으로 판단할 수 있다.

<386> 위 실시예들에서 MAC address를 이용한 판단이 불가한 경우는 모든 MPDU 디코딩을 실패했거나 PPDU 수신을 중단하는 경우 등을 포함할 수 있다.

<388> 위에서 설명한 intra-BSS, inter-BSS frame 판단 부분을 참조하면 intra-BSS frame은 BSS_COLOR 또는 MAC address 또는 PARTIAL_AID(GROUP_ID 함께 참조)를 통하여 판단할 수 있다. 또한 inter-BSS frame은 BSS_COLOR 또는 MAC address 또는 PARTIAL_AID(GROUP_ID 함께 참조) 또는 AP가 DL PPDU를 수신함으로 판단할 수 있다. BSS_COLOR와 PARTIAL_AID는 공존할 수 없으므로 MAC address에 의해 판단할 수 있는 경우를 제외하면 intra-BSS frame 조건과 inter-BSS frame 조건을 모두 만족시키는 경우는 BSS_COLOR 또는 PARTIAL_AID(GROUP_ID 함께 참조)를 통해 intra-BSS frame 조건을 만족시키고 AP가 DL PPDU를 수신함으로 inter-BSS frame을 만족시키는 경우이다.

<390> 본 발명의 일 실시예에 따르면 inter-BSS frame 조건과 intra-BSS frame 조건 모두를 만족시키는 경우 프레임이 intra-BSS frame인지 inter-BSS frame인지 판단할 수 없는 것일 수 있다. 또는 inter-BSS frame 조건과 intra-BSS frame 조건 모두를 만족시키고 MAC address를 이용한 판단이 불가한 경우 프레임이 intra-BSS frame인지 inter-BSS frame인지 판단할 수 없는 것일 수 있다. 따라서 intra-BSS frame인지 inter-BSS frame인지 판단할 수 없기 때문에 regular NAV 셋팅하는 동작을 수행할 수 있다.

<391> 위 실시예들에서 MAC address를 이용한 판단이 불가한 경우는 모든 MPDU 디코딩을 실패했거나 PPDU 수신을 중단하는 경우 등을 포함할 수 있다.

<393> 또한 PARTIAL_AID 보다 MAC address의 분해능이 높다. 따라서 본 발명의 일 실시예에 따르면 GROUP_ID와 PARTIAL_AID에 의한 판단보다 MAC address에 의한 판단이 더 우선할 수 있다. 또는 수신한 프레임이 intra-BSS frame 조건과 inter-BSS frame 조건을 모두 만족시킬 때 GROUP_ID와 PARTIAL_AID에 의한 판단보다 MAC address에 의한 판단이 더 우선할 수 있다. 즉, 본 발명의 일 실시예에 따르면 GROUP_ID와 PARTIAL_AID에 의한 판단 또는 BSS_COLOR에 의한 판단보다 MAC address에 의한 판단이 더 우선할 수 있다. 또는 수신한 프레임이 intra-BSS frame 조건과 inter-BSS frame 조건을 모두 만족시킬 때 GROUP_ID와 PARTIAL_AID에 의한 판단 또는 BSS_COLOR에 의한 판단보다 MAC address에 의한 판단이 더 우선할 수 있다.

<395> 도 23은 본 발명의 일 실시예에 따른 intra-BSS frame, inter-BSS frame 판단을 나타낸 도면이다.

<396> 본 발명의 일 실시예를 따르면 HE-SIG-A는 SR field를 포함할 수 있다. 이에 따라 TXVECTOR parameter SPATIAL_REUSE가 존재할 수 있다. 또한 PPDU가 Trigger frame을 포함할 때 SR field를 특정값으로 셋팅할 수 있다. 예를 들면 HE SU PPDU 또는 HE extended range PPDU를 보내는 STA는 그 PPDU가 Trigger frame을 포함하고 있는 경우 SR field를 SR_Delay를 나타내는 값으로 셋팅할 수 있다. 본 발명의 일 실시예를 따르면 STA가 수신한 PPDU가 inter-BSS PPDU이고 받지 않은 것으로 취급하게 되는 경우(예를 들면, OBSS PD level보다 낮은 RSSI로 수신) 그 PPDU가 HE SU PPDU 또는 HE extended range SU PPDU이고 RXVECTOR parameter SPATIAL_REUSE가 SR_Delay로 셋팅되어 있으면 그 STA는 그 PPDU 길이 동안 medium condition을 busy로 판단할 수 있다. 또다른 예로 HE MU PPDU를 보내는 STA는 그 PPDU가 Trigger frame을 포함하고 있는 경우 SR field를 SR_Restricted를 나타내는 값으로 셋팅할 수 있다. 본 발명의 일 실시예를 따르면 STA가 수신한 PPDU가 inter-BSS PPDU이고 받지 않은 것으로 취급하게 되는 경우(예를 들면, OBSS PD level보다 낮은 RSSI로 수신) 그 PPDU가 HE MU PPDU이고 RXVECTOR parameter SPATIAL_REUSE가 SR_Restricted로 셋팅되어 있으면 그 STA가 TXOP을 그 HE MU PPDU 길이 안에서 시작하는 경우, TXOP은 그 HE MU PPDU 길이 안쪽으로 제한될 수 있다. 이러한 실시예를 통해 Trigger frame에 의해 Trigger된 STA들의 CS(Carrier Sense)과정에서

medium busy로 판단하여 Trigger 되었지만 송신하지 못할 가능성을 줄일 수 있다.

<397> 본 발명의 일 실시예를 따르면 AP가 DL PPDU를 수신한 경우 그 PPDU가 inter-BSS frame이라고 판단할 수 있다. 예를 들면 Trigger frame은 DL로만 전송될 수 있으므로 Trigger frame을 포함한 PPDU를 수신하면 그 PPDU를 inter-BSS frame이라고 판단할 수 있다. 일 실시예로 PPDU의 HE-SIG-A의 SR field가 특정값으로 셋팅되어 있으면 그 PPDU가 Trigger frame을 포함하고 있다고 판단할 수 있다. 예를 들어 HE SU PPDU 또는 HE extended range SU PPDU의 SR field가 SR_Delay로 셋팅되어 있으면 그 PPDU가 Trigger frame을 포함하고 있다고 판단할 수 있다. 또한 HE MU PPDU의 SR field가 SR_Restricted로 셋팅되어 있으면 그 PPDU가 Trigger frame을 포함하고 있다고 판단할 수 있다. PPDU가 Trigger frame을 포함하고 있다고 판단하면 그 PPDU가 DL PPDU라고 판단하는 것이고 AP가 이러한 판단을 하는 경우 해당 PPDU를 inter-BSS frame으로 판단할 수 있다. 도 23을 참조하면 AP1은 AP0가 전송한 Trigger frame을 포함한 PPDU를 수신할 수 있다. AP0가 보내는 PPDU가 Trigger frame을 포함하고 있기 때문에 SR field를 특정값, 예를 들면 HE SU PPDU 또는 HE extended range SU PPDU에서 SR_Delay, HE MU PPDU에서 SR_Restricted로 셋팅한 경우 AP1은 AP0와 같은 BSS color를 쓰게 된 상황에서도 해당 PPDU가 DL PPDU이고 inter-BSS frame임을 판단할 수 있다. 따라서 더 빠르게 color code based CCA 동작을 시작하는 것이 가능할 수 있다.

<398> 또한 본 발명의 일 실시예를 따르면 도 23의 실시예는 도 22의 실시예와 통합되어 실시될 수 있다. 즉, 도 23에서와 같이 SR field를 통해 inter-BSS frame이

라고 판단했고, 도 22에서 설명한 것처럼 intra-BSS frame 조건도 만족시킨 경우, 최종적으로 inter-BSS frame으로 판단할 수 있다. 또는 intra-BSS frame인지 inter-BSS frame인지 판단할 수 없는 것일 수 있다.

<400> 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.

<401> 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 아는 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.

<402> 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】

<403> 100 : 스테이션

200 : 액세스 포인트

제출 일자 : 2016-09-07

【특허청구범위】

【청구항 1】

무선랜을 위한 방법, 장치 및 시스템.

91-80

제출 일자 : 2016-09-07

【요약서】

【요약】

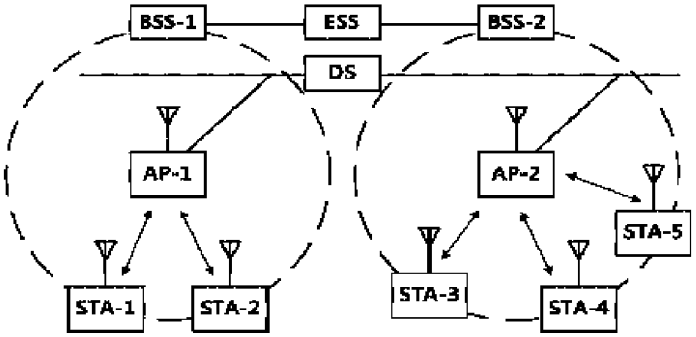
본 발명은 무선랜을 위한 장치, 시스템 및 무선랜 통신 방법에 관한 것으로, 본 발명의 실시예에 따르면 무선랜에서 BSS 컬러 충돌이 발생했을 때 잘못된 동작을 방지하기 위한 다양한 방법, 장치 및 시스템이 제공될 수 있다.

【대표도】

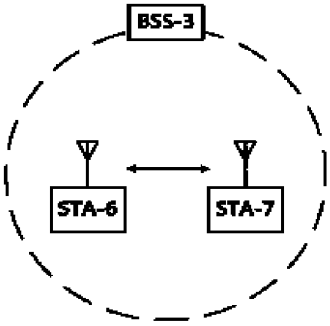
도 8

【도면】

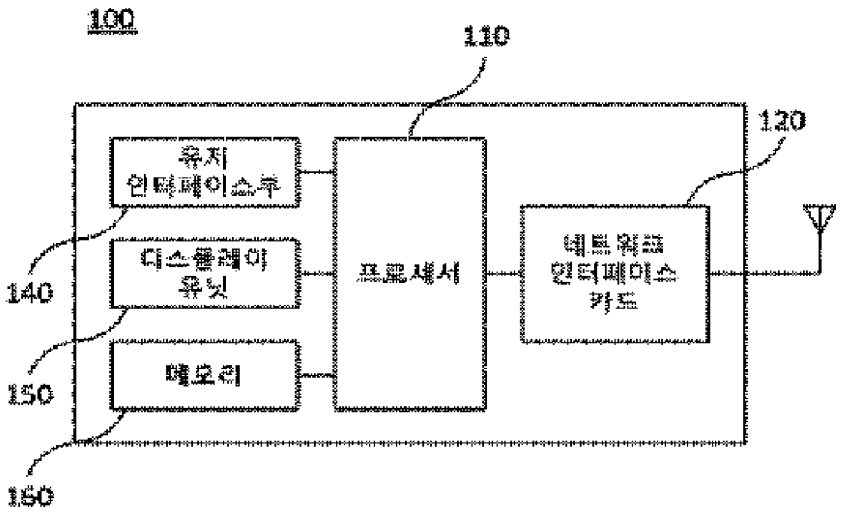
【도 1】


BSS-1
ESS
BSS-2
DS
AP-1
AP-2
STA-5
STA-1
STA-2
STA-3
STA-4

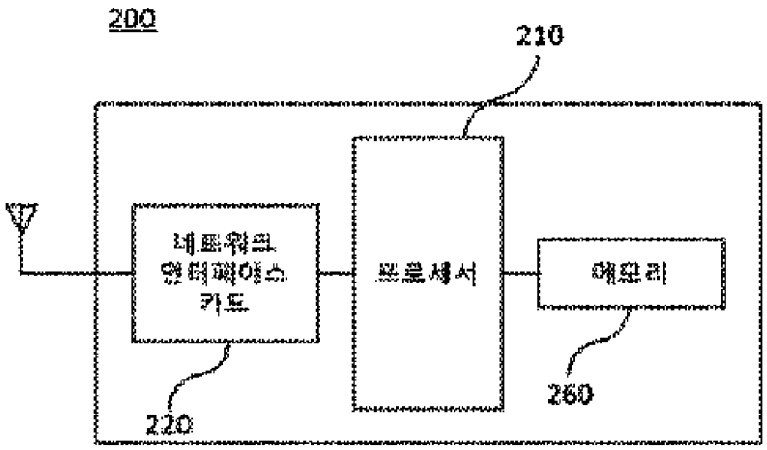
【도 2】


BSS-3
STA-6
STA-7

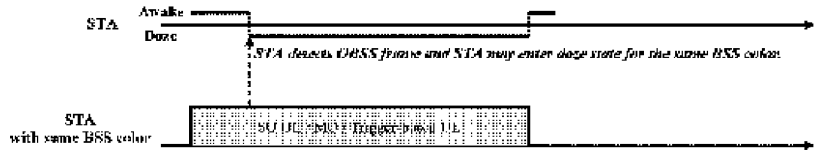
【도 3】


100
110
120
유저
인터페이스부
디스플레이
유닛
프로세서
네트워크
인터페이스
카드
메모리
140
150
160

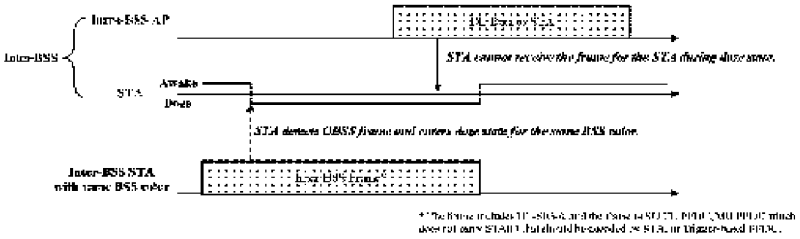
【도 4】


200
210
네트워크
인터페이스
카드
프로세서
메모리
220
260

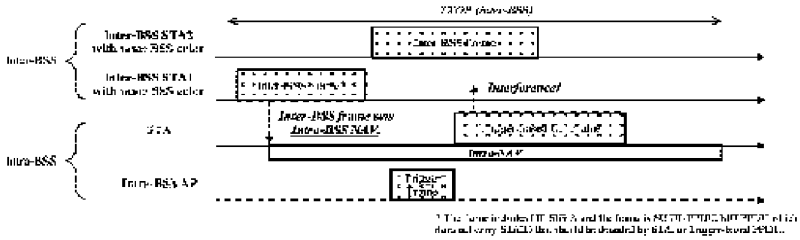
【도 5】


STA
Awake
Doze
STA with same BSS color

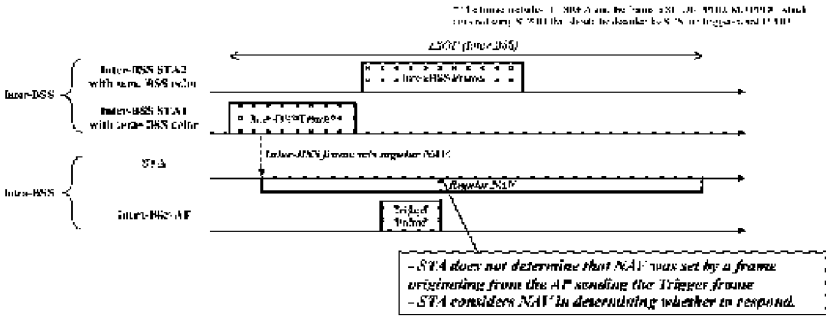
【도 6】


Intra-BSS
Intra-BSS AP
STA
Awake
Doze
Inter-BSS STA
with same BSS color

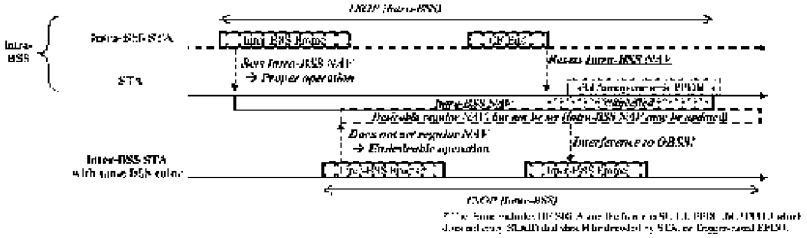
【도 7】


Intra-BSS
Inter-BSS STA2
with same BSS color
Inter-BSS STA1
with same BSS color
Interference!
STA
Intra-BSS
Intra-BSS AP

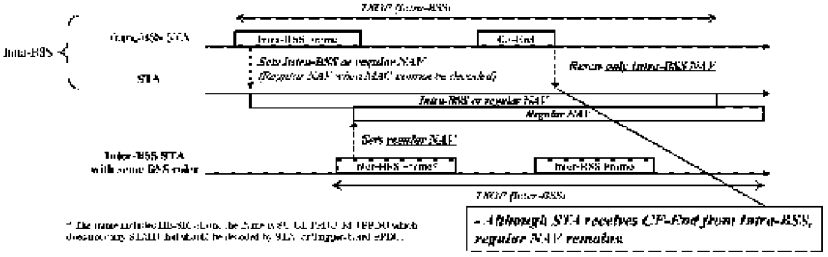
【도 8】


Inter-BSS
Intra-BSS
- STA does not determine that NAV was set by a frame originating from the AP sending the Trigger frame
- STA considers NAV in determining whether to respond.

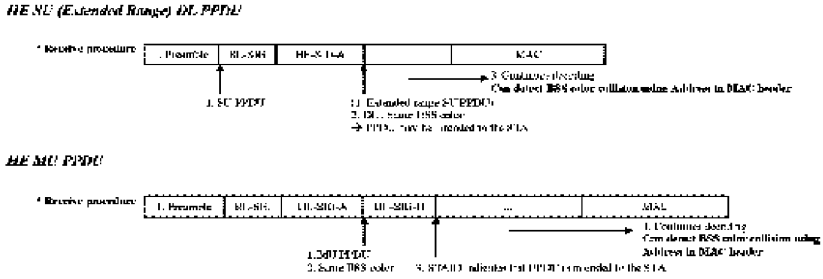
【도 9】


Intra-BSS
Inter-BSS
Interference to OBSS

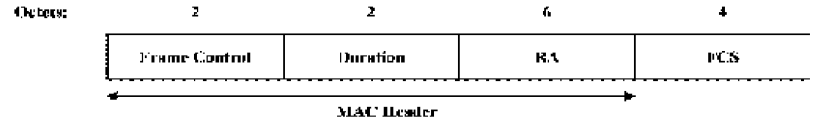
【도 10】


Inter-BSS
Intra-BSS
- Although STA receives CF-End from Intra-BSS, regular NAV remains.

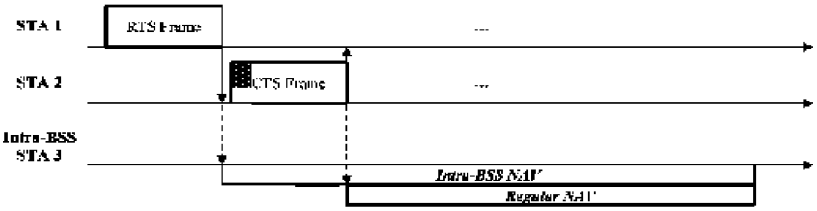
【도 11】


HE SU (Extended Range) DL PPDU
HE MU PPDU
MAC

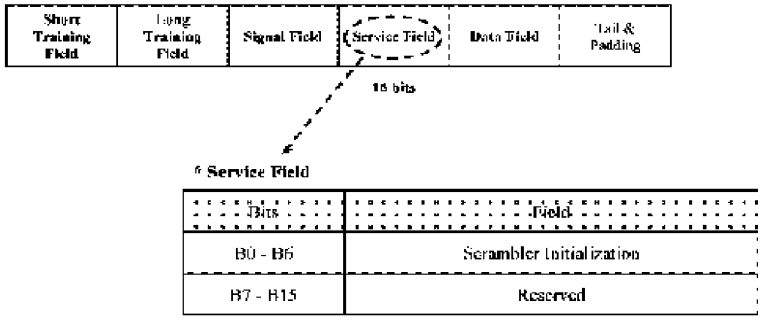
【도 12】


Octets:
2
2
6
4
Frame Control
Duration
RA
FCS
MAC Header

【도 13】


STA 1
RTS Frame
STA 2
CTS Frame
Intra-BSS
STA 3
Intra-BSS NAV
Regular NAV

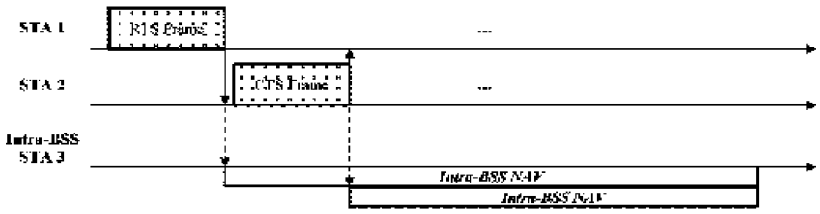
【도 14】



【도 15】

Bits	Field
B0 - B6	Scrambler Initialization
B7 - B12	BSS Color
B13 - B15	Reserved

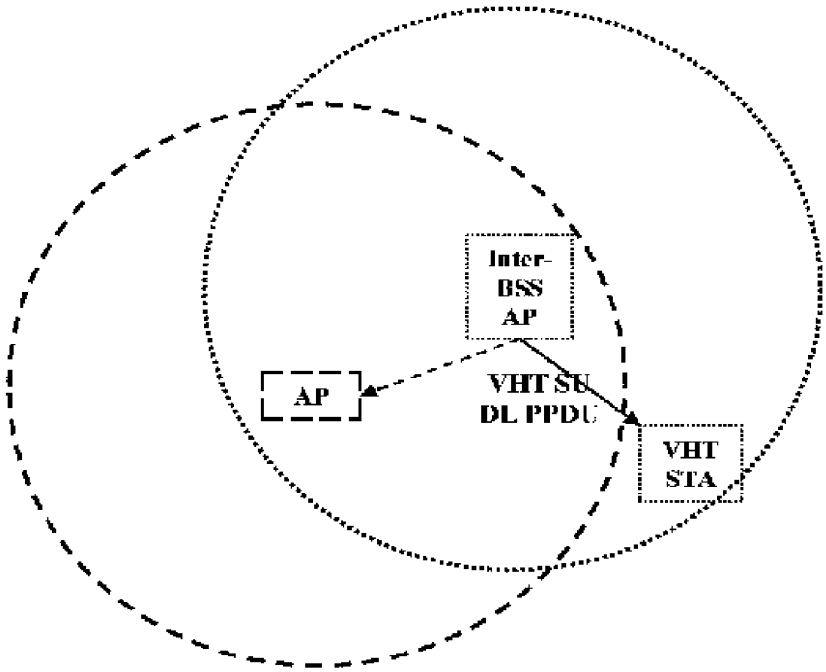
【도 16】



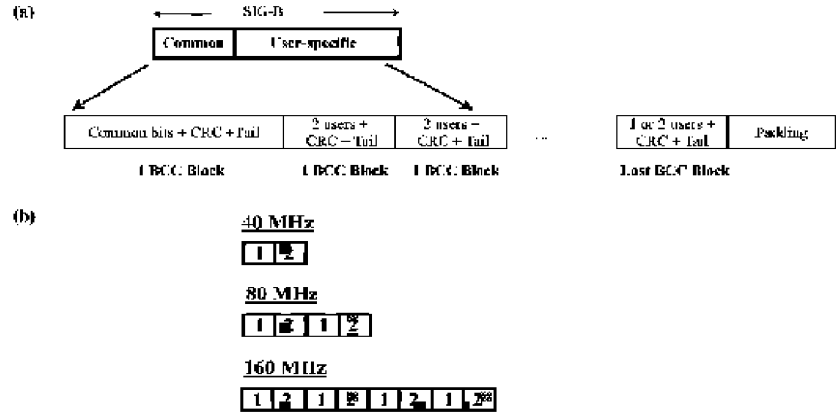
【도 17】

Condition	Group ID	Partial AID
Addressed to AP	0	BSSID[39:47]
Addressed to Mesh STA	0	RA[39:47]
Sent by an AP and addressed to a STA associated with that AP or sent by a DLS or TDLS STA in a direct path to a DLS or TDLS peer STA	63	$(dec(AID[0:8]) \quad dec(BSSID[44:47] \text{ XOR } BSSID[40:43])) * 2^{5} \bmod 2^{9}$ where XOR is a bitwise exclusive OR operation mod A indicates the A-modulo operation dec A[b:c]) is the base to decimal operator where b is scaled by 2^{0} and c by $2^{(c-b)}$
Otherwise	63	0

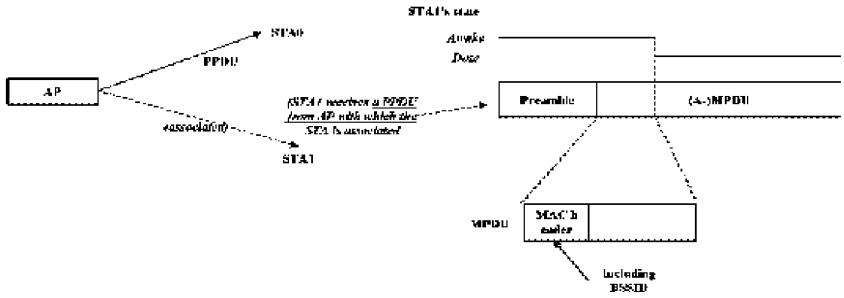
【도 18】



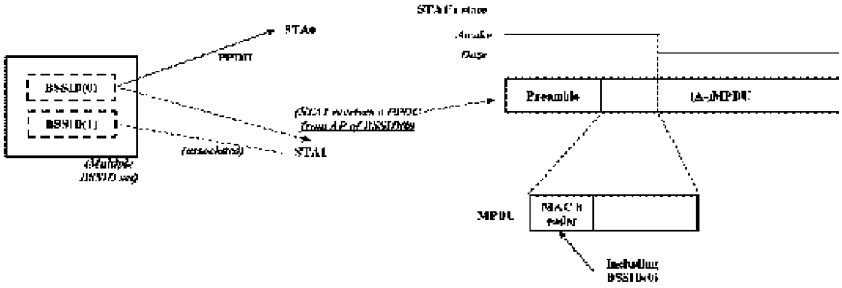
【도 19】


(a)
SIG-B
Common
User-specific
Common bits + CRC + Tail
2 users + CRC + Tail
2 users + CRC + Tail
1 or 2 users + CRC + Tail
Padding
1 BCC Block
1 BCC Block
1 BCC Block
Last BCC Block
(b)
40 MHz
80 MHz
160 MHz

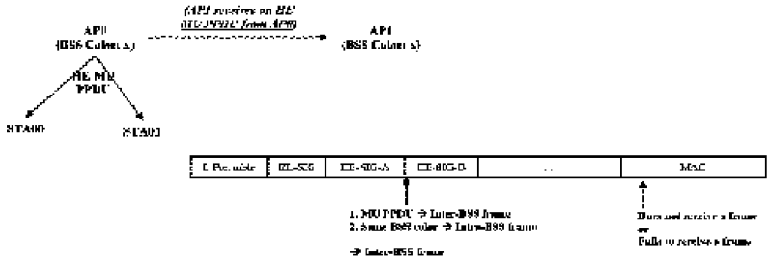
【도 20】


STA1's state
Awake
Doze
AP
PPDU
STA1
Preamble
(A-)MPDU
MPDU
MAC header
including BSSID

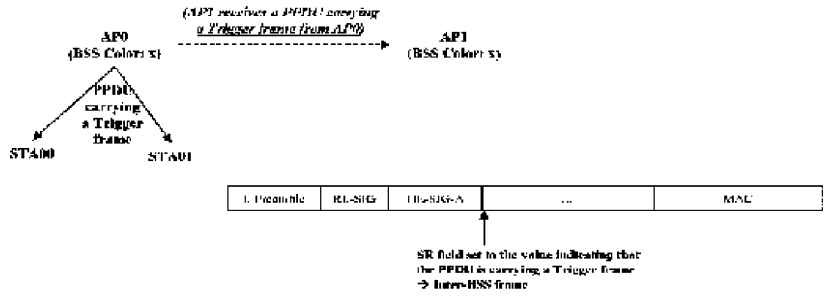
【도 21】


STA0
PPDU
BSSID(0)
BSSID(1)
STA1
Preamble
(A-)MPDU
MPDU
MAC h
eader
Including
BSSID(0)

【도 22】


AP0
(BSS Color: x)
AP1
(BSS Color: x)
HE MU
PPDU
STA00
STA01
L Preamble
RL-SIG
HE-SIG-A
HE-SIG-B
...
MAC
1. MU PPDU → Inter-BSS frame
2. Same BSS color → Intra-BSS frame
→ Inter-BSS frame
Does not receive a frame
or
Fails to receive a frame

【도 23】


AP0
(BSS Color: x)
AP1
(BSS Color: x)
PPDU
carrying
a Trigger
frame
STA00
STA01
L Preamble
RL-SIG
HE-SIG-A
...
MAC
SR field set to the value indicating that
the PPDU is carrying a Trigger frame
→ Inter-BSS frame

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출 원 인 : 주식회사 윌러스표준기술연구소
Applicant(s) WILUS Institute of Standards and Technology Inc.

2018년 10월 29일

특 허 청
COMMISSIONER

제출 일자 : 2016-05-11

【서지사항】

【서류명】 특허출원서

【참조번호】 160056HEW

【출원구분】 특허출원

【출원인】

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【특허고객번호】 1-2013-022334-3

【대리인】

【성명】 임국일

【대리인번호】 9-2014-000874-4

【포괄위임등록번호】 2014-036557-3

【발명의 국문명칭】 BSS 컬러 충돌이 발생했을 때 잘못된 동작을 방지하기 위한 방법, 장치 및 시스템

【발명의 영문명칭】 METHOD, APPARATUS, AND SYSTEM FOR PREVENTING INAPPOROPRIATE OPERATIONS WHEN BSS COLOR COLLISION OCCURRED

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【주소】 경기도 의왕시 내손중앙로 11 의왕내손이편한세상 1114동 302호
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【발명자】
【성명】 안우진
【성명의 영문표기】 Woojin AHN
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【주민등록번호】 740908-1XXXXXX
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【국적】 KR
【출원언어】 국어
【이 발명을 지원한 국가연구개발사업】
【과제고유번호】 R0166-16-1030
【부처명】 미래창조과학부
【연구관리 전문기관】 정보통신기술진흥센터

제출 일자 : 2016-05-11

【연구사업명】 정보통신방송표준개발지원

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

【기여율】 1/1

【주관기관】 (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】	62 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		

【발명의 설명】

【발명의 명칭】

BSS 컬러 충돌이 발생했을 때 잘못된 동작을 방지하기 위한 방법, 장치 및 시스템{METHOD, APPARATUS, AND SYSTEM FOR PREVENTING INAPPOROPRIATE OPERATIONS WHEN BSS COLOR COLLISION OCCURRED}

【기술분야】

<1> 본 발명은 BSS 컬러 관련 동작에서 잘못된 동작을 방지하는 방법으로서, 더욱 상세하게는 무선랜에서 BSS 컬러 충돌이 발생했을 때 잘못된 동작을 방지하기 위한 다양한 방법, 장치 및 시스템에 관한 것이다.

【배경기술】

<2> 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 기기들을 가정이나 기업 또는 특정 서비스 제공지역에서 무선으로 인터넷에 접속할 수 있도록 하는 기술이다.

<3> IEEE(Institute of Electrical and Electronics Engineers) 802.11은 2.4GHz 주파수를 이용한 초기의 무선랜 기술을 지원한 이래, 다양한 기술의 표준을 실용화 또는 개발 중에 있다. 먼저, 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.

<4> 그리고 무선랜에서 취약점으로 지적되어온 통신 속도에 대한 한계를 극복하기 위하여 제정된 기술 규격으로서 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 수 있다.

<5> 무선랜의 보급이 활성화되고 또한 이를 이용한 어플리케이션이 다양화됨에 따라, IEEE 802.11n이 지원하는 데이터 처리 속도보다 더 높은 처리율(Very High Throughput, VHT)을 지원하기 위한 새로운 무선랜 시스템에 대한 필요성이 대두되

었다. 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. 이론적으로, 이 규격에 따르면 다중 스테이션의 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 2.4GHz/5GHz 대신 60GHz 밴드를 사용해 데이터를 전송하는 방식으로 IEEE 802.11ad가 있다. IEEE 802.11ad는 빔포밍 기술을 이용하여 최대 7Gbps의 속도를 제공하는 전송규격으로서, 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.

<6> 한편, 최근에는 802.11ac 및 802.11ad 이후의 차세대 무선랜 표준으로서, 고밀도 환경에서의 고효율 및 고성능의 무선랜 통신 기술을 제공하기 위한 논의가 계속해서 이루어지고 있다. 즉, 차세대 무선랜 환경에서는 고밀도의 스테이션과 AP(Access Point)의 존재 하에 실내/외에서 높은 주파수 효율의 통신이 제공되어야 하며, 이를 구현하기 위한 다양한 기술들이 필요하다.

【발명의 내용】

【해결하려는 과제】

<7> 본 발명은 전술한 바와 같이 고밀도 환경에서의 고효율/고성능의 무선랜 통신을 제공하기 위한 목적을 가지고 있다.

【과제의 해결 수단】

<8> 본 발명의 실시예에 따르면 무선랜을 위한 장치, 시스템 및 무선랜 통신 방법이 제공될 수 있다.

【발명의 효과】

<9> 본 발명의 실시예에 따르면, 맥 헤더에 컨트롤 정보를 효율적으로 포함시킬 수 있는 방법을 제공한다. 본 발명은 무선랜을 이용하는 스테이션 내지 액세스 포인트, 셀룰러 통신을 이용하는 스테이션 내지 기지국 등 다양한 통신 디바이스에 사용 가능하다.

【도면의 간단한 설명】

<10> 도 1은 본 발명의 일 실시예에 따른 무선랜 시스템을 나타낸 도면.

도 2는 본 발명의 다른 실시예에 따른 무선랜 시스템을 나타낸 도면.

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

도 4는 본 발명의 일 실시예에 따른 액세스 포인트의 구성을 나타낸 블록도.

도 5는 본 발명의 일 실시예에 따른 intra-PPDU power save를 나타낸 도면.

도 6은 본 발명의 일 실시예에 따른 BSS color collision이 발생한 경우 intra-PPDU power save를 나타낸 도면.

도 7은 본 발명의 일 실시예에 따른 BSS color collision이 발생한 경우 프레임 교환을 나타낸 도면.

도 8은 본 발명의 일 실시예에 따른 BSS color collision을 인지한 이후 프레임 교환을 나타낸 도면.

도 9는 본 발명의 일 실시예에 따른 BSS color collision이 발생한 경우 프레임 교환을 나타낸 도면.

도 10은 본 발명의 일 실시예에 따른 BSS color collision을 인지한 이후 프레임 교환을 나타낸 도면.

도 11은 본 발명의 일 실시예에 따른 BSS color collision 감지 과정을 나타낸 도면.

도 12는 본 발명의 일 실시예에 따른 CTS frame 또는 Ack frame의 MAC 포맷을 나타낸 도면.

도 13은 본 발명의 일 실시예에 따른 NAV 셋팅을 나타낸 도면.

도 14는 본 발명의 일 실시예에 따른 11a 패킷 구조를 나타낸 도면.

도 15는 본 발명의 일 실시예에 따른 레거시 패킷의 Service field 구성을 나타낸 도면.

도 16은 본 발명의 일 실시예에 따른 NAV 셋팅을 나타낸 도면.

도 17은 본 발명의 일 실시예에 따른 VHT-SIG-A의 Partial AID 및 Group ID 셋팅을 나타낸 표.

도 18은 본 발명의 일 실시예에 따른 VHT SU DL PPDU 수신을 나타낸 도면.

도 19는 본 발명의 일 실시예에 따른 HE-SIG-B 필드의 인코딩 구조(encoding structure), 구성를 나타낸 도면.

【발명을 실시하기 위한 구체적인 내용】

<11> 본 명세서에서 사용되는 용어는 본 발명에서의 기능을 고려하면서 가능한 현재 널리 사용되는 일반적인 용어를 선택하였으나, 이는 당 분야에 종사하는 기술자의 의도, 관례 또는 새로운 기술의 출현 등에 따라 달라질 수 있다. 또한 특정 경우는 출원인이 임의로 선정한 용어도 있으며, 이 경우 해당되는 발명의 설명 부분에서 그 의미를 기재할 것이다. 따라서 본 명세서에서 사용되는 용어는, 단순한 용어의 명칭이 아닌 그 용어가 가진 실질적인 의미와 본 명세서의 전반에 걸친 내용을 토대로 해석되어야 함을 밝혀두고자 한다.

<12> 명세서 전체에서, 어떤 구성이 다른 구성과 "연결" 되어 있다고 할 때, 이는 "직접적으로 연결" 되어 있는 경우뿐 아니라, 그 중간에 다른 구성요소를 사이에 두고 "전기적으로 연결" 되어 있는 경우도 포함한다. 또한 어떤 구성이 특정 구성요소를 "포함" 한다고 할 때, 이는 특별히 반대되는 기재가 없는 한 다른 구성요소를 제외하는 것이 아니라 다른 구성요소를 더 포함할 수 있는 것을 의미한다. 이에 더하여, 특정 임계값을 기준으로 "이상" 또는 "이하" 라는 한정 사항은 실시예에 따라 각각 "초과" 또는 "미만" 으로 적절하게 대체될 수 있다.

<13> 도 1은 본 발명의 일 실시예에 따른 무선랜 시스템을 도시하고 있다. 무선랜 시스템은 하나 또는 그 이상의 베이직 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.

<14> 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.

<15> 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 비 액세스 포인트(Non-AP) 스테이션뿐만 아니라 액세스 포인트(AP)를 모두 포함한다. 또한, 본 명세서에서는 스테이션과 AP 등의 무선랜 통신 디바이스를 모두 포함하는 개념으로서 '단말' 이라는 용어가 사용될 수 있다. 무선 통신을 위한 스테이션은 프로세서(Processor)와 트랜시버(transceiver)를 포함하고, 실시예에 따라 유저 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 수행할 수 있다. 그리고, 트랜시버는 상기 프로세서와 기능적으로 연결되어 있으며 스테이션을 위하여 무선 네트워크를 통해 프레임을 송수신한다.

<16> 액세스 포인트(Access Point, AP)는 자신에게 결합된(associated) 스테이션을 위하여 무선 매체를 경유하여 분배시스템(DS)에 대한 접속을 제공하는 개체이다. 인프라스트럭쳐 BSS에서 비 AP 스테이션들 사이의 통신은 AP를 경유하여 이루어지는 것이 원칙이지만, 다이렉트 링크가 설정된 경우에는 비AP 스테이션들 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.

<17> 복수의 인프라스트럭쳐 BSS는 분배 시스템(DS)을 통해 상호 연결될 수 있다. 이때, 분배 시스템을 통하여 연결된 복수의 BSS를 확장 서비스 세트(Extended Service Set, ESS)라 한다.

<18> 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.

<19> 도 2에 도시된 BSS-3는 독립 BSS이며 AP를 포함하지 않기 때문에, 모든 스테이션(STA-6, STA-7)이 AP와 접속되지 않은 상태이다. 독립 BSS는 분배 시스템으로의 접속이 허용되지 않으며, 자기 완비적 네트워크(self-contained network)를 이

룬다. 독립 BSS에서 각각의 스테이션들(STA-6, STA-7)은 다이렉트로 서로 연결될 수 있다.

<20> 도 3은 본 발명의 일 실시예에 따른 스테이션(100)의 구성을 나타낸 블록도이다.

<21> 도시된 바와 같이, 본 발명의 실시예에 따른 스테이션(100)은 프로세서(110), 네트워크 인터페이스 카드(NIC, 120), 유저 인터페이스부(140), 디스플레이 유닛(150) 및 메모리(160)를 포함할 수 있다.

<22> 먼저, 네트워크 인터페이스 카드(120)는 무선랜 접속을 수행하기 위한 모듈이며, 스테이션(100)을 위한 패킷 전송과 수신을 수행한다. 네트워크 인터페이스 카드(120)는 스테이션(100)에 내장되거나 외장으로 구비될 수 있으며, 실시예에 따라 서로 다른 주파수 밴드를 이용하는 적어도 하나의 네트워크 인터페이스 카드 모듈을 포함할 수 있다. 이를 테면, 상기 네트워크 인터페이스 카드는 2.4GHz, 5GHz 및 60GHz 등의 서로 다른 주파수 밴드의 네트워크 인터페이스 카드 모듈을 포함할 수 있다. 일 실시예에 따르면, 스테이션(100)은 6GHz 이상의 주파수 밴드를 이용하는 네트워크 인터페이스 카드 모듈과, 6GHz 이하의 주파수 밴드를 이용하는 네트워크 인터페이스 카드 모듈을 구비할 수 있다. 각각의 네트워크 인터페이스 카드 모듈은 해당 네트워크 인터페이스 카드 모듈이 지원하는 주파수 밴드의 무선랜 규격에 따라 AP 또는 외부 스테이션과 무선 통신을 수행할 수 있다. 네트워크 인터페이스 카드(120)는 스테이션(100)의 성능 및 요구 사항에 따라 한 번에 하나의 네트워크 인터페이스 카드 모듈만을 동작시키거나 동시에 다수의 네트워크 인터페이

스 카드 모듈을 함께 동작시킬 수 있다. 스테이션(100)이 복수의 네트워크 인터페이스 카드 모듈을 포함할 경우, 각 네트워크 인터페이스 카드 모듈은 각각 독립된 형태로 구비될 수도 있으며, 하나의 칩으로 통합되어 구비될 수도 있다.

<23> 다음으로, 유저 인터페이스부(140)는 스테이션(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 스테이션(100)을 제어할 수 있다. 또한, 유저 인터페이스부(140)는 다양한 출력 수단을 이용하여 프로세서(110)의 명령에 기초한 출력을 수행할 수 있다.

<24> 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 스테이션(100)에서 사용되는 제어 프로그램 및 그에 따른 각종 데이터를 저장한다. 이러한 제어 프로그램에는 스테이션(100)이 AP 또는 외부 스테이션과 접속을 수행하는데 필요한 접속 프로그램이 포함될 수 있다.

<25> 본 발명의 프로세서(110)는 다양한 명령 또는 프로그램을 실행하고, 스테이션(100) 내부의 데이터를 프로세싱 할 수 있다. 또한, 상기 프로세서(110)는 상술한 스테이션(100)의 각 유닛들을 제어하며, 유닛들 간의 데이터 송수신을 제어할 수 있다. 본 발명의 실시예에 따르면, 프로세서(110)는 메모리(160)에 저장된 AP와의 접속을 위한 프로그램을 실행하고, AP가 전송한 통신 설정 메시지를 수신할

수 있다. 또한, 프로세서(110)는 통신 설정 메시지에 포함된 스테이션(100)의 우선 조건에 대한 정보를 판독하고, 스테이션(100)의 우선 조건에 대한 정보에 기초하여 AP에 대한 접속을 요청할 수 있다. 이에 대한 구체적인 실시예는 추후 기술하기로 한다.

<26> 도 3에 도시된 스테이션(100)은 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 상기 스테이션(100)의 일부 구성들, 이를 테면 유저 인터페이스부(140) 및 디스플레이 유닛(150) 등은 스테이션(100)에 선택적으로 구비될 수 있다.

<27> 도 4는 본 발명의 일 실시예에 따른 AP(200)의 구성을 나타낸 블록도이다.

<28> 도시된 바와 같이, 본 발명의 실시예에 따른 AP(200)는 프로세서(210), 네트워크 인터페이스 카드(220) 및 메모리(260)를 포함할 수 있다. 도 4에서 AP(200)의 구성 중 도 3의 스테이션(100)의 구성과 동일하거나 상응하는 부분에 대해서는 중복적인 설명을 생략하도록 한다.

<29> 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, 상기 AP(200)의 네트워크 인터페이스 카드(220) 또한 서로 다른 주파수 밴드를 이용하는 복수의 네트워크 인터페이스 카드 모듈을 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 네트워크 인터페이스 카드 모듈과, 6GHz 이하의 주파수 밴드를 이용하는 네트워크 인터페이스 카드 모듈을 구비할 수 있다. 각각의 네트워크 인터페이스 카드 모듈은 해당 네트워크 인터페이스 카드 모듈이 지원하는 주파수 밴드의 무선랜 규격에 따라 스테이션과 무선 통신을 수행할 수 있다. 상기 네트워크 인터페이스 카드(220)는 AP(200)의 성능 및 요구 사항에 따라 한 번에 하나의 네트워크 인터페이스 카드 모듈만을 동작시키거나 동시에 다수의 네트워크 인터페이스 카드 모듈을 함께 동작시킬 수 있다.

<30> 다음으로, 메모리(260)는 AP(200)에서 사용되는 제어 프로그램 및 그에 따른 각종 데이터를 저장한다. 이러한 제어 프로그램에는 스테이션의 접속을 관리하는 접속 프로그램이 포함될 수 있다. 또한, 프로세서(210)는 AP(200)의 각 유닛들을 제어하며, 유닛들 간의 데이터 송수신을 제어할 수 있다. 본 발명의 실시예에 따르면, 프로세서(210)는 메모리(260)에 저장된 스테이션과의 접속을 위한 프로그램을 실행하고, 하나 이상의 스테이션에 대한 통신 설정 메시지를 전송할 수 있다. 이때, 통신 설정 메시지에는 각 스테이션의 접속 우선 조건에 대한 정보가 포함될 수 있다. 또한, 프로세서(210)는 스테이션의 접속 요청에 따라 접속 설정을 수행한다. 이에 대한 구체적인 실시예는 추후 기술하기로 한다.

<32> 본 발명의 일 실시예에 따르면 HE PPDU는 HE-SIG-A에 포함된 BSS identifier

인 BSS color(BSS 컬러)를 통해 PPDU가 어느 BSS가 송신한 것인지, 혹은 같은 BSS가 송신한 것인지, 혹은 다른 BSS가 송신한 것인지 등을 파악할 수 있다. 또한 PPDU가 어느 BSS가 송신한 것인지, 혹은 같은 BSS가 송신한 것인지, 혹은 다른 BSS가 송신한 것인지 등을 파악하는 데에 있어서 MAC header를 참조할 수도 있다. MAC header의 Address 필드 중에 BSSID가 있으면 같은 BSS가 송신한 것으로 파악할 수 있고, Address 필드 중에 BSSID가 없으면 다른 BSS가 송신했거나 어떤 BSS가 송신했는지 알 수 없는 것으로 파악할 수 있다.

<34> 본 발명의 일 실시예에 따르면 OBSS들이 같은 BSS color를 사용하는 경우가 있을 수 있다. 이 상황을 아래에서 BSS color collision(BSS color 충돌)이라고 부르겠다.

<36> Intra-PPDU Power Save

<37> 도 5는 본 발명의 일 실시예에 따른 intra-PPDU power save를 나타낸 도면이다.

<38> 도 5를 참조하면 STA가 PPDU를 detection(감지)했을 때 PPDU가 특정 조건을 만족시킬 때 doze state로 들어갈 수 있다.

<39> 본 발명의 일 실시예에 따르면

<40> An HE non-AP STA that is in awake state (see 11.2.2.2 (STA Power

Management modes)) and has dot11IntraPPDUPowerSaveOptionActivated equal to true operates in intra-PPDU power save mode.

<41> An HE non-AP STA that is in intra-PPDU power save mode may enter the doze state until the end of a received PPDU when one of the following conditions is met:

<42> - The PPDU is an HE MU PPDU with:

<43> ===The value of the RXVECTOR parameter BSS_COLOR equal to the BSS color of the BSS with which the STA is associated and,

<44> ===The value of the RXVECTOR parameter UL_FLAG is equal to 0 and,

<45> ===The values obtained from the RXVECTOR parameter STA_ID_LIST do not match the identifier of the STA or the broadcast identifier(s) intended for the STA

<46> - The PPDU is an HE MU PPDU, HE SU PPDU, or HE extended range SU PPDU with:

<47> ===The value of the RXVECTOR parameter BSS_COLOR equal to the BSS color of the BSS with which the STA is associated and,

<48> ===The value of the RXVECTOR parameter UL_FLAG is equal to 1

<49> - The PPDU is an HE trigger-based PPDU with:

<50> ===The value of the RXVECTOR parameter BSS_COLOR equal to the BSS color

of the BSS with which the STA is associated

<S1> An HE STA that is in intra-PPDU power save mode and has entered doze state shall continue to operate its NAV timer and consider the medium busy during doze state and shall transition into awake state at the end of the PPDU.

<S2> NOTE – The STA can contend for access to the medium immediately on the expiry of the NAV timer.

<S4> Awake state에 있고 dot11IntraPPDUPowerSaveOptionActivated가 true로 되어 있는 HE non-AP STA는 intra-PPDU power save mode로 작동한다.

<S5> Intra-PPDU power save mode에 있는 HE non-AP STA는 다음 조건 중 하나를 만족할 때 수신한 PPDU의 끝까지 doze state로 들어갈 수 있다.

<S6> - PPDU가 HE MU PPDU이고

<S7> ===RXVECTOR parameter BSS_COLOR 값이 그 STA가 association된 BSS의 BSS color와 같고,

<S8> ===RXVECTOR parameter UL_FLAG 값이 0이고,

<S9> ===RXVECTOR parameter STA_ID_LIST 값들이 그 STA의 identifier와 일치하지 않거나 그 STA에게 intend된 broadcast identifier(s)가 아닐 때.

<S60> - PPDU가 HE MU PPDU, HE SU PPDU, 또는 HE extended range SU PPDU이고,

<61> ===RXVECTOR parameter BSS_COLOR 값이 그 STA가 association된 BSS의 BSS color와 같고,

<62> ===RXVECTOR parameter UL_FLAG 값이 1일 때

<63> - PPDU가 HE trigger-based PPDU이고,

<64> ===RXVECTOR parameter BSS_COLOR 값이 그 STA가 association된 BSS의 BSS color과 같을 때

<66> Intra-PPDU power save mode에 있고 doze state에 들어간 HE STA는 NAV timer를 계속 작동시켜야 하고 doze state동안 medium 상태를 busy로 판단해야 하고, 그 PPDU의 끝에서 awake state로 바뀌어야 한다.

<67> NAV timer가 expire 되면 STA는 medium access를 위해 즉시 경쟁할 수 있다.

<69> 도 6은 본 발명의 일 실시예에 따른 BSS color collision이 발생한 경우 intra-PPDU power save를 나타낸 도면이다.

<70> 도 6과 앞서 설명한 Intra-PPDU power save를 참조하면 STA는 수신한 PPDU가 특정 조건을 만족할 때 doze state로 들어갈 수 있다. 만약 도 6과 같이 inter-BSS가 intra-BSS(또는 MYBSS)와 같은 BSS color를 사용할 경우, inter-BSS frame을 수신하여 BSS color가 같음을 확인했고 앞서 설명한 조건을 만족시킬 때 doze state로 들어갈 수 있다. 또한 inter-BSS frame 동안 doze state로 들어가게 되면 그동

안 그 STA에 intend된 frame을 수신할 수 없는 문제가 발생한다.

<71> 본 발명의 일 실시예에 따르면 언급한 문제를 해결하기 위해 BSS color collision을 인지한 뒤부터는 같은 BSS color의 PPDU를 수신했을 때 intra-PPDU power save mode에 있는 STA가 doze state로 들어가지 않을 수 있다. 또는 수신한 프레임이 Intra-BSS인지 Inter-BSS인지 판단할 수 없는 경우에 intra-PPDU power save mode에 있는 STA가 doze state로 들어가지 않을 수 있다. 또는 BSS color collision을 인지한 뒤에 dot11IntraPPDUPowerSaveOptionActivated를 false로 설정할 수 있다. 또는 BSS color collision을 인지하면 BSS color에 기반한 동작을 하지 않을 수 있다. 또는 BSS color collision을 인지하면 같은 BSS color에 기반한 동작을 하지 않을 수 있다. 또는 BSS color collision을 인지한 뒤부터는 어떤 시간까지 같은 BSS color의 PPDU를 수신했을 때 intra-PPDU power save mode에 있는 STA가 doze state로 들어가지 않을 수 있다. 또는 BSS color collision을 인지한 뒤에 어떤 시간까지 intra-PPDU power save mode로 동작하지 않을 수 있다. 언급한 어떤 시간은 예를 들면 BSS color collision이 해결되는 시간일 수 있다. 일 실시예로 특정 reserve된 BSS color(예를 들면 0)으로 동작하여 BSS color operation을 제한할 수 있고 그때까지일 수 있다. 또한 언급한 어떤 시간은 현재의 association이 끊어지는 시간일 수 있다. 또는 BSS color collision을 인지한 뒤에 STA는 doze state에 들어가지 않을 수 있다.

<73> Updating two NAVs

<74> 본 발명의 일 실시예에 따르면 STA는 다수의 NAV를 사용할 수 있다. 한가지 실시예로 STA는 2개의 NAV를 사용할 수 있다.

<75> Mandatory or optional support of two NAVs is TBD.

<76> For the two NAVs maintained by a HE STA, one is identified as Intra-BSS NAV, and the second one is identified as regular NAV.

<77> A STA that receives at least one valid frame in a PSDU and identifies the frame as Intra-BSS can update its Intra-BSS NAV with the information from any valid Duration field in the PSDU.

<78> A STA that receives at least one valid frame in a PSDU and identifies the frame as Inter-BSS can update its regular NAV with the information from any valid Duration field in the PSDU.

<79> A STA that receives at least one valid frame in a PSDU and cannot identify the frame as Intra-BSS or Inter-BSS can update its regular NAV with the information from any valid Duration field in the PSDU.

<80> A STA that receives a valid HE-SIG-A in a HE PPDU and identifies the HE-SIG-A as Intra-BSS can update its Intra-BSS NAV with the information from the TXOP Duration field in the HE-SIG-A.

<81> A STA that receives a valid HE-SIG-A in a HE PPDU and identifies the HE-SIG-A as Inter-BSS can update its regular NAV with the information from

the TXOP Duration field in the HE-SIG-A.

<82> When the received frame's RA is equal to the STA's own MAC address, the STA shall not update its Intra-BSS NAV or regular NAV with the information from the Duration field.

<83> When a STA receives both a valid HE-SIG-A in a HE PPDU and a valid frame in the PSDU of the HE PPDU, the STA shall not update its Intra-BSS NAV or regular NAV with the information from the TXOP Duration field in the HE-SIG-A.

<84> For all other received frames that are identified by the STA as Intra-BSS, the STA shall update its Intra-BSS NAV when the received value of the Duration field is greater than the STA's current Intra-BSS NAV value.

<85> For all other received frames that are identified by the STA as Inter-BSS or cannot be identified as Intra-BSS or Inter-BSS, the STA shall update its regular NAV when the received value of the Duration field is greater than the STA's current regular NAV value.

<86> For all other received HE-SIG-As that are identified by the STA as Intra-BSS, the STA shall update its Intra-BSS NAV when the received value of the TXOP Duration field is greater than the STA's current Intra-BSS NAV value.

<87> For all other received HE-SIG-As that are identified by the STA as Inter-BSS, the STA shall update its Inter-BSS NAV when the received value of the TXOP Duration field is greater than the STA's current regular NAV value.

<89> 2개의 NAV 지원은 mandatory일 수 있고, 또는 optional일 수 있다.

<90> STA가 유지하는 2개의 NAV에 대해서, 하나의 NAV는 Intra-BSS NAV이고, 다른 하나는 regular NAV일 수 있다.

<91> PSDU에서 적어도 하나의 valid frame을 수신하고 그것을 Intra-BSS로 판단하는 STA는 PSDU의 어떠한 valid Duration 필드 정보로부터 그것의 Intra-BSS NAV를 업데이트할 수 있다.

<92> PSDU에서 적어도 하나의 valid frame을 수신하고 그것을 Inter-BSS로 판단하는 STA는 PSDU의 어떠한 valid Duration 필드 정보로부터 그것의 regular NAV를 업데이트할 수 있다.

<93> PSDU에서 적어도 하나의 valid frame을 수신하고 그것을 Intra-BSS인지 Inter-BSS인지 판단할 수 없는 STA는 PSDU의 어떠한 valid Duration 필드 정보로부터 그것의 regular NAV를 업데이트할 수 있다.

<94> HE PPDU의 valid HE-SIG-A를 수신하고 HE-SIG-A를 Intra-BSS로 판단하는 STA는 HE-SIG-A의 TXOP Duration 필드 정보로부터 그것의 Intra-BSS NAV를 업데이트할 수 있다.

<95> HE PPDU의 valid HE-SIG-A를 수신하고 HE-SIG-A를 Inter-BSS로 판단하는 STA는 HE-SIG-A의 TXOP Duration 필드 정보로부터 그것의 regular NAV를 업데이트할 수 있다.

<96> 수신한 프레임의 RA가 STA의 MAC address와 일치할 때 STA는 Duration 필드 정보로부터 그것의 Intra-BSS NAV 또는 regular NAV를 업데이트하면 안된다.

<97> STA가 HE PPDU의 valid HE-SIG-A와 HE PPDU의 PSDU의 valid frame을 모두 받았을 때 STA는 HE-SIG-A의 TXOP Duration 필드 정보로부터 그것의 Intra-BSS NAV 또는 regular NAV를 업데이트하면 안된다.

<98> STA에 의해 Intra-BSS로 판단되는 모든 다른 received frames에 대해, 수신한 Duration 필드의 값이 STA의 현재 Intra-BSS NAV 값보다 클 때 그것의 Intra-BSS NAV를 업데이트 해야 한다.

<99> STA에 의해 Inter-BSS로 판단되거나 Intra-BSS인지 Inter-BSS인지 판단할 수 없는 모든 다른 received frames에 대해, 수신한 Duration 필드의 값이 STA의 현재 regular NAV 값보다 클 때 그것의 regular NAV를 업데이트 해야 한다.

<100> STA에 의해 Intra-BSS로 판단되는 모든 다른 HE-SIG-As에 대해, 수신한 TXOP Duration 필드의 값이 STA의 현재 Intra-BSS NAV 값보다 클 때 STA는 그것의 Intra-BSS NAV를 업데이트 해야 한다.

<101> STA에 의해 Inter-BSS로 판단되는 모든 다른 HE-SIG-As에 대해, 수신한 TXOP Duration 필드의 값이 STA의 현재 regular NAV 값보다 클 때 STA는 그것의 Inter-

BSS NAV(또는 regular NAV)를 업데이트 해야 한다.

<103> Truncation of TXOP

<104> An HE STA that receives a CF-End frame should not reset its NAV if:

<105> - The CF-End did not originate from the STA's associated BSS or any BSS of a multi-BSSID set that the STA's associated BSS belongs to and the most recent NAV update was due to a PPDU originating from the STA's associated BSS or any BSS of a multi-BSSID set that the STA's associated BSS belongs to.

<106> - The CF-End originated from the STA's associated BSS or any BSS of a multi-BSSID set that the STA's associated BSS belongs to and the most recent NAV update was not due to a PPDU originating from the STA's associated BSS or any BSS of a multi-BSSID set that the STA's associated BSS belongs to.

<108> CF-End 프레임을 수신하는 HE STA는 다음의 경우에 그것의 NAV를 리셋하면 안된다.

<109> - CF-End가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 오지 않았고, 가장 최근의 NAV가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 온 PPDU에 의해

셋팅되었을 때

<110> - CF-End가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 왔고, 가장 최근의 NAV가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 오지 않은 PPDU에 의해 셋팅되었을 때

<112> A NAV is considered in virtual CS for a STA that is polled from a Trigger frame for UL MU transmission unless one of the following conditions is met:

<113> - The NAV was set by a frame originating from the AP sending the Trigger frame

<114> - The response generated by the STA contains an Ack frame or a BlockAck frame and the duration of the HE trigger-based PPDU is less than a TBD value

<115> - The NAV was set by a frame originating from an intra-BSS STA

<116> - The CS Required subfield in the Trigger frame is 0

<117> - Other condition TBD

<119> 다음 조건들 중 하나도 만족되지 않을 때 UL MU transmission을 위한 Trigger frame에 의해 poll 된 STA는 virtual CS에서 NAV를 고려한다.

<120> - NAV가 Trigger frame을 보낸 AP가 보낸 frame에 의해 셋팅되었을 때

<121> - STA가 보낼 response가 Ack frame이나 BlockAck frame을 포함하고 HE trigger-based PPDU의 duration이 TBD 값보다 작을 때

<122> - NAV가 intra-BSS STA가 보낸 frame에 의해 셋팅되었을 때

<123> - Trigger frame의 CS Required subfield가 0일 때

<124> - 그 외 TBD 조건

<126> 도 7은 본 발명의 일 실시예에 따른 BSS color collision이 발생한 경우 프레임 교환을 나타낸 도면이다.

<127> 도 7을 참조하면 STA는 Inter-BSS 프레임을 수신하고 Inter-BSS 프레임의 BSS color가 Intra-BSS와 같기 때문에 Intra-NAV 셋팅을 할 수 있다. 예를 들면 수신한 프레임이 SU UL PPDU이거나 MU PPDU인데 STA가 디코딩해야할 STA의 own STAID나 broadcast ID, multicast ID를 포함하고 있지 않거나 Trigger-based PPDU인 경우에 STA는 그 프레임이 자신에게 오는 프레임이 아니라고 판단하고 MAC decoding을 하지 않거나 MAC decoding을 할 수 없어서 HE-SIG-A의 TXOP Duration 필드로부터 NAV 셋팅을 할 수 있다. 그런데 수신한 프레임이 실제로는 Inter-BSS 프레임이지만 Inter-BSS가 같은 BSS color를 사용하기 때문에 수신한 프레임을 Intra-BSS 프레임으로 판단하는 경우가 발생할 수 있다. 그러한 경우에 two NAVs를 사용하는 STA의 경우에 Inter-BSS 프레임으로부터 Intra-NAV를 셋팅할 수 있다. 그러한 상태

에서 STA가 Intra-BSS AP로부터 그 STA를 트리거하는 Trigger frame을 수신한 경우 셋팅되어있는 NAV가 intra-BSS STA가 보낸 frame에 의해 셋팅된 것이라 판단할 수 있기 때문에 Trigger frame에 NAV를 고려하지 않고 Trigger frame에 응답할 수 있고, 그러한 경우에 OBSS에 interference를 유발할 수 있다.

<129> 도 8은 본 발명의 일 실시예에 따른 BSS color collision을 인지한 이후 프레임 교환을 나타낸 도면이다.

<130> 도 8을 참조하면 도 7에서 언급한 문제를 해결하기 위해 STA는 Inter-BSS frame으로부터 regular NAV(또는 inter-BSS NAV 또는 non-intra-BSS NAV)를 셋팅할 수 있다.

<131> 일 실시예로 STA가 BSS color collision을 인지한 후에 STA는 수신한 프레임의 BSS color가 Intra-BSS의 BSS color와 같을 때 HE-SIG-A의 TXOP Duration에 기반하여 Intra-BSS NAV를 업데이트하지 않을 수 있다. 또는 STA가 BSS color collision을 인지한 후에 STA는 수신한 프레임이 Intra-BSS인지 Inter-BSS인지 판단할 수 없을 때 HE-SIG-A의 TXOP Duration에 기반하여 Intra-BSS NAV를 업데이트하지 않을 수 있다. BSS color collision을 인지한 후에는 수신한 PPDU의 BSS color가 Intra-BSS의 BSS color와 같을 때 수신한 프레임이 Intra-BSS 프레임인지 Inter-BSS 프레임인지 HE-SIG-A 정보만 가지고 판단할 수 없게 된다. 이러한 경우에 STA가 BSS color collision을 인지한 이후 도면과 같이 Intra-BSS와 같은 BSS color를 쓰는 frame을 수신한 경우에 HE-SIG-A의 TXOP Duration에 기반하여

regular NAV를 업데이트할 수 있다. 이때 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 업데이트하는 것은 MAC decoding을 할 수 없을 때로 제한할 수도 있다. Regular NAV가 셋팅되어 있는 때에 Intra-BSS AP로부터 Trigger frame을 수신하게 되면 NAV가 Intra-BSS의 프레임에 의해 셋팅되었다고 판단하지 않게 되고 NAV를 고려할 수 있다. 그리고 OBSS에 interference를 주지 않을 수 있게 된다.

<132> 또는 BSS color collision을 인지한 후에 STA는 RXVECTOR parameter BSS_COLOR 값에 따라 doze state로 들어가지 않을 수 있다.

<133> 또한 STA가 BSS color collision을 인지한 후에 STA가 수신한 프레임의 BSS color가 Intra-BSS의 BSS color와 같을 때 MAC decoding을 계속할 수 없는 경우에 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 업데이트할 수 있다.

<134> 또한 STA가 BSS color collision을 인지한 후에 STA가 수신한 프레임의 BSS color가 Intra-BSS의 BSS color와 같을 때 MAC decoding을 계속할 수 있는 경우에 MAC header의 MAC address에 기반하여 Intra-BSS NAV 또는 regular NAV를 업데이트할 수 있다.

<135> 또다른 실시예로 STA가 BSS color collision을 인지한 후에 STA는 같은 BSS color에 기반한 operation들을 하지 않을 수 있다.

<136> 또다른 실시예로 STA가 BSS color collision을 인지한 후에 STA는 BSS color에 기반한 operation들을 하지 않을 수 있다.

<138> 도 9는 본 발명의 일 실시예에 따른 BSS color collision이 발생한 경우 프레임 교환을 나타낸 도면이다.

<139> 도 9을 참조하면 STA는 Inter-BSS 프레임을 수신하고 Inter-BSS 프레임의 BSS color가 Intra-BSS와 같기 때문에 regular NAV 셋팅이 안될 수 있다. 예를 들면 수신한 프레임이 SU UL PPDU이거나 MU PPDU인데 STA가 디코딩해야할 STA의 own STAID나 broadcast ID, multicast ID를 포함하고 있지 않거나 Trigger-based PPDU인 경우에 STA는 그 프레임이 자신에게 오는 프레임이 아니라고 판단하고 MAC decoding을 하지 않거나 MAC decoding을 할 수 없게 되고 HE-SIG-A의 TXOP Duration 필드에 기반하여 NAV 셋팅을 할 수 있다. 그런데 수신한 프레임이 실제로는 Inter-BSS 프레임이지만 Inter-BSS가 같은 BSS color를 사용하기 때문에 수신한 프레임을 Intra-BSS 프레임으로 판단하는 경우가 발생할 수 있다. 그러한 경우에 two NAVs를 사용하는 STA의 경우에 Inter-BSS 프레임으로부터 regular NAV 셋팅이 안될 수 있다. 도면을 참조하면 Intra-BSS STA가 Intra-BSS NAV를 셋팅할 수 있다. Intra-BSS NAV가 셋팅되어 있을 때 STA가 Inter-BSS frame을 수신하고 그 수신한 프레임의 BSS color가 Intra-BSS의 BSS color와 같으면 수신한 프레임을 Intra-BSS로 판단하고 regular NAV를 셋팅하지 않을 수 있다(수신한 프레임의 TXOP Duration이 더 길면 Intra-BSS NAV를 업데이트하거나 수신한 프레임의 TXOP Duration이 더 짧으면 Intra-BSS NAV 업데이트를 하지 않을 수 있다.). 그러한 상태에서 STA가 Intra-BSS에서 보낸 CF-End를 수신하면 Intra-BSS NAV 를 리셋할 수 있다. 그러면 STA는 OBSS에 interference를 유발할 수 있다.

<141> 도 10은 본 발명의 일 실시예에 따른 BSS color collision을 인지한 이후 프레임 교환을 나타낸 도면이다.

<142> 도 10을 참조하면 도 8에서 언급한 문제를 해결하기 위해 STA는 Inter-BSS frame으로부터 regular NAV(또는 inter-BSS NAV 또는 non-intra-BSS NAV)를 셋팅할 수 있다.

<143> 일 실시예로 STA가 BSS color collision을 인지한 후에 STA는 수신한 프레임의 BSS color가 Intra-BSS의 BSS color와 같을 때 HE-SIG-A의 TXOP Duration에 기반하여 Intra-BSS NAV를 업데이트하지 않을 수 있다. 또는 STA가 BSS color collision을 인지한 후에 STA는 수신한 프레임이 Intra-BSS인지 Inter-BSS인지 판단할 수 없을 때 HE-SIG-A의 TXOP Duration에 기반하여 Intra-BSS NAV를 업데이트하지 않을 수 있다. BSS color collision을 인지한 후에는 수신한 PPDU의 BSS color가 Intra-BSS의 BSS color와 같을 때 수신한 프레임이 Intra-BSS 프레임인지 Inter-BSS 프레임인지 HE-SIG-A 정보만 가지고 판단할 수 없게 된다. 이러한 경우에 STA가 BSS color collision을 인지한 이후 도면과 같이 Intra-BSS와 같은 BSS color를 쓰는 frame을 수신한 경우에 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 업데이트할 수 있다. 이때 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 업데이트하는 것은 MAC decoding을 할 수 없을 때로 제한할 수도 있다. Regular NAV가 셋팅되어 있는 때에 regular NAV가 Intra-BSS의 프레임에 의해 셋팅되었다고 판단하지 않게 되고 Intra-BSS STA로부터 CF-End를 수신하게 되면

regular NAV를 리셋하지 않을 수 있다(Intra-BSS NAV도 셋팅되어있는 경우에는 Intra-BSS NAV만 리셋할 수 있다.). 그리고 OBSS에 interference를 주지 않을 수 있게 된다.

<144> 또한 STA가 BSS color collision을 인지한 후에 STA가 수신한 프레임의 BSS color가 Intra-BSS의 BSS color와 같을 때 MAC decoding을 계속할 수 없는 경우에 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 업데이트할 수 있다.

<145> 또한 STA가 BSS color collision을 인지한 후에 STA가 수신한 프레임의 BSS color가 Intra-BSS의 BSS color와 같을 때 MAC decoding을 계속할 수 있는 경우에 MAC header의 MAC address에 기반하여 Intra-BSS NAV 또는 regular NAV를 업데이트 할 수 있다.

<146> 도면을 추가 설명하면 BSS color collision을 인식한 후에 STA가 Intra-BSS frame을 수신하면 BSS color만 보고서는 Intra-BSS 인지 Inter-BSS 인지 판단할 수 없게 된다. 그러한 경우 STA는 Intra-BSS NAV 또는 regular NAV를 설정하게 된다. 예를 들면 수신한 프레임의 MAC을 decoding할수 있거나 해야하는 경우 MAC header의 MAC address를 확인하여 Intra-BSS로 판단하고 Duration 필드에 기반하여 Intra-BSS NAV를 설정할 수 있고, MAC을 decoding할 수 없거나 할 필요가 없는 경우 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 설정할 수 있다. 이러한 상태에서 Intra-BSS와 같은 BSS color를 사용하는 Inter-BSS frame을 수신하면 MAC을 디코딩할 수 없거나 할 필요가 없는 경우에 수신한 프레임을 Intra-BSS라고 판단할 수 없으므로 regular NAV를 셋팅하거나 기존에 있던 regular NAV를 업데이트

하거나 TXOP Duration이 기존에 있던 regular NAV보다 짧아서 업데이트하지 않을 수 있다. 즉, regular NAV가 남아있게 된다. 이러한 상태에서 Intra-BSS로부터 CF-End를 수신해도 그 CF-End가 regular NAV를 리셋하지는 못할 수 있다. 따라서 OBSS에 interference를 주지 않게 된다.

<147> 또다른 실시예로 STA가 BSS color collision을 인지한 후에 STA는 같은 BSS color에 기반한 operation들을 하지 않을 수 있다.

<148> 또다른 실시예로 STA가 BSS color collision을 인지한 후에 STA는 BSS color에 기반한 operation들을 하지 않을 수 있다.

<150> 또다른 실시예로 NAV가 Intra-BSS에 의해 셋팅되었는지 Inter-BSS에 의해 셋팅되었는지 판단할 수 없는 경우에 CF-End를 수신하면 그 NAV를 리셋하지 않을 수 있다.

<151> 또는 NAV가 Intra-BSS에 의해 셋팅되었는지 Inter-BSS에 의해 셋팅되었는지 판단할 수 없는 경우에 Inter-BSS로부터 CF-End를 수신하면 그 NAV를 리셋하지 않을 수 있다.

<153> 본 발명의 일 실시예에 따르면 CF-End 프레임을 수신하는 HE STA는 다음의 경우에 그것의 NAV를 리셋하지 않을 수 있다.

<154> - CF-End가 STA가 association된 BSS나 association된 BSS가 속한 multi-

BSSID set의 any BSS로부터 오지 않았고, 가장 최근의 NAV가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 온 PPDU에 의해 셋팅되었을 때

<155> - CF-End가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 왔고, 가장 최근의 NAV가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 오지 않은 PPDU에 의해 셋팅되었을 때

<156> - 가장 최근의 NAV가 Intra-BSS에 의해 셋팅되었는지 Inter-BSS에 의해 셋팅되었는지 판단할 수 없을 때

<158> 또한 본 발명의 일 실시예에 따르면 CF-End 프레임을 수신하는 HE STA는 다음의 경우에 그것의 NAV를 리셋하지 않을 수 있다.

<159> - CF-End가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 오지 않았고, 가장 최근의 NAV가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 온 PPDU에 의해 셋팅되었을 때

<160> - CF-End가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 왔고, 가장 최근의 NAV가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 오지 않은 PPDU에 의

해 셋팅되었을 때

<161> - CF-End가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 오지 않았고, 가장 최근의 NAV가 Intra-BSS에 의해 셋팅되었는지 Inter-BSS에 의해 셋팅되었는지 판단할 수 없을 때

<163> 도 11은 본 발명의 일 실시예에 따른 BSS color collision 감지 과정을 나타낸 도면이다.

<164> 도 11을 참조하면 STA는 패킷 수신 과정에서 BSS color collision 을 감지할 수 있다. 일 실시예로 STA는 패킷 수신 과정에서 MAC decoding을 할 수 있고 BSS color collision이 발생한 경우 MAC header의 MAC address로부터 BSS color collision을 감지할 수 있다.

<165> 예를 들면 STA가 HE SU PPDU를 수신한 경우, L-SIG signaling을 통해 SU PPDU임을 판단하거나 L-SIG signaling과 HE-SIG-A의 modulation을 통해 extended range SU PPDU임을 판단할 수 있다. 그리고 HE-SIG-A의 BSS color 가 Intra-BSS의 BSS color와 같고 UL/DL flag가 DL을 가리키고 있는 경우 디코딩을 계속할 수 있다. HE-SIG-A의 BSS color 가 Intra-BSS의 BSS color와 같고 UL/DL flag가 UL을 가리키고 있는 경우 디코딩을 계속할 수도 있고 계속하지 않을 수도 있다. 디코딩을 계속하는 경우 MAC header의 MAC address 필드가 2개 이상 있는 경우 이 중 적어도 하나가 자신이 속한 BSSID나 자신이 속한 BSS가 속한 multi-BSSID set의

BSSID가 아닌 경우 BSS color collision이 발생한 것으로 판단할 수 있다.

<166> 또다른 예를 들면 STA가 HE MU PPDU를 수신한 경우, L-SIG signaling과 HE-SIG-A의 modulation을 통해 MU PPDU임을 판단할 수 있다. 그리고 HE-SIG-A의 BSS color가 Intra-BSS의 BSS color와 같고, HE-SIG-B에서의 STAID가 STA가 수신해야할 STAID(STA의 own STAID나 broadcast/multicast STAID)를 포함하고 있는 경우 디코딩을 계속할 수 있다. 디코딩을 계속하는 경우 MAC header의 MAC address 필드가 2개 이상 있는 경우 이 중 적어도 하나가 자신이 속한 BSSID나 자신이 속한 BSS가 속한 multi-BSSID set의 BSSID가 아닌 경우 BSS color collision이 발생한 것으로 판단할 수 있다.

<168> 본 발명의 일 실시예로 STA가 BSS color collision을 인지하거나 BSS color collision을 피할 수 없음을 인지하면 BSS color 값으로 특정 reserve된 값, 예를 들면 0,을 사용할 수 있다. 또한 BSS color 0값으로 셋팅되어있는 프레임을 수신하는 intended recipient는 BSS color collision이나 BSS color collision을 피할 수 없음을 보고받은 것으로 할 수 있다.

<170> 본 발명의 일 실시예로 PPDU를 수신하는 STA가 BSS color 기반 operation을 하지 않도록 BSS color 값으로 특정 reserve된 값, 예를 들면 0,을 사용할 수 있다. 또한 이러한 BSS color 값을 사용하는 PPDU를 전송하기 위한 채널 엑세스 동

작에서는 기존의 채널 엑세스(또는 Color code based CCA가 아닌 채널 엑세스 또는 detected frame이 intra-BSS frame인지 아닌지를 구분하여 다른 CCA level을 적용하지 않는 채널 엑세스)를 할 수 있다. 또한 Legacy PPDU를 전송할 때 PPDU를 수신하는 STA가 수신한 프레임이 intra-BSS인지 아닌지에 따른 operation을 하지 않도록 하는 시그날링을 포함시킬 수 있다. 예를 들면 MAC address의 BW signaling 기법을 사용할 수 있다. 또는 MAC header에서 기존에 특정 frame에서 고정된 값을 사용하거나 reserved인 필드를 사용하여 시그날링할 수 있다.

<172> 도 12는 본 발명의 일 실시예에 따른 CTS frame 또는 Ack frame의 MAC 포맷을 나타낸 도면이다.

<173> 도 12를 참조하면 CTS, Ack 프레임은 Frame Control, Duration, RA, FCS로 이루어질 수 있다. 또한 Frame Control, Duration, RA, FCS 각 필드는 2, 2, 6, 4 바이트로 이루어질 수 있다. 또한 본 실시예에서 Frame Control, Duration, RA 필드가 MAC Header일 수 있다. 도 12를 참조하면 CTS 또는 Ack 프레임의 address 필드는 1개일 수 있다. 본 발명의 일 실시예에 따르면 RTS frame의 응답으로 보내지는 CTS frame의 경우에 RA 필드는 RTS frame의 TA 필드를 Individual/Group bit를 0으로 하여 셋팅할 수 있다. 또한 CTS frame이 frame exchange의 첫번째 프레임인 경우에 RA 필드는 transmitter의 MAC address로 셋팅할 수 있다. 또한 Ack frame의 RA 필드는 Ack frame 바로 이전의 individually addressed Data, Management, BlockAckReq, BlockAck, 또는 PS-Poll 프레임의 Address 2 필드로부터

nonbandwidth signaling TA 값으로 셋팅할 수 있다. 또한 RA 값을 수신자의 MAC address으로 셋팅할 수 있다.

<175> 도 13은 본 발명의 일 실시예에 따른 NAV 셋팅을 나타낸 도면이다.

<176> 앞서 설명한 것과 같이 STA는 다수의 NAV를 사용할 수 있고, 예를 들면 Intra-BSS NAV와 Regular NAV를 사용할 수 있다. 또한 도 13을 참조하면 STA가 MAC Header에 Address 필드가 1개만 있는 프레임을 수신한 경우 실제 그 프레임이 Intra-BSS 프레임이지만 그 프레임에 의해 Regular NAV를 설정할 수 있다. 또는 1개의 NAV를 사용하는 경우엔 마지막 설정된 NAV가 Intra-BSS frame에 의한 것이 아니라고 판단할 수 있다. 이하에 NAV를 설정할 수 있다고 기술한 것은 설정해야 하는 값으로 받은 길이가 현재 설정되어 있는 해당 NAV의 길이보다 길 때를 의미할 수 있다. 예를 들어 CTS frame 또는 Ack frame의 Address 필드가 1개만 있을 수 있다. 예를 들면 Address 필드가 1개만 있는 프레임을 수신한 경우 그 Address 필드가 AP address 혹은 BSSID를 나타내고 있지 않아서 Intra-BSS 프레임으로 판단할 수 없고, 따라서 regular NAV를 설정할 수 있다. 또는 1개의 NAV를 사용하는 경우엔 NAV를 설정하고 그 NAV가 Intra-BSS frame에 의한 것이 아니라고 판단할 수 있다. 예를 들면 다운링크 CTS frame이 전송되는 경우, 그 프레임의 Address 필드에는 non-AP STA의 맥 어드레스가 적혀있을 수 있고, 이를 수신한 다른 STA는 그 프레임이 intra-BSS 프레임이라고 판단할 수 없을 수 있다. 그러한 경우 그 프레임에 의해 regular NAV를 설정할 수 있다. 또는 1개의 NAV를 사용하는 경우엔 NAV를 설

정하고 그 NAV가 Intra-BSS frame에 의한 것이 아니라고 판단할 수 있다. 또다른 예로 Address 필드가 1개만 있는 프레임의 경우 그 프레임이 intra-BSS 프레임인지 inter-BSS 프레임인지 판단할 수 없는 경우가 발생할 수 있기 때문에 Address 필드가 1개만 있는 프레임에 의해서는 Address 값에 상관없이 regular NAV를 설정하도록 정의할 수도 있다. 이러한 경우의 예를 들면 업링크 또는 다운링크의 CTS frame을 수신한 STA는 그 프레임에 의해 regular NAV를 설정할 수 있다. 또는 1개의 NAV를 사용하는 경우엔 NAV를 설정하고 그 NAV가 Intra-BSS frame에 의한 것이 아니라고 판단할 수 있다. 이하에 two NAVs를 사용하는 상황에서 설명한 부분은 이에 한정되지 않고 1개의 NAV를 사용하는 경우에도 적용될 수 있다. 예를 들어 intra-BSS NAV를 설정하는 것은 NAV를 설정하고 그 NAV가 Intra-BSS frame에 의한 것이라고 판단하는 것이라 할 수 있다. 또는 regular NAV를 설정하는 것은 NAV를 설정하고 그 NAV가 Intra-BSS frame에 의한 것이 아니라고 판단하는 것이라 할 수 있다.

<177> 도면을 참조하면 같은 BSS의 STA 1과 STA 2가 RTS/CTS frame 교환을 하고 있고, Intra-BSS STA 3은 그 RTS/CTS frame 교환 또는 프레임 교환의 일부를 수신할 수 있다. 예를 들면 Intra-BSS STA 3이 RTS frame을 수신한 경우 MAC Header의 address를 통해 그 프레임을 Intra-BSS 프레임으로 판단하고 Intra-BSS NAV를 설정할 수 있다. 또한 Intra-BSS STA 3이 CTS frame을 수신한 경우 위에서 설명한 것과 같이 그 프레임에 의해 regular NAV를 설정할 수 있다.

<178> 앞서 설명한 것처럼 CF-End를 수신했을 때 NAV reset하지 않을 수 있는 경우가 있고(Truncation of TXOP 부분), 예를 들어 intra-BSS STA 3이 intra-BSS CTS

프레임에 의해 regular NAV를 설정한 경우, NAV를 셋팅한 STA가 Intra-BSS의 STA이고 Intra-BSS STA가 전송한 CF-End를 수신했을지라도 regular NAV가 reset되지 않을 수 있다.

<179> 또다른 예로 Intra-BSS STA 3 이 RTS frame을 수신하지 못해서 Intra-BSS NAV가 셋팅되어 있지 않고, CTS frame을 수신해서 regular NAV가 셋팅된 경우, Inter-BSS의 CF-End 프레임을 수신하면 Regular NAV가 reset될 수 있고 Intra-BSS NAV가 설정되어 있지 않기 때문에 interference를 유발할 수 있다.

<180> 언급한 문제를 해결하기 위해 Address 필드가 1개 있는 프레임을 보낼 때 BSS identifier, 예를 들면 BSS Color,를 포함하는 새로운 포맷, 예를 들면 HE PPDU 포맷을 사용할 수 있지만 그러한 경우 새로운 포맷을 읽을 수 없는 레거시 STA의 경우에는 해당 프레임을 읽을 수 없는 문제가 발생할 수 있다.

<182> 도 14는 본 발명의 일 실시예에 따른 11a 패킷 구조를 나타낸 도면이다.

<183> 도 14를 참조하면 11a 패킷은 Short Training Field, Long Training Field, Signal Field, Data Field로 구성될 수 있다. 또한 Data Field는 Service 필드, PSDU, Tail 비트, 필요하면 Padding 비트를 포함할 수 있다. 이 중 Service Field는 Scrambler Initialization 비트를 포함할 수 있고, 이는 receiver에서 descrambler를 synchronize하는 데에 사용될 수 있다. 또한 Scrambler Initialization 비트는 7비트일 수 있고, Service Field의 B0부터 B6비트일 수 있

다. 또한 Service Field는 B0부터 전송될 수 있다. 또한 Service Field에서 Reserved 필드가 있을 수 있고, 예를 들면 Scrambler Initialization 비트를 제외한 나머지 9비트가 Reserved로 남아있을 수 있다. Reserved 필드는 0으로 셋팅될 수 있고, 수신자는 이 값을 무시할 수 있다.

<184> 본 발명의 일 실시예로 도 13에서 언급한 문제를 해결하기 위해 11a 패킷 또는 레거시 패킷에 BSS identifier를 포함할 수 있다. 이때 BSS identifier로는 BSS Color, 제 2의 BSS Color, partial BSS Color, BSSID의 일부, BSSID 또는 BSSID 일부로부터 산출할 수 있는 값 등이 포함될 수 있다. 또한 본 발명의 일 실시예에 따르면 BSS identifier를 시그날링하는 위치는 레거시 패킷의 reserved fields 혹은 reserved fields의 조합일 수 있다. 또한 reserved fields는 Signal field, Service field 등에 존재할 수 있고 하나 이상의 필드의 reserved field들을 BSS identifier를 나타내는데에 사용할 수 있다.

<186> 도 15는 본 발명의 일 실시예에 따른 레거시 패킷의 Service field 구성을 나타낸 도면이다.

<187> 도 15를 참조하면 패킷의 Data field의 Service field에 BSS identifier를 포함할 수 있다. 이때 BSS identifier로는 BSS Color, 제 2의 BSS Color, partial BSS Color, VHT PPDU에 BSS identifier를 넣기 위한 AID 할당 룰에 따라 할당하는 AID 비트, BSSID의 일부, BSSID 또는 BSSID 일부로부터 산출할 수 있는 값 등이 포함될 수 있다. 예를 들면 도 14에서 나타낸 것 같은 기존 Service field의

Reserved field를 BSS identifier를 나타내는 데에 사용할 수 있다. 이때 receiver는 reserved field의 값들을 무시할 수 있기 때문에 새로운 표준의 STA가 기존에 reserved 였던 필드를 다른 용도로 활용하더라도 레거시 STA에 끼치는 영향을 없을 수 있다. 도 15를 참조하면 레거시 패킷의 Service field의 B7부터 B12까지의 비트를 이용하여 6비트의 BSS Color를 나타낼 수 있다.

<188> 일 실시예로 도 14와 도 15에서 설명한 레거시 패킷 또는 레거시 패킷의 Service field에 BSS identifier 혹은 BSS Color 등을 넣는 방법은 해당 레거시 패킷이 전달하는 MAC frame의 Address 필드가 1개만 있는 경우에만 한정하지 않아서 모든 레거시 패킷에 BSS identifier를 넣을 수 있다. 따라서 이를 참조하여 해당 프레임이 Intra-BSS 프레임인지 아닌지 판단할 수 있다.

<189> 또다른 실시예로 도 14와 도 15에서 설명한 레거시 패킷 또는 레거시 패킷의 Service field에 BSS identifier 혹은 BSS Color 등을 넣는 방법은 해당 레거시 패킷이 전달하는 MAC frame의 Address 필드가 1개만 있는 경우에만 사용하여 이 방법을 사용하지 않는 프레임에 대해 기존의 Reserved field를 최대한 유지시킬 수 있고 미래에 사용을 위해 남겨둘 수 있다.

<191> 도 16은 본 발명의 일 실시예에 따른 NAV 셋팅을 나타낸 도면이다.

<192> 도 16을 참조하면 MAC Header의 Address 필드가 1개만 있는 패킷을 수신한 경우라도 Intra-BSS 프레임인지 Inter-BSS 프레임인지 확인할 수 있고, 이에 따라

Intra-BSS NAV 또는 regular NAV를 올바로 설정할 수 있다. 또는 설정된 NAV가 intra-BSS 프레임에 의한 것인지 아닌지 올바로 판단할 수 있다. 본 발명의 일 실시예에 따르면 도 13에서 설명한 문제를 해결하기 위해 도 14와 도 15에서 설명한 방법을 사용할 수 있고, 그러한 경우 레거시 포맷으로 전송되는 프레임을 수신하여 기존에는 intra-BSS 프레임인지 inter-BSS 프레임인지 판단할 수 없었던 상황에서도 레거시 패킷에 포함된 BSS identifier를 참조하여 intra-BSS 프레임인지 inter-BSS 프레임인지를 올바로 판단할 수 있고, 이에 따라 Intra-BSS NAV 혹은 regular NAV를 올바로 설정할 수 있다.

<193> 예를 들어 STA 1과 STA 2가 RTS/CTS frame exchange를 하는 경우에 Intra-BSS STA 3이 CTS Frame을 수신한 경우 CTS Frame이 레거시 패킷 포맷으로 전송되는 경우에도 BSS identifier를 참조하여 그 프레임을 Intra-BSS 프레임으로 판단할 수 있다. 즉, intra-BSS CTS frame에 의해 regular NAV를 셋팅하지 않을 수 있다. 또는 1개의 NAV를 사용하는 경우엔 NAV를 설정하고 그 NAV가 Intra-BSS frame에 의한 것이라고 판단할 수 있다. 따라서 이러한 상황에서 intra-BSS STA가 보낸 CF-End 프레임을 수신한 경우 NAV reset을 할 수 있다. 또한 inter-BSS STA가 보낸 CF-End 프레임을 수신한 경우 그 프레임에 의해 NAV reset이 되지 않을 수 있다.

<195> 도 17은 본 발명의 일 실시예에 따른 VHT-SIG-A의 Partial AID 및 Group ID 셋팅을 나타낸 표이다.

<196> 도 17을 참조하면 VHT-SIG-A의 Partial AID와 Group ID를 다음과 같이 셋팅

할 수 있다. AP로 향하는 PPDU 또는 PSDU인 경우에 Partial AID로 BSSID[39:47]을 사용할 수 있다. 또한 Group ID는 0으로 셋팅할 수 있다.

<197> 또한 Mesh STA로 향하는 PPDU 또는 PSDU인 경우에 Partial AID로 RA[39:47]을 사용할 수 있다. 또한 Group ID는 0으로 셋팅할 수 있다.

<198> 또한 AP가 보내고 그에 association된 STA로 향하는 PPDU 또는 PSDU인 경우에 Partial AID로

<199> (dec(AID[0:8]) + dec(BSSID[44:47] XOR BSSID[40:43]) * 2^5) mod 2^9

<200> 을 사용할 수 있다. XOR은 bitwise exclusive OR operation을, mod X는 X-modulo operation을, dec(A[b:c])은 the cast to decimal operator where b is scaled by 2^0 and c by 2^(c-b)을 나타낼 수 있다. 또한 Group ID는 63으로 셋팅할 수 있다.

<201> 또한 DLS STA 또는 TDLS STA가 direct path로 보내고 DLS STA 또는 TDLS STA로 향하는 PPDU 또는 PSDU인 경우에 Partial AID로

<202> (dec(AID[0:8]) + dec(BSSID[44:47] XOR BSSID[40:43]) * 2^5) mod 2^9

<203> 을 사용할 수 있다. XOR은 bitwise exclusive OR operation을, mod X는 X-modulo operation을, dec(A[b:c])은 the cast to decimal operator where b is scaled by 2^0 and c by 2^(c-b)을 나타낼 수 있다. 또한 Group ID는 63으로 셋팅할 수 있다.

<204> 또한 그 외의 경우엔 Partial AID을 0, Group ID를 63으로 셋팅할 수 있다.

<206> 도 18은 본 발명의 일 실시예에 따른 VHT SU DL PPDU 수신을 나타낸 도면이다.

<207> 본 발명의 일 실시예에 따르면 STA는 수신한 프레임이 intra-BSS 프레임인지 inter-BSS 프레임인지 판단하여 그에 따른 Spatial reuse, NAV setting, NAV resetting, intra-PPDU power save 동작 등을 할 수 있다. 예를 들어 수신한 프레임이 inter-BSS 프레임인 경우 특정 조건 하에서 기존 minimum receive sensitivity level 혹은 CCA threshold 보다 큰 OBSS PD level을 사용하여 CCA 할 수 있다. 또다른 예로 수신한 프레임이 intra-BSS 프레임인지 아닌지에 따라 NAV를 셋팅할 수 있고, 그 NAV를 intra-BSS 프레임 혹은 intra-BSS 프레임이 아닌 프레임에 의해 셋팅된 것으로 판단할 수 있다. 또다른 예로 STA가 수신한 프레임이 intra-BSS 프레임이고, 그 프레임이 자신이 대상 수신자인 프레임이 아닌 경우 STA는 doze state로 들어갈 수 있다. 또한 이때 doze state로 들어가는 기간은 수신한 프레임이 끝나는 시간까지일 수 있다.

<208> 일 실시예에 따르면 수신한 프레임의 BSS Color가 자신의 BSS Color와 같은 경우 수신한 프레임을 intra-BSS 프레임으로 판단할 수 있다. 또는 수신한 프레임의 MAC Header의 RA 또는 TA가 association된 BSSID 혹은 association된 BSSID의 bandwidth signaling variant와 같은 경우 수신한 프레임을 intra-BSS 프레임으로

판단할 수 있다. 또는 수신한 프레임의 MAC Header의 RA 또는 TA가 association된 BSSID와 같은 multiple BSSID set에 있는 BSSID 혹은 그 BSSID의 bandwidth signaling variant와 같은 경우 수신한 프레임을 intra-BSS 프레임으로 판단할 수 있다.

<209> 일 실시예에 따르면 AP가 프레임을 수신했을 때 수신한 프레임이 DL 프레임이면 그 프레임을 inter-BSS 프레임으로 판단할 수 있다. BSS Color 비트는 주변의 다른 BSS와 같은 값을 사용하게 될 수도 있으므로 inter-BSS 프레임으로 판단할 수 있는 경우의 프레임을 inter-BSS 프레임으로 판단하면 intra-/inter-BSS 프레임 판단을 더 정확히 할 수 있다. 예를 들면 주변 BSS가 같은 BSS Color를 사용하는 경우, AP가 수신한 프레임의 HE-SIG-A의 BSS Color 또는 VHT-SIG-A의 partial BSS color(또는 partial AID의 일부)가 자신의 BSS의 것과 일치하여 intra-BSS 프레임임을 나타내고 있다 하더라도, 해당 패킷이 DL 패킷인 것을 확인하면 수신한 프레임이 inter-BSS 프레임인 것으로 판단할 수 있다.

<210> 본 발명의 일 실시예에 따르면 AP가 VHT PPDU를 수신했는데 VHT-SIG-A의 Group ID 필드가 63으로 셋팅되어 있으면 해당 프레임을 inter-BSS 프레임으로 판단할 수 있다. 도 17에서 설명한 것과 같이 DL PPDU인 경우에 Group ID 필드가 63으로 셋팅될 수 있기 때문이다. 또다른 실시예로 DLS 또는 TDLS STA가 direct path로 DLS 또는 TDLS STA에 보내면서 Group ID 63을 셋팅하는 경우가 있을 수 있다면 AP는 해당 기능 또는 프로토콜의 사용 여부를 알 수 있고, DLS 또는 TDLS STA가 direct path로 DLS 또는 TDLS STA에 보내면서 Group ID로 63을 셋팅한 것이 아니라

고 판단할 수 있는 경우에만 Group ID 63 값을 통한 Inter-BSS 프레임 판단을 할 수도 있다. 도 18을 참조하면 Inter-BSS AP가 자신과 association된 VHT STA에 VHT PPDU를 송신할 수 있고, AP가 이것을 수신하게 되면 VHT PPDU에 해당 PPDU가 DL PPDU임이 시그날링될 수 있으므로 수신한 PPDU를 inter-BSS 프레임으로 판단할 수 있다. 또다른 실시예로 VHT PPDU의 Partial AID 값이 자신의 BSS에서는 있을 수 없는 값일 경우 해당 PPDU를 Inter-BSS 프레임으로 판단할 수 있다. 또는 VHT PPDU의 Group ID와 Partial AID 값의 조합으로 해당 PPDU가 Intra-BSS 프레임인지 Inter-BSS 프레임인지를 판단할 수 있다.

<211> 또다른 예로 AP가 VHT MU PPDU를 수신한 경우 수신한 프레임을 inter-BSS 프레임으로 판단할 수 있다. VHT MU PPDU는 다운링크만 존재하기 때문에 AP가 수신한 경우 inter-BSS 프레임으로 판단할 수 있다. 일 실시예에 따르면 해당 프레임이 VHT PPDU인 것은 auto detection method로 알 수 있고, VHT-SIG-A의 Group ID가 0 또는 63이 아닌 경우 해당 프레임이 MU PPDU라는 것을 알 수 있다.

<212> 또다른 예로 AP가 HE PPDU를 수신한 경우 HE-SIG-A의 UL/DL flag(혹은 UL flag) 값이 다운링크를 지시(예를 들면 0 값)하고 있으면 해당 PPDU를 inter-BSS 프레임으로 판단할 수 있다. 또다른 실시예로 AP가 HE PPDU를 수신한 경우 해당 PPDU가 DLS 또는 TDLS STA에게 보내지지 않은 것이라 판단할 수 있는 경우에 HE-SIG-A의 UL/DL flag(혹은 UL flag) 값이 다운링크를 지시(예를 들면 0 값)하고 있으면 해당 PPDU를 inter-BSS 프레임으로 판단할 수 있다. 또다른 실시예로 AP가 HE PPDU를 수신한 경우 해당 PPDU가 IBSS의 멤버인 STA에게 보내지지 않은 것이라 판

단할 수 있는 경우에 HE-SIG-A의 UL/DL flag(혹은 UL flag) 값이 다운링크를 지시(예를 들면 0 값)하고 있으면 해당 PPDU를 inter-BSS 프레임으로 판단할 수 있다. 일 실시예로 해당 PPDU가 DLS 또는 TDLS STA 또는 IBSS의 멤버인 STA에게 보내지지 않는 경우라는 것은 AP가 해당 기능이나 프로토콜의 사용 여부를 판단할 수 있으므로 알 수 있을 수 있다.

<213> 또다른 예로 AP가 자신이 trigger하지 않은 HE trigger-based PPDU를 수신한 경우 해당 PPDU를 inter-BSS 프레임으로 판단할 수 있다.

<215> 도 19는 본 발명의 일 실시예에 따른 HE-SIG-B 필드의 인코딩 구조(encoding structure), 구성를 나타낸 도면이다.

<216> HE MU PPDU는 프리앰블(preamble)에 HE-SIG-B 필드를 포함할 수 있고, HE-SIG-B 필드는 HE MU PPDU를 해석하는데에 필요한 정보들을 포함할 수 있다. 도 19(a)는 본 발명의 일 실시예에 따른 HE-SIG-B 필드의 인코딩 구조를 나타낸 도면인데, 이를 참조하면 HE-SIG-B 필드는 Common과 User-specific 블락으로 나누어진다. 또한 common 블락과 user-specific 블락들은 비트 도메인에서 나누어지며 20 MHz를 베이스로 인코딩될 수 있다. 이 중 Common 필드는 수신자가 되는 스테이션들이 PPDU를 받기 위해 공통으로 필요한 정보를 싣고 있을 수 있으며 그 정보로는 RU allocation 등이 있고 이를 통해 RU arrangement, MU-MIMO에서 사용자수 등을 알 수 있다. 또한 User-specific 필드는 common 필드에 속하지 않는 수신자가 되는 스테이들 각각에 따라 필요한 정보를 포함할 수 있다. Common 필드에서 RU

allocation 정보를 따라 할당된 유저 순서대로 user-specific 필드가 나열될 수 있다. User-specific 정보로는 STAID; 한 RU에 싱글 유저가 할당된 경우 NSTS (Number of Spatial Streams), TxBF (transmit beamforming), MCS (Modulation and Coding Scheme), DCM (Dual Sub-Carrier Modulation) and Coding (Use of LDPC); 한 RU에 다수의 유저가 할당된 경우 Spatial Configuration Fields, MCS, DCM and Coding 등이 포함될 수 있다. User-specific 정보는 하나 이상의 Per-user 정보(또는 User Block)를 포함할 수 있다. Common 필드가 BCC 블락 하나를 이루고 user-specific 필드는 유저 2명에 대한 필드가 BCC 블락 하나를 이루며 가장 마지막 블락은 유저 1명에 대한 필드가 BCC 블락 하나를 이룰 수 있다. 각 BCC 블락마다 CRC와 Tail 비트가 포함될 수 있다. 그리고 HE-SIG-B 마지막에는 OFDM 심볼 바운더리(boundary)에 따라 패딩(Padding)이 붙을 수 있다.

<217> 도 19 (b)는 본 발명의 일 실시예에 따른 40MHz 이상의 대역폭을 사용할 경우 HE-SIG-B의 구성을 나타낸 도면인데, 이를 참조하면 HE-SIG-B는 20MHz 단위로 2개의 콘텐츠(HE-SIG-B content channel 1 and HE-SIG-B content channel 2)로 구성될 수 있다. 도면에서 각 사각형은 20MHz 서브밴드를 나타내고 있고, 1, 2는 각각 다른 정보를 포함할 수 있다. 40MHz, 80MHz, 160MHz에서 HE-SIG-B는 도면과 같이 1, 2가 반복되는 구조를 갖고 있을 수 있다. 각 20MHz의 HE-SIG-B는 해당 20MHz 밴드를 이용하는 RU에 대한 common, user-specific 필드를 포함할 수 있다. HE-SIG-B는 각 20MHz에서 최대 2개의 서로 다른 컨텐츠를 가질 수 있으므로 그 2개의 HE-SIG-B를 디코딩할 수 있으면 전체 대역폭의 MU PPDU 구성에 대한 정보를 알 수 있

다.

<218> 본 발명의 일 실시예에 따르면 User-specific 필드의 STAID는 해당 Per-user content를 보고 해당 RU를 디코딩해야하는 STA 를 지시하는 데에 쓰일 수 있다. 해당 RU가 어느 한 STA에 addressed 되어 있으면 STAID는 해당 STA의 AID로 셋팅될 수 있다. 또한 single BSS AP인 경우에(multiple BSSID를 사용하지 않는 경우에) 해당 RU를 여러 STA가 받아야 하는 경우, 즉 broadcast인 경우 STAID는 0 값으로 셋팅될 수 있다. 또한 multiple BSS AP인 경우에(multiple BSSID를 사용하는 경우에) 해당 RU가 multiple BSS 중 하나의 BSS에만 broadcast하는 경우에 STAID는 multiple BSSID TIM operation을 따라 group addressed AID assignment 방법으로 할당된 AID 값으로 셋팅될 수 있다. 예를 들면 multiple BSSID set의 BSSID(0)부터 BSSID(N-1)까지가 AID 0부터 (N-1)에 해당할 수 있고 그 값을 이용해 해당 BSS에 broadcast할 수 있다. 또한 multiple BSS AP인 경우에(multiple BSSID를 사용하는 경우에 해당 RU가 multiple BSS 모두에 broadcast하는 경우에 STAID는 어떤 특정한 값, 예를 들면 group addressed AID assignment 방법으로 할당되지 않는 AID 값 중에서 셋팅될 수 있고, 예를 들면 2047 값으로 셋팅될 수 있다.

<219> 본 발명의 일 실시예에 따르면 하나의 HE MU PPDU에 한개 이상의 BSS 또는 STA에 broadcast(또는 groupcast, multicast) 되는 RU 다수개와 특정 STA에 unicast 되는 RU가 공존할 수 있다. 그러한 경우에 HE MU PPDU를 수신하는 STA가 자신에게 해당하는 RU를 올바로 찾아 디코딩할 수 있어야 한다. 일 실시예로 STA가 HE MU PPDU를 수신했을 때 HE-SIG-B의 Per user 정보들이 나타내는 STAID 중 STAID

가 나타내는 그룹(1개 이상의 STA의 집합)의 hierarchy에 따라 적은 범위의 STA를 나타내는 STAID부터 찾아나가고 그러한 STAID가 존재할 때 해당 RU를 디코딩할 수 있다. 예를 들어 그룹1 < 그룹2 < ... < 그룹n 인 경우(그룹x < 그룹y: 그룹x가 그룹y에 포함됨을 나타냄), HE-SIG-B의 Per user 정보들의 STAID 중에서 다음 순서(우선 순위)에 의해 디코딩할 RU를 찾을 수 있다. 1) 그룹1의 STAID 2) 그룹2의 STAID ... n) 그룹n의 STAID.

<220> 본 발명의 일 실시예에 따르면 multiple BSSID를 사용하는 경우에 하나의 HE MU PPDU에 다수의 BSS에 broadcast(또는 groupcast, multicast) 되는 RU와 하나의 BSS에 broadcast(또는 groupcast, multicast) 되는 RU와 특정 STA에 unicast 되는 RU가 공존할 수 있다. 그러한 경우에 HE MU PPDU를 수신하는 STA가 자신에게 해당하는 RU를 올바로 찾아 디코딩할 수 있어야 한다.

<221> 따라서 본 발명의 일 실시예에 따르면 STA가 HE MU PPDU를 수신했을 때 HE-SIG-B의 Per user 정보들이 나타내는 STAID 중

<222> 1) 자신의 AID에 해당하는 것이 있으면 해당 Per user 정보에 따라 해당 RU를 디코딩할 수 있다.

<223> 2) 또한 자신의 AID에 해당하는 것이 없고, 자신이 association된 BSS에 broadcast하는 AID(STAID) 값에 해당하는 것이 있으면 해당 Per user 정보에 따라 해당 RU를 디코딩할 수 있다.

<224> 3) 또한 자신의 AID에 해당하는 것이 없고, 자신이 association된 BSS에

broadcast하는 AID(STAID) 값에 해당하는 것이 없고, 모든 BSS에 broadcast하는 AID(STAID) 값에 해당하는 것이 있으면 해당 Per user 정보에 따라 해당 RU를 디코딩할 수 있다.

<225> 4) 또한 자신의 AID에 해당하는 것이 없고, 자신이 association된 BSS에 broadcast하는 AID(STAID) 값에 해당하는 것이 없고, 모든 BSS에 broadcast하는 AID(STAID) 값에 해당하는 것이 없으면 디코딩해야하는 RU가 없는 것으로 판단할 수 있다.

<226> 위 단계는 위에서 설명한 STAID 설정 룰에 따라 설명하였지만 본 발명은 이에 한정되지 않고, AID(STAID) broadcast에 그룹 개념이 들어간 경우, 그룹의 hierarchy에 따라 위 단계를 확장할 수 있다. 예를 들면 모든 BSS에 broadcast하는 것은 아니지만 다수의 BSS에 broadcast하는 AID(STAID)가 존재하는 경우, 위 단계의 2), 3) 사이에 자신이 속한 그러한AID(STAID)가 있는지 확인하고 있다면 해당 RU를 디코딩할 수 있다. 또다른 예로 하나의 BSS나 다수의 BSS에 broadcast하는 것은 아니지만 다수의 STA에 broadcast하는 AID(STAID)가 존재하는 경우, 위 단계의 1), 2) 사이에 그 AID(STAID)가 있는지 확인하고 있다면 해당 RU를 디코딩할 수 있다. 또한 이 개념은 더 많은 단계로 확장될 수 있다.

<227> 본 발명의 일 실시예에 따르면 multiple BSSID를 사용하는 않는 경우에 하나의 HE MU PPDU에 모든 STA에 broadcast(또는 groupcast, multicast) 되는 RU와 모든 STA가 아닌 다수의 STA에 broadcast(또는 groupcast, multicast) 되는 RU와 특정 STA에 unicast 되는 RU가 공존할 수 있다. 그러한 경우에 HE MU PPDU를 수신하

는 STA가 자신에게 해당하는 RU를 올바로 찾아 디코딩할 수 있어야 한다.

<228> 따라서 본 발명의 일 실시예에 따르면 STA가 HE MU PPDU를 수신했을 때 HE-SIG-B의 Per user 정보들이 나타내는 STAID 중

<229> 1) 자신의 AID에 해당하는 것이 있으면 해당 Per user 정보에 따라 해당 RU를 디코딩할 수 있다.

<230> 2) 또한 자신의 AID에 해당하는 것이 없고, 자신이 속한 그룹에 broadcast(또는 groupcast, multicast)하는 AID(STAID) 값에 해당하는 것이 있으면 해당 Per user 정보에 따라 해당 RU를 디코딩할 수 있다.

<231> 3) 또한 자신의 AID에 해당하는 것이 없고, 자신이 속한 그룹에 broadcast(또는 groupcast, multicast)하는 AID(STAID) 값에 해당하는 것이 없고, 모든 STA에 broadcast하는 AID(STAID) 값에 해당하는 것이 있으면 해당 Per user 정보에 따라 해당 RU를 디코딩할 수 있다.

<232> 4) 또한 자신의 AID에 해당하는 것이 없고, 자신이 속한 그룹에 broadcast(또는 groupcast, multicast)하는 AID(STAID) 값에 해당하는 것이 없고, 모든 STA에 broadcast하는 AID(STAID) 값에 해당하는 것이 없으면 디코딩해야하는 RU가 없는 것으로 판단할 수 있다.

<233> 위 단계는 AID(STAID) broadcast에 그룹 개념이 들어간 경우를 이야기하고 있는데, 그룹의 hierarchy에 따라 위 단계를 확장할 수 있다. 예를 들면 STA 그룹2가 그룹1을 포함한다고 할 때, HE-SIG-B의 Per user 정보들의 STAID 중에서 다음

순서(우선 순위)에 의해 디코딩할 RU를 찾을 수 있다. 1) 자신의 AID 2) 그룹1의 AID(STAID) 3) 그룹2의 AID(STAID) 4) 모든 STA에 broadcast하는 AID(STAID). 또한 이 개념은 더 많은 단계로 확장될 수 있다.

<235> 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.

<236> 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 아는 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.

<237> 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】

<238> 100 : 스테이션

200 : 액세스 포인트

【특허청구범위】

【청구항 1】

무선랜을 위한 방법, 장치 및 시스템.

제출 일자 : 2016-05-11

【요약서】

【요약】

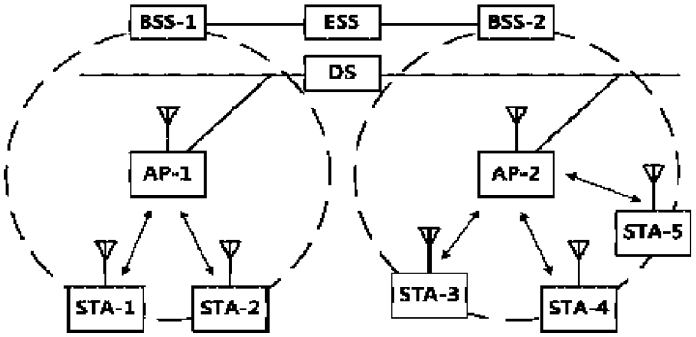
본 발명은 무선랜을 위한 장치, 시스템 및 무선랜 통신 방법에 관한 것으로, 본 발명의 실시예에 따르면 무선랜에서 BSS 컬러 충돌이 발생했을 때 잘못된 동작을 방지하기 위한 다양한 방법, 장치 및 시스템이 제공될 수 있다.

【대표도】

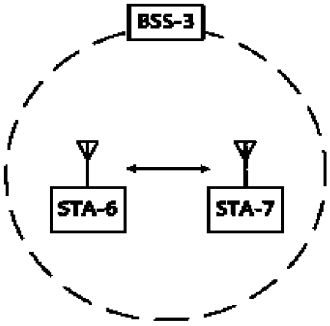
도 8

【도면】

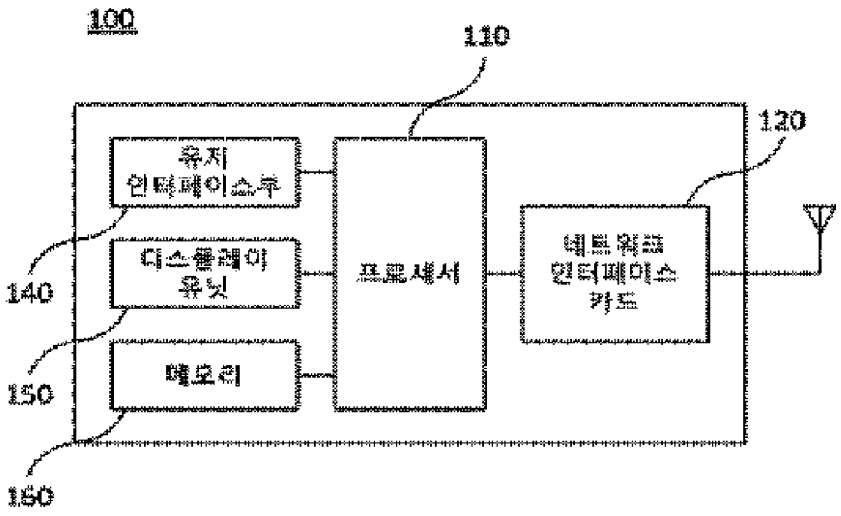
【도 1】


BSS-1
ESS
BSS-2
DS
AP-1
AP-2
STA-5
STA-1
STA-2
STA-3
STA-4

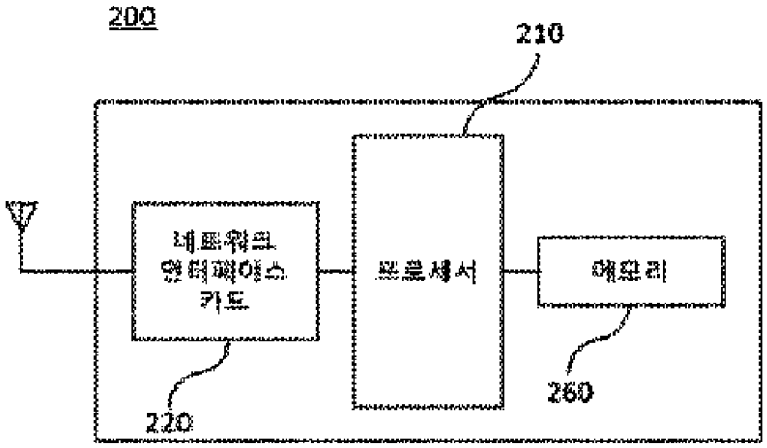
【도 2】


BSS-3
STA-6
STA-7

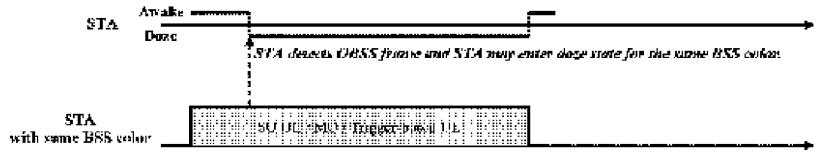
【도 3】


100
110
120
유저
인터페이스부
디스플레이
유닛
프로세서
네트워크
인터페이스
카드
메모리
140
150
160

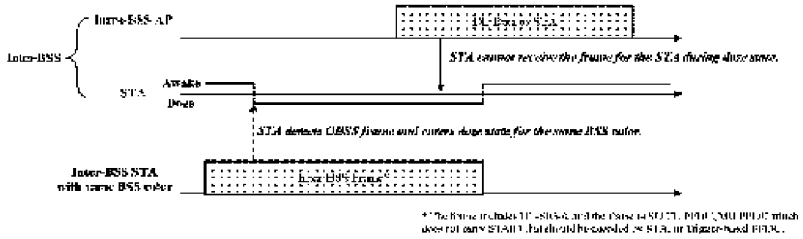
【도 4】


200
210
네트워크
인터페이스
카드
프로세서
메모리
220
260

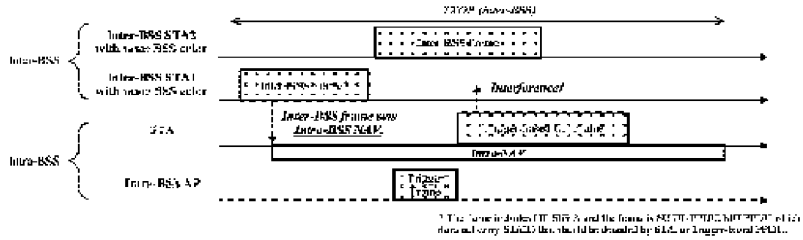
【도 5】


STA
Awake
Doze
STA with same BSS color

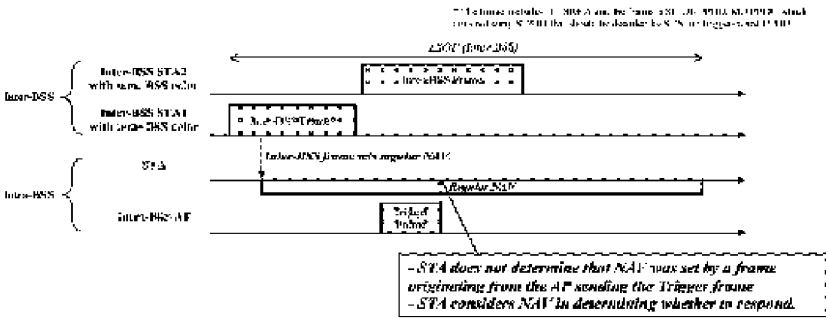
【도 6】


Intra-BSS
Intra-BSS AP
STA
Awake
Doze
Inter-BSS STA
with same BSS color

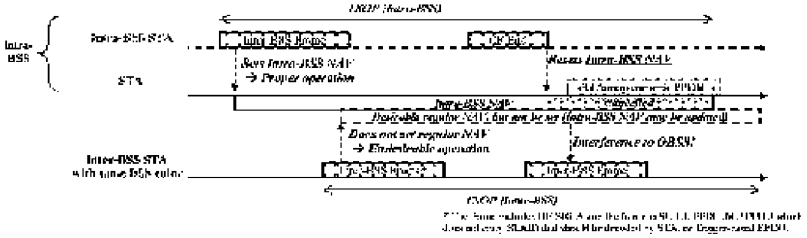
【도 7】


Intra-BSS
Inter-BSS STA2
with same BSS color
Inter-BSS STA1
with same BSS color
STA
Intra-BSS AP

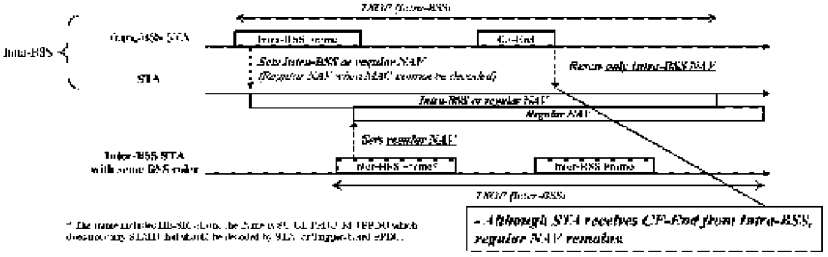
【도 8】


Inter-BSS
Intra-BSS
- STA does not determine that NAV was set by a frame originating from the AP sending the Trigger frame
- STA considers NAV in determining whether to respond.

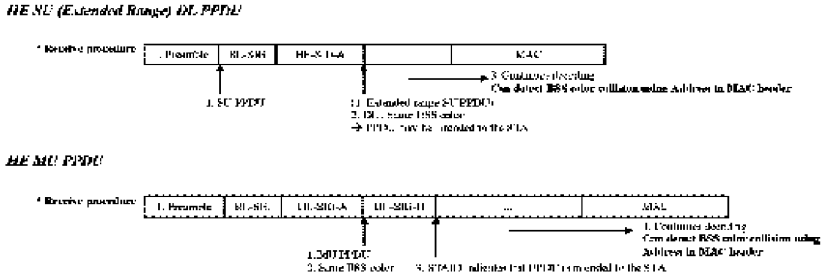
【도 9】


Intra-BSS
Inter-BSS
Interference to OBSS

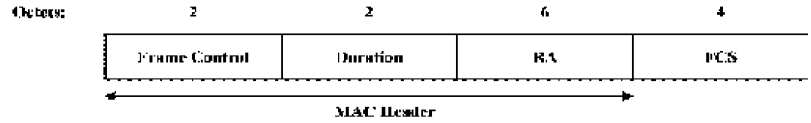
【도 10】


Inter-BSS
Intra-BSS
- Although STA receives CF-End from Intra-BSS, regular NAV remains.

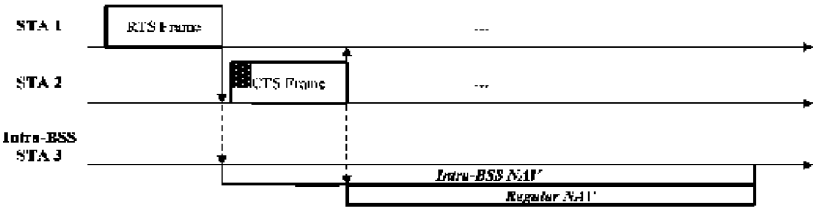
【도 11】


HE SU (Extended Range) DL PPDU
HE MU PPDU
MAC

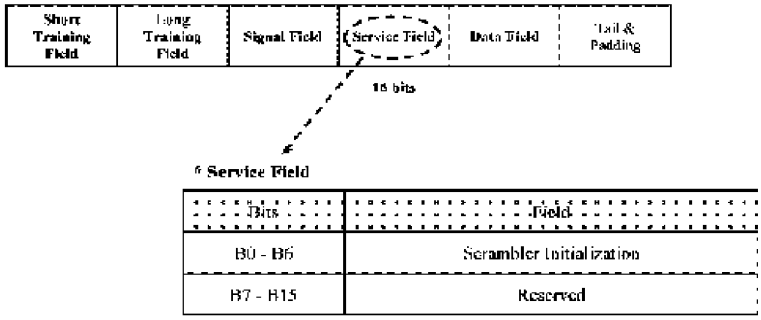
【도 12】


Octets:
2
2
6
4
Frame Control
Duration
RA
FCS
MAC Header

【도 13】


STA 1
RTS Frame
STA 2
CTS Frame
Intra-BSS
STA 3
Intra-BSS NAV
Regular NAV

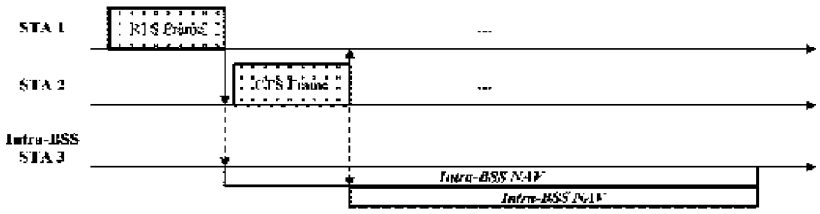
【도 14】



【도 15】

Bits	Field
B0 - B6	Scrambler Initialization
B7 - B12	BSS Color
B13 - B15	Reserved

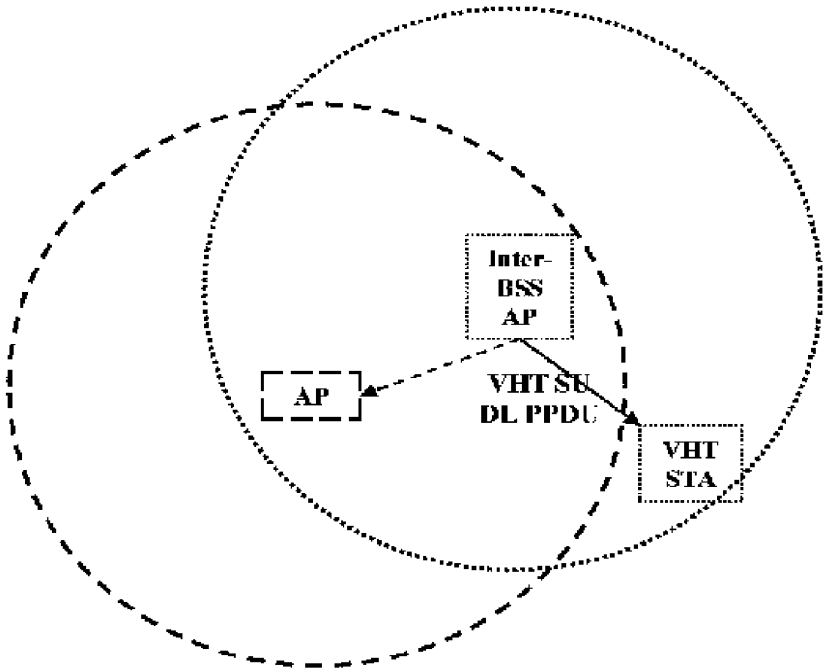
【도 16】



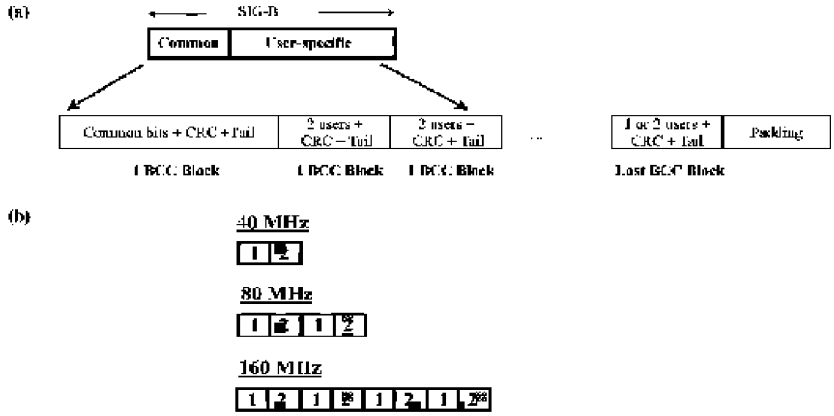
【도 17】

Condition	Group ID	Partial AID
Addressed to AP	0	BSSID[39:47]
Addressed to Mesh STA	0	RA[39:47]
Sent by an AP and addressed to a STA associated with that AP or sent by a DLS or TDLS STA in a direct path to a DLS or TDLS peer STA	63	$(dec(AID[0:8]) \quad dec(BSSID[44:47] \text{ XOR } BSSID[40:43])) * 2^{5} \bmod 2^{9}$ where XOR is a bitwise exclusive OR operation mod A indicates the A-modulo operation dec A[b:c]) is the cast to decimal operator where b is scaled by 2^{0} and c by $2^{(c-b)}$
Otherwise	63	0

【도 18】



【도 19】


(a)
SIG-B
Common
User-specific
Common bits + CRC + Tail
2 users + CRC + Tail
2 users + CRC + Tail
1 or 2 users + CRC + Tail
Padding
1 BCC Block
1 BCC Block
1 BCC Block
Last BCC Block
(b)
40 MHz
80 MHz
160 MHz

대 한 민 국 특 허 청
KOREAN INTELLECTUAL PROPERTY OFFICE

별첨 사본은 아래 출원의 원본과 동일함을 증명함.

This is to certify that the following application annexed hereto is a true copy from the records of the Korean Intellectual Property Office.

출 원 번 호 : 10-2016-0044465
Application Number

출 원 년 월 일 : 2016년 04월 11일
Filing Date Apr. 11, 2016

출 원 인 : 주식회사 윌러스표준기술연구소
Applicant(s) WILUS Institute of Standards and Technology Inc.

2018년 10월 29일

특 허 청
COMMISSIONER

제출 일자 : 2016-04-11

【서지사항】

【서류명】 특허출원서

【참조번호】 160043HEW

【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】 맥 효율을 향상시키기 위한 방법, 장치 및 시스템

【발명의 영문명칭】 METHOD, APPARATUS, AND SYSTEM FOR IMPROVING MAC

【발명자】

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【성명의 영문표기】 Geonjung KO

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【우편번호】 16547

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【국적】 KR

【발명자】

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【성명의 영문표기】 Juhyung SON

【주민등록번호】 770724-1XXXXXX

【우편번호】 16021

【주소】 경기도 의왕시 내손중앙로 11 의왕내손이편한세상 1114동 302호
【국적】 KR
【발명자】
【성명】 안우진
【성명의 영문표기】 Woojin AHN
【주민등록번호】 831010-1XXXXXX
【우편번호】 03410
【주소】 서울특별시 은평구 서오릉로13길 18-1
【국적】 KR
【발명자】
【성명】 곽진삼
【성명의 영문표기】 Jinsam KWAK
【주민등록번호】 740908-1XXXXXX
【우편번호】 16021
【주소】 경기도 의왕시 내손중앙로 11 의왕내손이편한세상 1113동1704호
【국적】 KR
【출원언어】 국어
【이 발명을 지원한 국가연구개발사업】
【과제고유번호】 R0166-16-1030
【부처명】 미래창조과학부
【연구관리 전문기관】 정보통신기술진흥센터
【연구사업명】 정보통신방송표준개발지원
【연구과제명】 IEEE802.11 High Efficiency WLAN (HEW) 표준개발
【기여율】 1/1

제출 일자 : 2016-04-11

【주관기관】 (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】	41 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	

【발명의 설명】

【발명의 명칭】

맥 효율을 향상시키기 위한 방법, 장치 및 시스템{METHOD, APPARATUS, AND SYSTEM FOR IMPROVING MAC}

【기술분야】

<1> 본 발명은 맥 효율을 향상시키기 위한 방법으로서, 더욱 상세하게는 무선랜에서 GCR 블락액 요청 등에서 맥 효율을 향상시키기 위한 다양한 방법, 장치 및 시스템에 관한 것이다.

【배경기술】

<2> 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 기기들을 가정이나 기업 또는 특정 서비스 제공지역에서 무선으로 인터넷에 접속할 수 있도록 하는 기술이다.

<3> IEEE(Institute of Electrical and Electronics Engineers) 802.11은 2.4GHz 주파수를 이용한 초기의 무선랜 기술을 지원한 이래, 다양한 기술의 표준을 실용화 또는 개발 중에 있다. 먼저, 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.

<4> 그리고 무선랜에서 취약점으로 지적되어온 통신 속도에 대한 한계를 극복하기 위하여 제정된 기술 규격으로서 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 수 있다.

<5> 무선랜의 보급이 활성화되고 또한 이를 이용한 어플리케이션이 다양화됨에 따라, IEEE 802.11n이 지원하는 데이터 처리 속도보다 더 높은 처리율(Very High Throughput, VHT)을 지원하기 위한 새로운 무선랜 시스템에 대한 필요성이 대두되었다. 이 중 IEEE 802.11ac는 5GHz 주파수에서 넓은 대역폭(80MHz~160MHz)을 지원

한다. 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. 이론적으로, 이 규격에 따르면 다중 스테이션의 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 2.4GHz/5GHz 대신 60GHz 밴드를 사용해 데이터를 전송하는 방식으로 IEEE 802.11ad가 있다. IEEE 802.11ad는 빔포밍 기술을 이용하여 최대 7Gbps의 속도를 제공하는 전송규격으로서, 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.

<6> 한편, 최근에는 802.11ac 및 802.11ad 이후의 차세대 무선랜 표준으로서, 고밀도 환경에서의 고효율 및 고성능의 무선랜 통신 기술을 제공하기 위한 논의가 계속해서 이루어지고 있다. 즉, 차세대 무선랜 환경에서는 고밀도의 스테이션과 AP(Access Point)의 존재 하에 실내/외에서 높은 주파수 효율의 통신이 제공되어야 하며, 이를 구현하기 위한 다양한 기술들이 필요하다.

【발명의 내용】

【해결하려는 과제】

<7> 본 발명은 전술한 바와 같이 고밀도 환경에서의 고효율/고성능의 무선랜 통신을 제공하기 위한 목적을 가지고 있다.

【과제의 해결 수단】

<8> 본 발명의 실시예에 따르면, 무선랜을 위한 장치, 시스템 및 무선랜 통신 방법이 제공될 수 있다.

【발명의 효과】

<9> 본 발명의 실시예에 따르면, 맥 효율을 향상시킬 수 있는 방법을 제공 한다. 본 발명은 무선랜을 이용하는 스테이션 내지 액세스 포인트, 셀룰러 통신을 이용하는 스테이션 내지 기지국 등 다양한 통신 디바이스에 사용 가능하다.

【도면의 간단한 설명】

<10> 도 1은 본 발명의 일 실시예에 따른 무선랜 시스템을 나타낸 도면.

도 2는 본 발명의 다른 실시예에 따른 무선랜 시스템을 나타낸 도면.

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

도 4는 본 발명의 일 실시예에 따른 액세스 포인트의 구성을 나타낸 블록도.

도 5는 본 발명의 일 실시예에 따른 트리거 프레임(Trigger Frame) 포맷을 나타낸 도면.

도 6은 본 발명의 일 실시예에 따른 트리거 프레임의 Common Info 필드와 Per User Info 필드를 나타낸 도면.

도 7은 본 발명의 일 실시예에 따른 트리거 프레임의 Common Info 필드와 Per User Info 필드를 나타낸 도면.

도 8은 본 발명의 일 실시예에 따른 MU-BAR 타입의 트리거 프레임에 대한 Trigger Dependent Common Info 필드와 Trigger Dependent Per User Info 필드를 나타낸 도면.

도 9는 본 발명의 일 실시예에 따른 MU-BAR 타입의 트리거 프레임에 대한 Trigger Dependent Common Info 필드를 나타낸 도면.

도 10은 본 발명의 일 실시예에 따른 트리거 프레임(Trigger Frame) 포맷을 나타낸 도면.

도 11은 본 발명의 일 실시예에 따른 트리거 프레임(Trigger Frame) 포맷을 나타낸 도면.

도 12는 본 발명의 일 실시예에 따른 BAR Control 필드와 BlockAckReq variant 인코딩(encoding)을 나타낸 도면.

도 13은 본 발명의 일 실시예에 따른 BAR Information 필드를 나타낸 도면.

도 14는 본 발명의 일 실시예에 따른 BAR Information 필드를 나타낸 도면.

도 15는 본 발명의 일 실시예에 따른 트리거 프레임 구조를 나타낸 도면.

【발명을 실시하기 위한 구체적인 내용】

<11> 본 명세서에서 사용되는 용어는 본 발명에서의 기능을 고려하면서 가능한 현재 널리 사용되는 일반적인 용어를 선택하였으나, 이는 당 분야에 종사하는 기술자

의 의도, 관례 또는 새로운 기술의 출현 등에 따라 달라질 수 있다. 또한 특정 경우는 출원인이 임의로 선정한 용어도 있으며, 이 경우 해당되는 발명의 설명 부분에서 그 의미를 기재할 것이다. 따라서 본 명세서에서 사용되는 용어는, 단순한 용어의 명칭이 아닌 그 용어가 가진 실질적인 의미와 본 명세서의 전반에 걸친 내용을 토대로 해석되어야 함을 밝혀두고자 한다.

<12> 명세서 전체에서, 어떤 구성이 다른 구성과 "연결" 되어 있다고 할 때, 이는 "직접적으로 연결" 되어 있는 경우뿐 아니라, 그 중간에 다른 구성요소를 사이에 두고 "전기적으로 연결" 되어 있는 경우도 포함한다. 또한 어떤 구성이 특정 구성요소를 "포함" 한다고 할 때, 이는 특별히 반대되는 기재가 없는 한 다른 구성요소를 제외하는 것이 아니라 다른 구성요소를 더 포함할 수 있는 것을 의미한다. 이에 더하여, 특정 임계값을 기준으로 "이상" 또는 "이하" 라는 한정 사항은 실시예에 따라 각각 "초과" 또는 "미만" 으로 적절하게 대체될 수 있다.

<13> 도 1은 본 발명의 일 실시예에 따른 무선랜 시스템을 도시하고 있다. 무선랜 시스템은 하나 또는 그 이상의 베이직 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.

<14> 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.

<15> 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 비 액세스 포인트(Non-AP) 스테이션뿐만 아니라 액세스 포인트(AP)를 모두 포함한다. 또한, 본 명세서에서는 스테이션과 AP 등의 무선랜 통신 디바이스를 모두 포함하는 개념으로서 '단말'이라는 용어가 사용될 수 있다. 무선 통신을 위한 스테이션은 프로세서(Processor)와 트랜시버(transceiver)를 포함하고, 실시예에 따라 유저 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 수행할 수 있다. 그리고, 트랜시버는 상기 프로세서와 기능적으로 연결되어 있으며 스테이션을 위하여 무선 네트워크를 통해 프레임을 송수신한다.

<16> 액세스 포인트(Access Point, AP)는 자신에게 결합된(associated) 스테이션을 위하여 무선 매체를 경유하여 분배시스템(DS)에 대한 접속을 제공하는 개체이다. 인프라스트럭쳐 BSS에서 비 AP 스테이션들 사이의 통신은 AP를 경유하여 이루어지는 것이 원칙이지만, 다이렉트 링크가 설정된 경우에는 비AP 스테이션

들 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.

<17> 복수의 인프라스트럭쳐 BSS는 분배 시스템(DS)을 통해 상호 연결될 수 있다. 이때, 분배 시스템을 통하여 연결된 복수의 BSS를 확장 서비스 세트(Extended Service Set, ESS)라 한다.

<18> 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.

<19> 도 2에 도시된 BSS-3는 독립 BSS이며 AP를 포함하지 않기 때문에, 모든 스테이션(STA-6, STA-7)이 AP와 접속되지 않은 상태이다. 독립 BSS는 분배 시스템으로의 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.

<20> 도 3은 본 발명의 일 실시예에 따른 스테이션(100)의 구성을 나타낸 블록도이다.

<21> 도시된 바와 같이, 본 발명의 실시예에 따른 스테이션(100)은 프로세서(110), 네트워크 인터페이스 카드(NIC, 120), 유저 인터페이스부(140), 디스플레이

유닛(150) 및 메모리(160)를 포함할 수 있다.

<22> 먼저, 네트워크 인터페이스 카드(120)는 무선랜 접속을 수행하기 위한 모듈이며, 스테이션(100)을 위한 패킷 전송과 수신을 수행한다. 네트워크 인터페이스 카드(120)는 스테이션(100)에 내장되거나 외장으로 구비될 수 있으며, 실시예에 따라 서로 다른 주파수 밴드를 이용하는 적어도 하나의 네트워크 인터페이스 카드 모듈을 포함할 수 있다. 이를 테면, 상기 네트워크 인터페이스 카드는 2.4GHz, 5GHz 및 60GHz 등의 서로 다른 주파수 밴드의 네트워크 인터페이스 카드 모듈을 포함할 수 있다. 일 실시예에 따르면, 스테이션(100)은 6GHz 이상의 주파수 밴드를 이용하는 네트워크 인터페이스 카드 모듈과, 6GHz 이하의 주파수 밴드를 이용하는 네트워크 인터페이스 카드 모듈을 구비할 수 있다. 각각의 네트워크 인터페이스 카드 모듈은 해당 네트워크 인터페이스 카드 모듈이 지원하는 주파수 밴드의 무선랜 규격에 따라 AP 또는 외부 스테이션과 무선 통신을 수행할 수 있다. 네트워크 인터페이스 카드(120)는 스테이션(100)의 성능 및 요구 사항에 따라 한 번에 하나의 네트워크 인터페이스 카드 모듈만을 동작시키거나 동시에 다수의 네트워크 인터페이스 카드 모듈을 함께 동작시킬 수 있다. 스테이션(100)이 복수의 네트워크 인터페이스 카드 모듈을 포함할 경우, 각 네트워크 인터페이스 카드 모듈은 각각 독립된 형태로 구비될 수도 있으며, 하나의 칩으로 통합되어 구비될 수도 있다.

<23> 다음으로, 유저 인터페이스부(140)는 스테이션(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 기

초하여 스테이션(100)을 제어할 수 있다. 또한, 유저 인터페이스부(140)는 다양한 출력 수단을 이용하여 프로세서(110)의 명령에 기초한 출력을 수행할 수 있다.

<24> 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 스테이션(100)에서 사용되는 제어 프로그램 및 그에 따른 각종 데이터를 저장한다. 이러한 제어 프로그램에는 스테이션(100)이 AP 또는 외부 스테이션과 접속을 수행하는데 필요한 접속 프로그램이 포함될 수 있다.

<25> 본 발명의 프로세서(110)는 다양한 명령 또는 프로그램을 실행하고, 스테이션(100) 내부의 데이터를 프로세싱 할 수 있다. 또한, 상기 프로세서(110)는 상술한 스테이션(100)의 각 유닛들을 제어하며, 유닛들 간의 데이터 송수신을 제어할 수 있다. 본 발명의 실시예에 따르면, 프로세서(110)는 메모리(160)에 저장된 AP와의 접속을 위한 프로그램을 실행하고, AP가 전송한 통신 설정 메시지를 수신할 수 있다. 또한, 프로세서(110)는 통신 설정 메시지에 포함된 스테이션(100)의 우선 조건에 대한 정보를 판독하고, 스테이션(100)의 우선 조건에 대한 정보에 기초하여 AP에 대한 접속을 요청할 수 있다. 이에 대한 구체적인 실시예는 추후 기술하기로 한다.

<26> 도 3에 도시된 스테이션(100)은 본 발명의 일 실시예에 따른 블록도로서, 분리하여 표시한 블록들은 디바이스의 엘리먼트들을 논리적으로 구별하여 도시한 것

이다. 따라서 상술한 디바이스의 엘리먼트들은 디바이스의 설계에 따라 하나의 칩으로 또는 복수의 칩으로 장착될 수 있다. 또한, 본 발명의 실시예에서 상기 스테이션(100)의 일부 구성들, 이를 테면 유저 인터페이스부(140) 및 디스플레이 유닛(150) 등은 스테이션(100)에 선택적으로 구비될 수 있다.

<27> 도 4는 본 발명의 일 실시예에 따른 AP(200)의 구성을 나타낸 블록도이다.

<28> 도시된 바와 같이, 본 발명의 실시예에 따른 AP(200)는 프로세서(210), 네트워크 인터페이스 카드(220) 및 메모리(260)를 포함할 수 있다. 도 4에서 AP(200)의 구성 중 도 3의 스테이션(100)의 구성과 동일하거나 상응하는 부분에 대해서는 중복적인 설명을 생략하도록 한다.

<29> 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, 상기 AP(200)의 네트워크 인터페이스 카드(220) 또한 서로 다른 주파수 밴드를 이용하는 복수의 네트워크 인터페이스 카드 모듈을 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 네트워크 인터페이스 카드 모듈과, 6GHz 이하의 주파수 밴드를 이용하는 네트워크 인터페이스 카드 모듈을 구비할 수 있다. 각각의 네트워크 인터페이스 카드 모듈은 해당 네트워크 인터페이스 카드 모듈이 지원하는 주파수 밴드의 무선랜 규격에 따라 스테이션과 무선 통신을 수행할 수 있다. 상기 네트워크 인터페이스 카드(220)는

AP(200)의 성능 및 요구 사항에 따라 한 번에 하나의 네트워크 인터페이스 카드 모듈만을 동작시키거나 동시에 다수의 네트워크 인터페이스 카드 모듈을 함께 동작시킬 수 있다.

<30> 다음으로, 메모리(260)는 AP(200)에서 사용되는 제어 프로그램 및 그에 따른 각종 데이터를 저장한다. 이러한 제어 프로그램에는 스테이션의 접속을 관리하는 접속 프로그램이 포함될 수 있다. 또한, 프로세서(210)는 AP(200)의 각 유닛들을 제어하며, 유닛들 간의 데이터 송수신을 제어할 수 있다. 본 발명의 실시예에 따르면, 프로세서(210)는 메모리(260)에 저장된 스테이션과의 접속을 위한 프로그램을 실행하고, 하나 이상의 스테이션에 대한 통신 설정 메시지를 전송할 수 있다. 이때, 통신 설정 메시지에는 각 스테이션의 접속 우선 조건에 대한 정보가 포함될 수 있다. 또한, 프로세서(210)는 스테이션의 접속 요청에 따라 접속 설정을 수행한다. 이에 대한 구체적인 실시예는 추후 기술하기로 한다.

<32> 도 5는 본 발명의 일 실시예에 따른 트리거 프레임(Trigger Frame) 포맷을 나타낸 도면이다.

<33> 도 5를 참조하면 트리거 프레임은 프레임 컨트롤(Frame Control), 듀레이션(Duration), RA, TA, Common Info, Per User Info 1, …, Per User Info N (N 유저에 대한 Per User Info), Padding, FCS로 이루어질 수 있다. 트리거 프레임은 UL MU 전송을 위한 리소스를 할당할 수 있고, 트리거 프레임이 포함된 PPDU 다음에 UL MU 전송을 이끌어낼 수(트리거할 수) 있다. 트리거 프레임이 포함된 PPDU 다음에

오는 UL MU 전송은 트리거 프레임이 포함된 PPDU로부터 SIFS 뒤일 수 있다. 도 5의 트리거 프레임 포맷에서 RA는 수신자 주소일 수 있다. 또한 TA는 트리거 프레임을 보내는 스테이션(STA)의 주소일 수 있다. 또한 트리거 프레임은 다수의 사용자를 불러낼 수 있는데, 도 5의 포맷에서 Common Info에는 다수의 사용자에게 공통되는 정보가 포함되어 있을 수 있고, Per User Info n에는 각 사용자 n에 해당되는 정보가 포함되어 있을 수 있다. 또한 수신자가 트리거 프레임에 응답을 준비할 시간을 주기 위한 Padding 필드가 포함될 수 있다.

<34> 본 발명의 일 실시예에 따르면 트리거 프레임이 다수의 유저를 트리거하는 경우 RA 필드에 Broadcast address 또는 Multicast address를 적을 수 있다. 또한 트리거 프레임이 1명의 유저를 트리거하는 경우 RA 필드에 그 유저의 MAC address를 적을 수 있다.

<36> 도 6은 본 발명의 일 실시예에 따른 트리거 프레임의 Common Info 필드와 Per User Info 필드를 나타낸 도면이다.

<37> 도 5를 참조하면 트리거 프레임 포맷은 Common Info 필드와 하나 이상의 Per User Info 필드를 포함할 수 있고, 도 6을 참조하면 Common Info 필드와 Per User Info 필드는 각각 다수의 필드로 구성될 수 있다. 도 6(a)를 참조하면 Common Info 필드는 Length, Cascade Indication, CS Required, HE-SIG-A Info, CP and LTF Type, Trigger Type, Trigger Dependent Common Info 필드 등을 포함할 수 있다. Length 필드는 트리거 프레임의 응답인 HE trigger-based PPDU의 길이 또는 HE

trigger-based PPDU의 L-SIG Length 값일 수 있고, 12비트로 이루어질 수 있다. 또한 Cascade Indication은 이 트리거 프레임 뒤에 subsequent 트리거 프레임이 따른다는 것을 가리킬 수 있다. 또한 CS Required 필드는 트리거 되는 STA들이 트리거에 응답할 때 medium state나 NAV를 고려할지 고려하지 않을지를 가리킬 수 있다. 만약 medium state나 NAV를 고려하는 것으로 지시되어 있으면 medium state를 고려하기 위해 ED(energy detect; energy detection)을 사용할 수 있다. 또한 HE-SIG-A Info 필드는 트리거 프레임에 응답하는 HE trigger-based PPDU의 HE-SIG-A 정보를 포함할 수 있다. 또한 HE-SIG-A Info 필드에서 지시하지 않아도 STA가 알 수 있는 정보는 HE-SIG-A Info 필드에 포함되지 않을 수 있다. 또한 CP and LTF Type 필드는 트리거 프레임의 응답인 HE trigger-based PPDU의 CP(cyclic prefix)와 LTF 조합을 나타낼 수 있다. 또한 Trigger Type은 트리거 프레임의 타임을 가리킬 수 있고, 트리거 프레임의 타임으로는 Basic Trigger, Beamforming Report Poll Trigger, MU-BAR, MU-RTS 등이 있을 수 있다. 또한 트리거 프레임 타입에 따른 Trigger Dependent Common Info가 포함될 수 있다.

<38> 도 6(b)를 참조하면 Per User Info 필드는 User Identifier, RU Allocation, Coding Type, MCS, DCM, SS Allocation, Trigger Dependent Per User Info 필드 등을 포함할 수 있다. User Identifier 필드는 트리거 프레임이 트리거하는 STA의 identifier를 나타낼 수 있고, identifier로 STA의 AID를 사용할 수 있다. 또한 RU Allocation 필드는 User Identifier 필드에 해당하는 STA가 트리거 프레임에 대한 응답으로 HE trigger-based PPDU를 보내도록 할당된 RU(Resource Unit) 정보를 나

타낼 수 있다. 또한 Coding Type 필드는 User Identifier 필드에 해당하는 STA가 트리거 프레임에 대한 응답으로 HE trigger-based PPDU를 보낼 때의 코딩 타입, 예를 들면 BCC 또는 LDPC, 을 지시할 수 있다. 또한 MCS 필드는 User Identifier 필드에 해당하는 STA가 트리거 프레임에 대한 응답으로 HE trigger-based PPDU를 보낼 때의 MCS를 지시할 수 있다. 또한 DCM 필드는 User Identifier 필드에 해당하는 STA가 트리거 프레임에 대한 응답으로 HE trigger-based PPDU를 보낼 때 DCM(dual carrier modulation)을 사용할지 말지를 지시할 수 있다. 또한 SS Allocation 필드는 User Identifier 필드에 해당하는 STA가 트리거 프레임에 대한 응답으로 HE trigger-based PPDU를 보낼 때 spatial streams를 지시할 수 있다. 또한 트리거 프레임 타입에 따른 Trigger Dependent Per User Info가 포함될 수 있다.

<40> 도 7은 본 발명의 일 실시예에 따른 트리거 프레임의 Common Info 필드와 Per User Info 필드를 나타낸 도면이다.

<41> 도 5를 참조하면 트리거 프레임 포맷은 Common Info 필드와 하나 이상의 Per User Info 필드를 포함할 수 있고, 도 7을 참조하면 Common Info 필드와 Per User Info 필드는 각각 다수의 필드로 구성될 수 있다. 도 7(a)를 참조하면 Common Info 필드는 Length, Cascade Indication, CS Required, Spatial Reuse, BW, CP and LTF Type, MU MIMO LTF Mode, Number of LTFs, STBC, LDPC Extra Symbol, AP TX Power, Packet Extension, Trigger Type, Trigger Dependent Common Info 필드 등을 포함할 수 있다. Length 필드는 트리거 프레임의 응답인 HE trigger-based PPDU의 길이

또는 HE trigger-based PPDU의 L-SIG Length 값일 수 있고, 12비트로 이루어질 수 있다. 또한 Cascade Indication은 이 트리거 프레임 뒤에 subsequent 트리거 프레임이 따른다는 것을 가리킬 수 있다. 또한 CS Required 필드는 트리거 되는 STA들이 트리거에 응답할 때 medium state나 NAV를 고려할지 고려하지 않을지를 가리킬 수 있다. 만약 medium state나 NAV를 고려하는 것으로 지시되어 있으면 medium state를 고려하기 위해 ED(energy detect; energy detection)을 사용할 수 있다. 또한 지시하지 않아도 STA가 알 수 있는 정보는 트리거 프레임에 포함되지 않을 수 있다. Spatial Reuse 필드는 트리거 프레임에 대한 응답으로 HE trigger-based PPDU를 보낼 때 HE-SIG-A에 들어갈 Spatial Reuse 필드는 나타낼 수 있다. 또한 BW 필드는 트리거 프레임에 대한 응답으로 HE trigger-based PPDU를 보낼 때 HE-SIG-A에 들어가 BW 정보를 나타낼 수 있다. 또한 CP and LTF Type 필드는 트리거 프레임의 응답인 HE trigger-based PPDU의 CP(cyclic prefix)와 LTF 조합을 나타낼 수 있다. 또한 MU MIMO LTF Mode와 Number of LTFs 필드는 트리거 프레임에 응답하는 HE trigger-based PPDU의 LTF 정보를 나타낼 수 있다. 또한 STBC 필드는 트리거 프레임에 응답하는 HE trigger-based PPDU가 STBC를 사용할지 말지를 지시할 수 있다. 또한 LDPC Extra Symbol 필드는 트리거 프레임에 대해 응답하는 HE trigger-based PPDU가 LDPC를 사용할 때 LDPC extra symbol이 있느지 없는지를 나타낼 수 있다. 또한 AP TX Power 필드는 트리거 프레임이 포함된 PPDU를 전송할 때의 TX Power를 지시할 수 있다. 또한 Packet Extension 필드는 트리거 프레임에 대해 응답하는 HE trigger-based PPDU의 packet extension 정보를 포함할 수 있다. 또한 Trigger

Type은 트리거 프레임의 타임을 가리킬 수 있고, 트리거 프레임의 타임으로는 Basic Trigger, Beamforming Report Poll Trigger, MU-BAR, MU-RTS 등이 있을 수 있다. 또한 트리거 프레임 타입에 따른 Trigger Dependent Common Info가 포함될 수 있다.

<42> 도 7(b)를 참조하면 Per User Info 필드는 User Identifier, RU Allocation, Coding Type, MCS, DCM, SS Allocation, Trigger Dependent Per User Info 필드 등을 포함할 수 있다. User Identifier 필드는 트리거 프레임이 트리거하는 STA의 identifier를 나타낼 수 있고, identifier로 STA의 AID를 사용할 수 있다. 또한 RU Allocation 필드는 User Identifier 필드에 해당하는 STA가 트리거 프레임에 대한 응답으로 HE trigger-based PPDU를 보내도록 할당된 RU(Resource Unit) 정보를 나타낼 수 있다. 또한 Coding Type 필드는 User Identifier 필드에 해당하는 STA가 트리거 프레임에 대한 응답으로 HE trigger-based PPDU를 보낼 때의 코딩 타입, 예를 들면 BCC 또는 LDPC, 을 지시할 수 있다. 또한 MCS 필드는 User Identifier 필드에 해당하는 STA가 트리거 프레임에 대한 응답으로 HE trigger-based PPDU를 보낼 때의 MCS를 지시할 수 있다. 또한 DCM 필드는 User Identifier 필드에 해당하는 STA가 트리거 프레임에 대한 응답으로 HE trigger-based PPDU를 보낼 때 DCM(dual carrier modulation)을 사용할지 말지를 지시할 수 있다. 또한 SS Allocation 필드는 User Identifier 필드에 해당하는 STA가 트리거 프레임에 대한 응답으로 HE trigger-based PPDU를 보낼 때 spatial streams를 지시할 수 있다. 또한 Target RSSI 필드는 User Identifier 필드에 해당하는 STA가 트리거 프레임에 대한 응답으

로 HE trigger-based PPDU를 보낼 때 수신자에게 도달하는 RSSI를 어떤 값으로 타겟팅할지 나타낼 수 있다. 또한 트리거 프레임 타입에 따른 Trigger Dependent Per User Info가 포함될 수 있다.

<44> 도 8은 본 발명의 일 실시예에 따른 MU-BAR 타입의 트리거 프레임에 대한 Trigger Dependent Common Info 필드와 Trigger Dependent Per User Info 필드를 나타낸 도면이다.

<45> 도 6과 도 7을 참조하면 트리거 프레임의 Common Info 필드는 Trigger Dependent Common Info를 포함할 수 있고, 트리거 프레임 타입이 MU-BAR 또는 MU-BAR (GCR)일 때 Trigger Dependent Common Info는 도 8(a)와 같을 수 있다. 또한 도 6과 도 7을 참조하면 트리거 프레임의 Per User Info 필드는 Trigger Dependent Per User Info를 포함할 수 있고, 트리거 프레임 타입이 MU-BAR 또는 MU-BAR (GCR)일 때 Trigger Dependent Per User Info는 도 8(b)와 같을 수 있다. 도 8(a)를 참조하면 트리거 프레임 타입이 MU-BAR 또는 MU-BAR (GCR)일 때 Trigger Dependent Common Info는 GCR Indication과 GCR Address 필드를 포함할 수 있다. GCR Indication 필드는 이 트리거 프레임이 GCR BlockAck을 요청하는 MU-BAR인지를 지시할 수 있다. 또한 GCR Address 필드는 GCR BlockAck을 요청하는 MU-BAR일 때 이 트리거 프레임을 수신해야하는(또는 GCR BlockAck 응답을 해야하는) GCR Group Address를 지시할 수 있다. 본 발명의 일 실시예로 GCR Address에서 포함되었더라도 트리거 프레임의 Per User Info의 STA Identifier에서 지시되어야만 GCR

BlockAck 응답을 할 수 있다.

<46> 도 8(b)를 참조하면 트리거 프레임 타입이 MU-BAR 또는 MU-BAR (GCR)일 때 Trigger Dependent Per User Info는 BAR Control 필드와 BAR Information 필드를 포함할 수 있다. 일 실시예로 BAR Control, BAR Information 필드는 기존의 BlockAckReq 프레임의 필드 구조를 사용할 수 있다. 또다른 실시예로 BAR Control, BAR Information 필드는 기존의 BlockAckReq 프레임의 필드 구조에서 하나 이상의 필드를 생략한 구조일 수 있다. 예를 들면 Trigger Dependent Common Info에 들어가는 정보를 생략할 수 있다. 예를 들면 Trigger Dependent Common Info에 GCR Indication을 넣고 BAR Control 필드에서 GCR indication을 생략할 수 있다. 또다른 예로 Trigger Dependent Common Info에 GCR Address를 넣고 BAR Information에서 GCR Group Address를 생략할 수 있다. 또다른 예로 Trigger Dependent Common Info에 GCR Address를 넣고 GCR BlockAck을 요청하는 경우에도 BAR Information에서 GCR Group Address를 생략할 수 있다.

<48> 도 9는 본 발명의 일 실시예에 따른 MU-BAR 타입의 트리거 프레임에 대한 Trigger Dependent Common Info 필드를 나타낸 도면이다.

<49> 도 6과 도 7을 참조하면 트리거 프레임의 Common Info 필드는 Trigger Dependent Common Info를 포함할 수 있고, 트리거 프레임 타입이 MU-BAR 또는 MU-BAR (GCR)일 때 Trigger Dependent Common Info는 도 9와 같을 수 있다. 도 9를 참조하면 트리거 프레임 타입이 MU-BAR 또는 MU-BAR (GCR)일 때 Trigger Dependent

Common Info는 GCR Address 필드를 포함할 수 있다. 또한 GCR Address 필드는 GCR BlockAck을 요청하는 MU-BAR일 때 이 트리거 프레임을 수신해야하는(또는 GCR BlockAck 응답을 해야하는) GCR Group Address를 지시할 수 있다. 본 발명의 일 실시예로 GCR Address를 특정값으로 셋팅함으로써 GCR BlockAck을 요청하는 MU-BAR이 아님을 나타낼 수 있다. 예를 들면 GCR BlockAck을 요청하는 MU-BAR이 아닐 때 GCR Address를 모두 0값으로 셋팅할 수 있다. 본 발명의 일 실시예로 GCR Address에서 포함되었더라도 트리거 프레임의 Per User Info의 STA Identifier에서 지시되어야만 GCR BlockAck 응답을 할 수 있다.

<50> 또다른 실시예로 MU-BAR 또는 MU-BAR(GCR)의 요청하는 acknowledgement의 Starting Sequence Control 값 또는 TID 값으로 GCR BlockAck 요청을 implicitly 지시할 수 있다. 또한 본 발명의 일 실시예에 따르면 이러한 경우 도 8에서 GCR Indication 또는 도 8, 도 9에서 GCR Address를 생략할 수 있다.

<52> 도 10은 본 발명의 일 실시예에 따른 트리거 프레임(Trigger Frame) 포맷을 나타낸 도면이다.

<53> 도 10을 참조하면 GCR BlockAck을 요청하기 위해서 도 5의 트리거 프레임에서 RA 필드를 GCR Address로 설정할 수 있다. 본 발명의 일 실시예에 따르면 트리거 프레임의 RA 필드가 GCR Address로 셋팅된 경우 해당하는 GCR Group이 트리거 프레임을 수신할 수 있다. 일 실시예로 트리거 프레임의 RA 필드가 GCR Address로 셋팅된 경우 Per User Info에는 GCR Address에 해당하는 GCR Group의 STA들만 포함

될 수 있다.

<54> 또한 일 실시예로 트리거 프레임의 RA 필드에 GCR Address를 사용함으로써 Common Info에서 GCR Address를 지시하지 않을 수 있다. 일 실시예로 트리거 프레임의 RA 필드에 GCR Address를 사용함으로써 도 8 또는 도 9의 GCR Address를 지시하지 않거나 필드를 생략할 수 있다. 일 실시예로 트리거 프레임의 RA 필드에 GCR Address를 사용함으로써 트리거 프레임 타입이 MU-BAR일 때 Common Info에서 GCR Address를 지시하지 않을 수 있다. 일 실시예로 트리거 프레임의 RA 필드에 GCR Address를 사용함으로써 트리거 프레임 타입이 MU-BAR (GCR)일 때 Common Info에서 GCR Address를 지시하지 않을 수 있다.

<55> 또다른 실시예로 트리거 프레임의 RA 필드에 GCR Address를 사용하더라도 도 8 또는 도 9의 GCR Address 필드를 유지할 수 있다. 이를 통해 RA 필드에 GCR Address가 아닌 다른 주소를 사용하더라도 일관성 있는 구조를 유지할 수 있다.

<57> 도 11은 본 발명의 일 실시예에 따른 트리거 프레임(Trigger Frame) 포맷을 나타낸 도면이다.

<58> 도 11을 참조하면 GCR BlockAck을 요청하기 위해서 도 5의 트리거 프레임에서 RA 필드를 Broadcast address로 설정할 수 있다. 본 발명의 일 실시예에 따르면 트리거 프레임의 RA 필드가 Broadcast address로 설정되었을 때 Common Info에서 GCR Address를 지시하며 GCR BlockAck을 요청할 수 있다. 본 발명의 일 실시예에

따르면 트리거 프레임이 MU-BAR 타입 또는 MU-BAR(GCR) 타입이고, 트리거 프레임의 RA 필드가 Broadcast address로 설정되었을 때 Common Info에서 GCR Address를 지시하며 GCR BlockAck을 요청할 수 있다.

<59> 본 발명의 일 실시예에 따르면 GCR BlockAck을 요청하는 트리거 프레임의 RA 필드를 Broadcast address로 설정하고 GCR BlockAck 이외의 acknowledgement 를 하나의 트리거 프레임에서 함께 요청할 수 있다. 도 11을 참조하면 트리거 프레임의 RA 필드를 Broadcast로 설정하고 Per User Info에서 GCR Group에 해당하는 STA 뿐만 아니라 다른 STA들도 지시(트리거)할 수 있다.

<61> 도 12는 본 발명의 일 실시예에 따른 BAR Control 필드와 BlockAckReq variant 인코딩(encoding)을 나타낸 도면이다.

<62> 본 발명의 일 실시예로 트리거 프레임이 MU-BAR 타입일 때 도 8(b)와 같은 Trigger Dependent Per User Info를 포함할 수 있고 그 중 BAR Control 필드는 도 12(a)와 같이 구성될 수 있다. 도 12(a)를 참조하면 BAR Control 필드는 BAR Ack Policy, Multi-TID, Compressed Bitmap, GCR, TID_INFO 필드 등을 포함할 수 있다. 도 12(b)를 참조하면 도 12(a)의 다수의 비트 조합에 따라 BlockAckReq variant 종류를 지시할 수 있다. 예를 들면 Multi-TID subfield value, Compressed Bitmap subfield value, GCR subfield value가 각각 0, 1, 1일 때 BlockAckReq variant 종류가 GCR BlockAckReq임을 지시할 수 있다.

<63> 본 발명의 일 실시예에 따르면 MU-BAR가 GCR BlockAck을 요청할 때 GCR BlockAck을 요청하는 STA에 대해 다른 acknowledgement를 함께 요청할 수 있다. 예를 들면 STA에 여러 TID에 대한 acknowledgement를 요청할 수 있다. 예를 들면 STA에 GCR BlockAck을 포함하여 여러 TID에 대한 acknowledgement를 요청할 수 있다. 예를 들면 Multi-TID subfield value와 GCR subfield value를 각각 1, 1로 셋팅함으로써 GCR BlockAck을 요청하며 다른 TID의 acknowledgement를 요청할 수 있다. 예를 들면 Multi-TID subfield value, Compressed Bitmap subfield value, GCR subfield value를 각각 1, 0, 1로 셋팅함으로써 GCR BlockAck을 요청하며 다른 TID의 acknowledgement를 함께 요청할 수 있다. 예를 들면 Multi-TID subfield value, Compressed Bitmap subfield value, GCR subfield value를 각각 1, 1, 1로 셋팅함으로써 GCR BlockAck을 요청하며 다른 TID의 acknowledgement를 함께 요청할 수 있다.

<64> 본 발명의 일 실시예로 GCR BlockAck을 요청하며 다른 TID의 acknowledgement를 함께 요청한 경우 STA는 이에 대한 응답으로 Multi-TID BlockAck을 전송하는 것이 가능하다. 또다른 실시예로 여러 TID에 대한 BlockAck 또는 Compressed BlockAck을 MPDU aggregation하는 것이 가능하다.

<66> 도 13은 본 발명의 일 실시예에 따른 BAR Information 필드를 나타낸 도면이다.

<67> 도 13을 참조하면 BAR Information 필드는 16비트의 Block Ack Starting

Sequence Control 필드로 구성되어 있다. 본 발명의 일 실시예로 트리거 프레임이 MU-BAR 타입일 때 도 8(b)와 같은 Trigger Dependent Per User Info를 포함할 수 있고 그 중 BAR Information 필드는 도 13과 같이 구성될 수 있다. 본 발명의 일 실시예로 트리거 프레임이 MU-BAR 타입일 때 도 8(b)와 같은 Trigger Dependent Per User Info를 포함할 수 있고, 도 8(a) 또는 도 9와 같은 Trigger Dependent Common Info를 포함할 때 그 중 BAR Information 필드는 도 13과 같이 구성될 수 있다.

<68> 일 실시예로 MU-BAR 프레임이 GCR BlockAck을 요청할 때 BAR Information 필드는 도 13과 같이 구성될 수 있다. 기존의 GCR BlockAckReq의 BAR Information 필드는 Block Ack Starting Sequence Control 필드와 GCR Group Address 필드로 구성되어 있지만 MU-BAR 프레임으로 GCR BlockAckReq를 하는 경우 GCR BlockAck을 요구하는 STA들마다 중복되는 정보인 GCR Group Address는 BAR Information 필드에서 생략할 수 있다. 이때 생략된 GCR Group Address 필드는 도 8(a) 또는 도 9의 실시예와 같이 Common Info 필드 또는 트리거 프레임이 MU-BAR일 때 Trigger Dependent Common Info 필드에 포함될 수 있다.

<70> 도 14는 본 발명의 일 실시예에 따른 BAR Information 필드를 나타낸 도면이다.

<71> 도 14를 참조하면 BAR Information 필드는 Per TID Info와 Block Ack Starting Sequence Control 필드로 구성될 수 있고, 이는 각 TID마다 반복될 수 있

다. 본 발명의 일 실시예에 따르면 도 12의 실시예에서와 같이 MU-BAR이 GCR BlockAck을 요청할 때 GCR BlockAck을 요청하는 STA에 대해 다른 acknowledgement를 함께 요청할 수 있고, 이때 BAR Information 필드는 도 14와 같을 수 있다. 또한 도 12에서 언급한 실시예와 같은 인코딩으로 GCR BlockAck을 요청하며 다른 TID의 acknowledgement를 요청할 때 BAR Information 필드는 도 14와 같을 수 있다. 이러한 경우 요청하는 acknowledgement의 TID 개수에 따라 BAR Information의 길이, 즉 Trigger Dependent Per User Info의 길이, 즉 Per User Info의 길이가 다를 수 있다. 또한 반복되는 TID 개수는 도 12(a)의 TID_INFO 필드에서 시그날링할 수 있다. 트리거 프레임의 수신자는 순차적으로 디코딩함으로써 각 Per User Info의 길이를 알 수 있다.

<73> 도 15는 본 발명의 일 실시예에 따른 트리거 프레임 구조를 나타낸 도면이다.

<74> 도 12부터 도 14에서 언급한 것과 같이 MU-BAR을 이용하여 한 STA에 대해 GCR BlockAck과 다른 TID의 acknowledgement를 함께 요청할 수 있고 그때의 트리거 프레임 구조는 도 15와 같을 수 있다. 도 15를 참조하면 Per User Info의 Trigger Dependent Per User Info의 BAR Information이 TID별로 반복될 수 있다. 일 실시예로 이때 BAR Control 필드 인코딩은 도 12(b)에서 설명한 것과 같을 수 있다. 일 실시예로 도 15와 같이 GCR BlockAck을 요청할 때 Common Info의 Trigger Dependent Common Info는 도 8(a) 또는 도 9와 같을 수 있다.

<76> 본 발명의 일 실시예에 따르면 HE Operation element는 BSS Color 필드를 포함할 수 있다. 또한 HE Operation element는 Beacon frame, Association Request frame, Association Response frame, Reassociation Request frame, Reassociation Response frame, Probe Request frame, Probe Response frame 등에 포함될 수 있다. 또한 BSS Color는 Beacon frame, Association Request frame, Association Response frame, Reassociation Request frame, Reassociation Response frame, Probe Request frame, Probe Response frame 등에 포함될 수 있다.

<77> 본 발명의 일 실시예에 따르면 BSS Color를 AP가 선택할 수 있고, non-AP STA는 AP로부터 전송받은 BSS Color 값을 사용할 수 있다. 일 실시예로 BSS에 BSS Color가 없는 경우 BSS Color 값을 0으로 셋팅할 수 있다. 또다른 실시예로 non-AP STA가 AP로부터 BSS Color 값을 전송받기 전에 BSS Color 값을 0으로 셋팅할 수 있다. 또다른 실시예로 non-AP STA가 AP로부터 HE Operation element를 전송받기 전에 BSS Color 값을 0으로 셋팅할 수 있다. 예를 들면 non-AP STA가 Probe Request frame을 전송하는 경우 AP로부터 프레임 또는 BSS Color를 포함한 프레임을 수신한 적이 없을 수 있고, 이러한 경우 BSS Color 값을 0으로 셋팅할 수 있다. 예를 들면 non-AP STA가 Probe Request frame을 전송하는 경우 AP로부터 프레임 또는 BSS Color를 포함한 프레임을 수신한 적이 없을 수 있고, 이러한 경우 HE Operation element의 BSS Color 값을 0으로 셋팅할 수 있다. 예를 들면 non-AP STA가 Probe Request frame을 전송하는 경우 AP로부터 프레임 또는 BSS Color를 포함한 프레임

을 수신한 적이 없을 수 있고, 이러한 경우 HE-SIG-A의 BSS Color 값을 0으로 셋팅할 수 있다. 본 발명의 일 실시예에 따르면 수신하는 AP로부터 HE Operation element를 수신한 적 없을 때 BSS Color 값을 0으로 셋팅할 수 있다. 본 발명의 일 실시예에 따르면 Probe Request frame을 보낼 때 BSS Color 값을 0으로 셋팅할 수 있다. 또는 Probe Request frame을 보낼 때 HE Operation element의 BSS Color 값을 0으로 셋팅할 수 있다. 또는 Probe Request frame을 보낼 때 HE-SIG-A의 BSS Color 값을 0으로 셋팅할 수 있다.

<78> 본 발명의 일 실시예에 따르면 다음 조건 중 하나를 만족하면 detected frame을 intra-BSS frame으로 판단할 수 있다.

<79> - Detected PPDU의 BSS Color가 수신하는 STA와 associate된 AP에 의해 announce된 BSS color와 같다.

<80> - Detected frame의 RA 또는 TA가 수신하는 STA와 associate된 AP의 BSSID 또는 bandwidth signaling variant와 같다.

<81> - 수신하는 STA가 associate된 AP가 어떤 multiple BSSID element에 의해 identify되고 detected frame의 RA 또는 TA가 그 multiple BSSID element에 의해 정의된 BSSID 또는 그것의 bandwidth signaling variant와 같다.

<82> 그러나 만약 주변의 BSS와 같은 BSS Color를 사용하는 경우가 있을 수 있다. 이러한 경우에 주변 BSS가 전송한 프레임을 수신한 경우 BSS Color가 자신의 BSS Color와 같음을 확인하게 되고 계속 수신 또는 디코딩할수 있는 프레임의 경우 프

레임의 RA 또는 TA로부터 수신한 프레임이 intra-BSS frame이 아님을 판단할 수 있다. 하지만 위와 같은 조건에 의해 Intra-BSS frame을 판단하는 경우 세가지 조건 중 BSS Color가 같은 첫번째 조건을 이미 만족시켰으므로 RA 또는 TA 값에 상관없이 수신한 프레임을 intra-BSS frame으로 판단할 수 있다.

<83> 따라서 본 발명의 일 실시예에 따르면 수신한 프레임이 intra-BSS 프레임인지 아닌지 판단할 때 BSS Color와 MAC address를 모두 사용가능한 경우 MAC address에 기반하여 판단할 수 있다. 본 발명의 일 실시예에 따르면 수신한 프레임이 intra-BSS 프레임인지 아닌지 판단할 때 BSS Color와 MAC address를 모두 사용가능한 경우 MAC address에 기반하여 최종 판단할 수 있다. 또는 수신한 프레임을 intra-BSS 프레임으로 판단했지만 RA 또는 TA가 BSSID 또는 그것의 bandwidth signaling variant 또는 associate된 AP와 같은 multiple BSS element에 의해 정의된 BSSID 또는 그것의 bandwidth signaling variant와 같지 않은 경우 수신한 프레임을 intra-BSS 프레임이 아닌 것으로 판단할 수 있다. 일 실시예로 intra-BSS 프레임이 아닌 것으로 판단한 경우, 혹은 intra-BSS 프레임으로 판단했다가 intra-BSS 프레임이 아닌 것으로 판단한 경우 향상된 CCA를 사용하지 않을 수 있다. 일 실시예로 intra-BSS 프레임이 아닌 것으로 판단한 경우, 혹은 intra-BSS 프레임으로 판단했다가 intra-BSS 프레임이 아닌 것으로 판단한 경우 OBSS PD level을 사용하지 않을 수 있다.

<84> 또다른 실시예로 위에서 언급한 detected frame을 intra-BSS frame으로 판단할 수 있는 세가지 조건 중 어느 하나라도 (확인할 수 없는게 아니라) 만족하지 못

하는 경우 detected frame을 intra-BSS frame이 아닌 것으로 판단할 수 있다.

<85> 본 발명의 일 실시예에 따르면 수신한 프레임의 RA가 자신의 MAC address와 다른 경우 수신한 HE-SIG-A가 inter-BSS가 전송한 것이거나 Intra-BSS가 전송했는지 inter-BSS가 전송했는지 판단할 수 없는 경우에 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 업데이트할 수 있다. 본 발명의 일 실시예에 따르면 수신한 프레임의 RA가 자신의 MAC address와 다른 경우 MAC decoding을 할 수 없는 경우에 수신한 HE-SIG-A가 inter-BSS가 전송한 것이거나 Intra-BSS가 전송했는지 inter-BSS가 전송했는지 판단할 수 없는 경우에 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 업데이트할 수 있다.

<86> 본 발명의 일 실시예에 따르면 수신한 프레임의 RA가 자신의 MAC address와 다른 경우 수신한 HE-SIG-A가 inter-BSS가 전송한 것이거나 Intra-BSS가 전송했는지 inter-BSS가 전송했는지 판단할 수 없는 경우에 HE-SIG-A의 TXOP Duration이 현재의 regular NAV보다 크면 이에 기반하여 regular NAV를 업데이트할 수 있다. 본 발명의 일 실시예에 따르면 수신한 프레임의 RA가 자신의 MAC address와 다른 경우 MAC decoding을 할 수 없는 경우에 수신한 HE-SIG-A가 inter-BSS가 전송한 것이거나 Intra-BSS가 전송했는지 inter-BSS가 전송했는지 판단할 수 없는 경우에 HE-SIG-A의 TXOP Duration이 현재의 regular NAV보다 크면 이에 기반하여 regular NAV를 업데이트할 수 있다.

<87> 본 발명의 일 실시예에 따르면 detected frame이 inter-BSS 프레임인 경우 어떤 조건 하에서 기존의 CCA threshold 또는 minimum receive sensitivity level

보다 큰 OBSS PD level을 사용하여 채널 엑세스를 할 수 있다. 일 실시예로 이때 OBSS PD level를 적용하는 기간은 detected PPDU 길이를 넘지 않을 수 있다. 일 실시예로 이때 OBSS PD level를 적용하는 기간은 detected PPDU payload 길이를 넘지 않을 수 있다. 일 실시예로 OBSS PD level을 적용하다가 다른 프레임을 수신한 경우 수신한 프레임이 intra-BSS 프레임인지 아닌지에 따른 CCA threshold를 그 다른 프레임에 대해 판단하여 CCA threshold로 사용할 수 있다. 또다른 실시예로 OBSS PD level를 적용하다가 intra-BSS 프레임을 수신한 경우 OBSS PD level을 사용하지 않고 기존의 CCA threshold를 사용할 수 있다. 일 실시예로 detect된 intra-BSS PPDU가 끝나지 않았을 때는 중간에 inter-BSS 프레임을 수신하더라도 intra-BSS PPDU가 끝날 때까지 OBSS PD level을 사용하지 않을 수 있다.

<89> 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.

<90> 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

아는 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.

<91> 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】

<92> 100 : 스테이션

200 : 액세스 포인트

제출 일자 : 2016-04-11

【특허청구범위】

【청구항 1】

무선랜을 위한 방법, 장치 및 시스템.

제출 일자 : 2016-04-11

【요약서】

【요약】

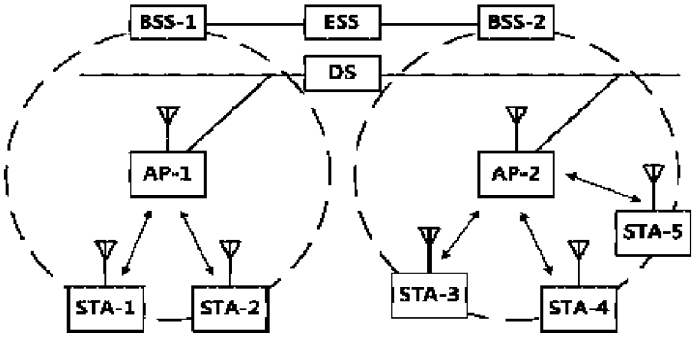
본 발명은 무선랜을 위한 장치, 시스템 및 무선랜 통신 방법에 관한 것으로, 본 발명의 실시예에 따르면 맥 효율을 향상시키기 위한 방법, 장치 및 시스템이 제공될 수 있다.

【대표도】

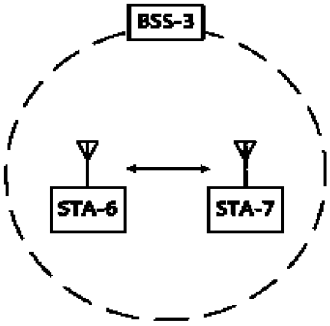
도 8

【도면】

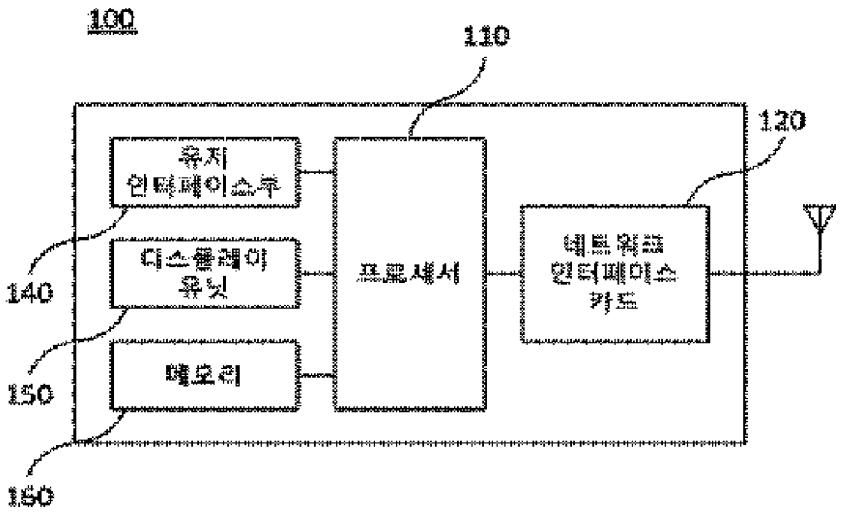
【도 1】


BSS-1
ESS
BSS-2
DS
AP-1
AP-2
STA-5
STA-1
STA-2
STA-3
STA-4

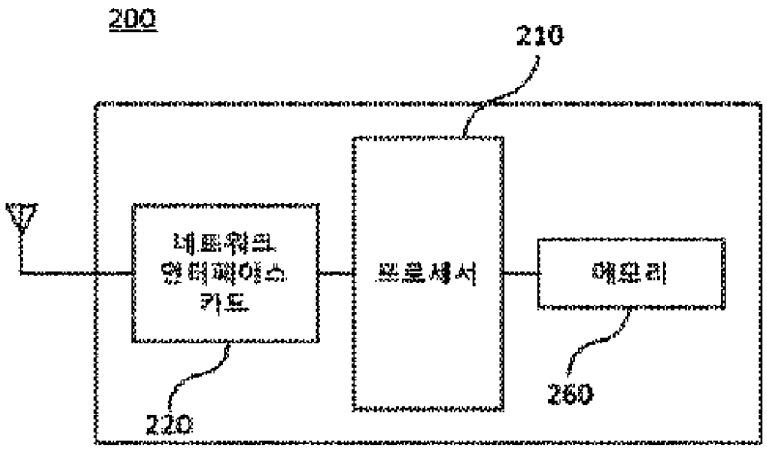
【도 2】


BSS-3
STA-6
STA-7

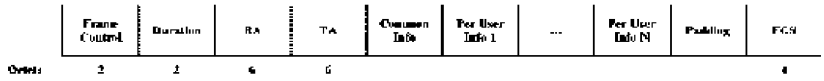
【도 3】


100
110
120
유저
인터페이스부
디스플레이
유닛
프로세서
네트워크
인터페이스
카드
메모리
140
150
160

【도 4】

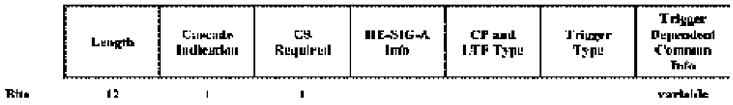

200
210
네트워크
인터페이스
카드
프로세서
메모리
220
260

【도 5】

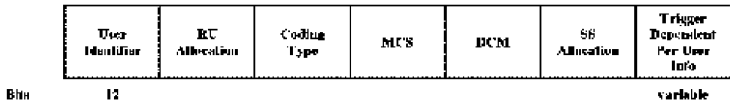


【도 6】

(a) Common Info field

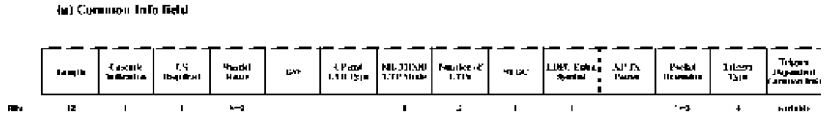


(b) Per User Info field

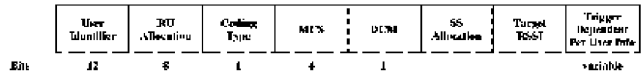


【도 7】

(a) Common Info field

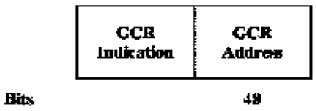


(b) Per User Info field

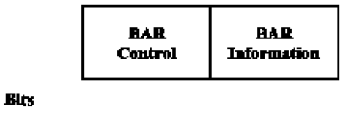


【도 8】

(a) Trigger Dependent Common Info field

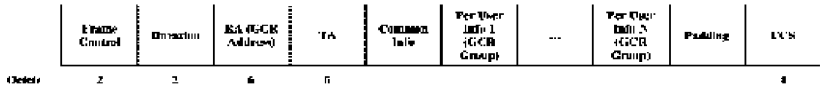


(b) Trigger Dependent Per User Info field

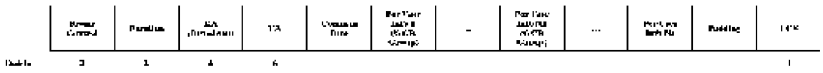


【도 9】

【도 10】



【도 11】



【도 12】

(a) BAR Control field

B0	B1	B2	B3	B4	B11	B12	B15
BAR Ack Policy	Multi-TID	Compressed Bitmap	GCR	Reserved		TID_INFO	
Bits	1	1	1	1	8	4	

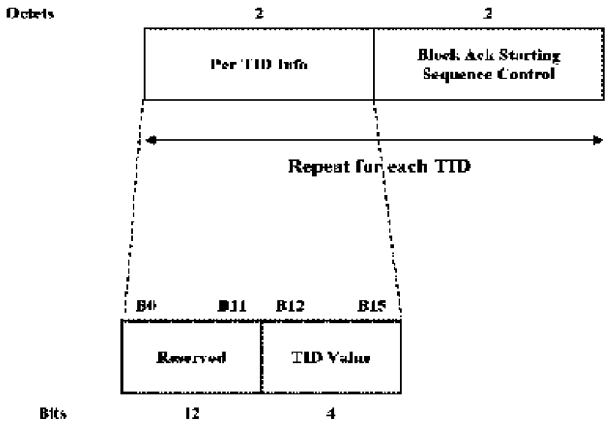
(b) BlockAckReq variant encoding

Multi-TID subfield value	Compressed Bitmap subfield value	GCR subfield value	BlockAckReq variant
0	0	0	Basic BlockAckReq
0	1	0	Compressed BlockAckReq
1	0	0	Extended Compressed BlockAckReq
1	1	0	Multi-TID BlockAckReq
0	0	1	Reserved
0	1	1	GCR BlockAckReq
1	0	1	Reserved
1	1	1	Reserved

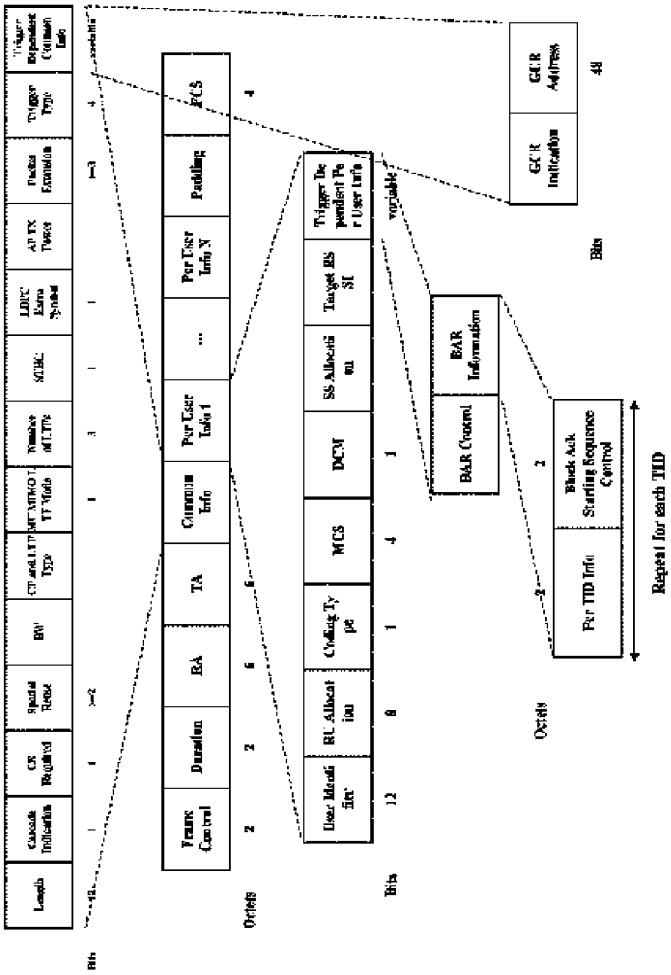
【도 13】

Block Ack Starting Sequence Control
Bits 16

【도 14】


Octets
2
2
Per TID Info
Block Ack Starting Sequence Control
Repeat for each TID
B0
B11
B12
B15
Reserved
TID Value
Bits
12
4

【도 15】


Length
Cascade Indication
CS Required
Special User
BW
GI And LTF Type
MU-MIMO LTF Mode
Number of HE-LTFs
STBC
LDPC Extra Symbol
AP TX Power
Packet Extension
Trigger Type
Trigger Dependent Common Info
Frame Control
Duration
RA
TA
Common Info
Per User Info 1
...
Per User Info N
Padding
FCS
User Identifier
RU Allocation
Coding Type
MCS
DCM
SS Allocation
Target RSSI
Trigger Dependent Per User Info
variable
GCR Indication
GCR Address
48
Bits
Octets
BAR Control
BAR Information
Per TID Info
Block Ack Starting Sequence Control
Repeat for each TID

대한민국특허청
KOREAN INTELLECTUAL PROPERTY OFFICE

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

2018년 10월 29일

특 허 청
COMMISSIONER

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【발명의 국문명칭】 BSS 컬러 충돌이 발생했을 때 잘못된 동작을 방지하기 위한 방법, 장치 및 시스템

【발명의 영문명칭】 METHOD, APPARATUS, AND SYSTEM FOR PREVENTING INAPPOROPRIATE OPERATIONS WHEN BSS COLOR COLLISION OCCURRED

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【취지】 위와 같이 특허청장에게 제출합니다.

대리인 임국일 (서명 또는 인)

【수수료】

【출원료】	0	면	46,000 원
【가산출원료】	40	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		

【발명의 설명】

【발명의 명칭】

BSS 컬러 충돌이 발생했을 때 잘못된 동작을 방지하기 위한 방법, 장치 및 시스템{METHOD, APPARATUS, AND SYSTEM FOR PREVENTING INAPPOROPRIATE OPERATIONS WHEN BSS COLOR COLLISION OCCURRED}

【기술분야】

<1> 본 발명은 BSS 컬러 관련 동작에서 잘못된 동작을 방지하는 방법으로서, 더욱 상세하게는 무선랜에서 BSS 컬러 충돌이 발생했을 때 잘못된 동작을 방지하기 위한 다양한 방법, 장치 및 시스템에 관한 것이다.

【배경기술】

<2> 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 기기들을 가정이나 기업 또는 특정 서비스 제공지역에서 무선으로 인터넷에 접속할 수 있도록 하는 기술이다.

<3> IEEE(Institute of Electrical and Electronics Engineers) 802.11은 2.4GHz 주파수를 이용한 초기의 무선랜 기술을 지원한 이래, 다양한 기술의 표준을 실용화 또는 개발 중에 있다. 먼저, 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.

<4> 그리고 무선랜에서 취약점으로 지적되어온 통신 속도에 대한 한계를 극복하기 위하여 제정된 기술 규격으로서 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 수 있다.

<5> 무선랜의 보급이 활성화되고 또한 이를 이용한 어플리케이션이 다양화됨에 따라, IEEE 802.11n이 지원하는 데이터 처리 속도보다 더 높은 처리율(Very High Throughput, VHT)을 지원하기 위한 새로운 무선랜 시스템에 대한 필요성이 대두되

었다. 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. 이론적으로, 이 규격에 따르면 다중 스테이션의 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 2.4GHz/5GHz 대신 60GHz 밴드를 사용해 데이터를 전송하는 방식으로 IEEE 802.11ad가 있다. IEEE 802.11ad는 빔포밍 기술을 이용하여 최대 7Gbps의 속도를 제공하는 전송규격으로서, 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.

<6> 한편, 최근에는 802.11ac 및 802.11ad 이후의 차세대 무선랜 표준으로서, 고밀도 환경에서의 고효율 및 고성능의 무선랜 통신 기술을 제공하기 위한 논의가 계속해서 이루어지고 있다. 즉, 차세대 무선랜 환경에서는 고밀도의 스테이션과 AP(Access Point)의 존재 하에 실내/외에서 높은 주파수 효율의 통신이 제공되어야 하며, 이를 구현하기 위한 다양한 기술들이 필요하다.

【발명의 내용】

【해결하려는 과제】

<7> 본 발명은 전술한 바와 같이 고밀도 환경에서의 고효율/고성능의 무선랜 통신을 제공하기 위한 목적을 가지고 있다.

【과제의 해결 수단】

<8> 본 발명의 실시예에 따르면 무선랜을 위한 장치, 시스템 및 무선랜 통신 방법이 제공될 수 있다.

【발명의 효과】

<9> 본 발명의 실시예에 따르면, 맥 헤더에 컨트롤 정보를 효율적으로 포함시킬 수 있는 방법을 제공한다. 본 발명은 무선랜을 이용하는 스테이션 내지 액세스 포인트, 셀룰러 통신을 이용하는 스테이션 내지 기지국 등 다양한 통신 디바이스에 사용 가능하다.

【도면의 간단한 설명】

<10> 도 1은 본 발명의 일 실시예에 따른 무선랜 시스템을 나타낸 도면.

도 2는 본 발명의 다른 실시예에 따른 무선랜 시스템을 나타낸 도면.

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

도 4는 본 발명의 일 실시예에 따른 액세스 포인트의 구성을 나타낸 블록도.

도 5는 본 발명의 일 실시예에 따른 intra-PPDU power save를 나타낸 도면.

도 6은 본 발명의 일 실시예에 따른 BSS color collision이 발생한 경우 intra-PPDU power save를 나타낸 도면.

도 7은 본 발명의 일 실시예에 따른 BSS color collision이 발생한 경우 프레임 교환을 나타낸 도면.

도 8은 본 발명의 일 실시예에 따른 BSS color collision을 인지한 이후 프레임 교환을 나타낸 도면.

도 9는 본 발명의 일 실시예에 따른 BSS color collision이 발생한 경우 프레임 교환을 나타낸 도면.

도 10은 본 발명의 일 실시예에 따른 BSS color collision을 인지한 이후 프레임 교환을 나타낸 도면.

도 11은 본 발명의 일 실시예에 따른 BSS color collision 감지 과정을 나타낸 도면.

【발명을 실시하기 위한 구체적인 내용】

<11> 본 명세서에서 사용되는 용어는 본 발명에서의 기능을 고려하면서 가능한 현재 널리 사용되는 일반적인 용어를 선택하였으나, 이는 당 분야에 종사하는 기술자의 의도, 관례 또는 새로운 기술의 출현 등에 따라 달라질 수 있다. 또한 특정 경우는 출원인이 임의로 선정한 용어도 있으며, 이 경우 해당되는 발명의 설명 부분에서 그 의미를 기재할 것이다. 따라서 본 명세서에서 사용되는 용어는, 단순한 용어의 명칭이 아닌 그 용어가 가진 실질적인 의미와 본 명세서의 전반에 걸친 내용을 토대로 해석되어야 함을 밝혀두고자 한다.

<12> 명세서 전체에서, 어떤 구성이 다른 구성과 "연결"되어 있다고 할 때, 이

는 "직접적으로 연결" 되어 있는 경우뿐 아니라, 그 중간에 다른 구성요소를 사이에 두고 "전기적으로 연결" 되어 있는 경우도 포함한다. 또한 어떤 구성이 특정 구성요소를 "포함" 한다고 할 때, 이는 특별히 반대되는 기재가 없는 한 다른 구성요소를 제외하는 것이 아니라 다른 구성요소를 더 포함할 수 있는 것을 의미한다. 이에 더하여, 특정 임계값을 기준으로 "이상" 또는 "이하" 라는 한정 사항은 실시예에 따라 각각 "초과" 또는 "미만" 으로 적절하게 대체될 수 있다.

<13> 도 1은 본 발명의 일 실시예에 따른 무선랜 시스템을 도시하고 있다. 무선랜 시스템은 하나 또는 그 이상의 베이직 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.

<14> 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.

<15> 스테이션(Station, STA)은 IEEE 802.11 표준의 규정을 따르는 매체 접속 제어(Medium Access Control, MAC)와 무선 매체에 대한 물리층(Physical Layer) 인터

페이스를 포함하는 임의의 디바이스로서, 광의로는 비 액세스 포인트(Non-AP) 스테이션뿐만 아니라 액세스 포인트(AP)를 모두 포함한다. 또한, 본 명세서에서는 스테이션과 AP 등의 무선랜 통신 디바이스를 모두 포함하는 개념으로서 '단말' 이라는 용어가 사용될 수 있다. 무선 통신을 위한 스테이션은 프로세서(Processor)와 트랜시버(transceiver)를 포함하고, 실시예에 따라 유저 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 수행할 수 있다. 그리고, 트랜시버는 상기 프로세서와 기능적으로 연결되어 있으며 스테이션을 위하여 무선 네트워크를 통해 프레임을 송수신한다.

<16> 액세스 포인트(Access Point, AP)는 자신에게 결합된(associated) 스테이션을 위하여 무선 매체를 경유하여 분배시스템(DS)에 대한 접속을 제공하는 개체이다. 인프라스트럭쳐 BSS에서 비 AP 스테이션들 사이의 통신은 AP를 경유하여 이루어지는 것이 원칙이지만, 다이렉트 링크가 설정된 경우에는 비AP 스테이션들 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.

<17> 복수의 인프라스트럭쳐 BSS는 분배 시스템(DS)을 통해 상호 연결될 수 있다. 이때, 분배 시스템을 통하여 연결된 복수의 BSS를 확장 서비스 세트(Extended

Service Set, BSS)라 한다.

<18> 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.

<19> 도 2에 도시된 BSS-3는 독립 BSS이며 AP를 포함하지 않기 때문에, 모든 스테이션(STA-6, STA-7)이 AP와 접속되지 않은 상태이다. 독립 BSS는 분배 시스템으로의 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.

<20> 도 3은 본 발명의 일 실시예에 따른 스테이션(100)의 구성을 나타낸 블록도이다.

<21> 도시된 바와 같이, 본 발명의 실시예에 따른 스테이션(100)은 프로세서(110), 네트워크 인터페이스 카드(NIC, 120), 유저 인터페이스부(140), 디스플레이 유닛(150) 및 메모리(160)를 포함할 수 있다.

<22> 먼저, 네트워크 인터페이스 카드(120)는 무선랜 접속을 수행하기 위한 모듈이며, 스테이션(100)을 위한 패킷 전송과 수신을 수행한다. 네트워크 인터페이스 카드(120)는 스테이션(100)에 내장되거나 외장으로 구비될 수 있으며, 실시예에 따라 서로 다른 주파수 밴드를 이용하는 적어도 하나의 네트워크 인터페이스 카드 모듈을 포함할 수 있다. 이를 테면, 상기 네트워크 인터페이스 카드는 2.4GHz, 5GHz

및 60GHz 등의 서로 다른 주파수 밴드의 네트워크 인터페이스 카드 모듈을 포함할 수 있다. 일 실시예에 따르면, 스테이션(100)은 6GHz 이상의 주파수 밴드를 이용하는 네트워크 인터페이스 카드 모듈과, 6GHz 이하의 주파수 밴드를 이용하는 네트워크 인터페이스 카드 모듈을 구비할 수 있다. 각각의 네트워크 인터페이스 카드 모듈은 해당 네트워크 인터페이스 카드 모듈이 지원하는 주파수 밴드의 무선랜 규격에 따라 AP 또는 외부 스테이션과 무선 통신을 수행할 수 있다. 네트워크 인터페이스 카드(120)는 스테이션(100)의 성능 및 요구 사항에 따라 한 번에 하나의 네트워크 인터페이스 카드 모듈만을 동작시키거나 동시에 다수의 네트워크 인터페이스 카드 모듈을 함께 동작시킬 수 있다. 스테이션(100)이 복수의 네트워크 인터페이스 카드 모듈을 포함할 경우, 각 네트워크 인터페이스 카드 모듈은 각각 독립된 형태로 구비될 수도 있으며, 하나의 칩으로 통합되어 구비될 수도 있다.

<23> 다음으로, 유저 인터페이스부(140)는 스테이션(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 스테이션(100)을 제어할 수 있다. 또한, 유저 인터페이스부(140)는 다양한 출력 수단을 이용하여 프로세서(110)의 명령에 기초한 출력을 수행할 수 있다.

<24> 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 스테이션(100)에서 사용되는 제어 프로

그램 및 그에 따른 각종 데이터를 저장한다. 이러한 제어 프로그램에는 스테이션(100)이 AP 또는 외부 스테이션과 접속을 수행하는데 필요한 접속 프로그램이 포함될 수 있다.

<25> 본 발명의 프로세서(110)는 다양한 명령 또는 프로그램을 실행하고, 스테이션(100) 내부의 데이터를 프로세싱 할 수 있다. 또한, 상기 프로세서(110)는 상술한 스테이션(100)의 각 유닛들을 제어하며, 유닛들 간의 데이터 송수신을 제어할 수 있다. 본 발명의 실시예에 따르면, 프로세서(110)는 메모리(160)에 저장된 AP와의 접속을 위한 프로그램을 실행하고, AP가 전송한 통신 설정 메시지를 수신할 수 있다. 또한, 프로세서(110)는 통신 설정 메시지에 포함된 스테이션(100)의 우선 조건에 대한 정보를 판독하고, 스테이션(100)의 우선 조건에 대한 정보에 기초하여 AP에 대한 접속을 요청할 수 있다. 이에 대한 구체적인 실시예는 추후 기술하기로 한다.

<26> 도 3에 도시된 스테이션(100)은 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 상기 스테이션(100)의 일부 구성들, 이를 테면 유저 인터페이스부(140) 및 디스플레이 유닛(150) 등은 스테이션(100)에 선택적으로 구비될 수 있다.

<27> 도 4는 본 발명의 일 실시예에 따른 AP(200)의 구성을 나타낸 블록도이다.

<28> 도시된 바와 같이, 본 발명의 실시예에 따른 AP(200)는 프로세서(210), 네트

워크 인터페이스 카드(220) 및 메모리(260)를 포함할 수 있다. 도 4에서 AP(200)의 구성 중 도 3의 스테이션(100)의 구성과 동일하거나 상응하는 부분에 대해서는 중복적인 설명을 생략하도록 한다.

<29> 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, 상기 AP(200)의 네트워크 인터페이스 카드(220) 또한 서로 다른 주파수 밴드를 이용하는 복수의 네트워크 인터페이스 카드 모듈을 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 네트워크 인터페이스 카드 모듈과, 6GHz 이하의 주파수 밴드를 이용하는 네트워크 인터페이스 카드 모듈을 구비할 수 있다. 각각의 네트워크 인터페이스 카드 모듈은 해당 네트워크 인터페이스 카드 모듈이 지원하는 주파수 밴드의 무선랜 규격에 따라 스테이션과 무선 통신을 수행할 수 있다. 상기 네트워크 인터페이스 카드(220)는 AP(200)의 성능 및 요구 사항에 따라 한 번에 하나의 네트워크 인터페이스 카드 모듈만을 동작시키거나 동시에 다수의 네트워크 인터페이스 카드 모듈을 함께 동작시킬 수 있다.

<30> 다음으로, 메모리(260)는 AP(200)에서 사용되는 제어 프로그램 및 그에 따른 각종 데이터를 저장한다. 이러한 제어 프로그램에는 스테이션의 접속을 관리하는 접속 프로그램이 포함될 수 있다. 또한, 프로세서(210)는 AP(200)의 각 유닛들을

제어하며, 유닛들 간의 데이터 송수신을 제어할 수 있다. 본 발명의 실시예에 따르면, 프로세서(210)는 메모리(260)에 저장된 스테이션과의 접속을 위한 프로그램을 실행하고, 하나 이상의 스테이션에 대한 통신 설정 메시지를 전송할 수 있다. 이때, 통신 설정 메시지에는 각 스테이션의 접속 우선 조건에 대한 정보가 포함될 수 있다. 또한, 프로세서(210)는 스테이션의 접속 요청에 따라 접속 설정을 수행한다. 이에 대한 구체적인 실시예는 추후 기술하기로 한다.

<32> 본 발명의 일 실시예에 따르면 HE PPDU는 HE-SIG-A에 포함된 BSS identifier인 BSS color(BSS 컬러)를 통해 PPDU가 어느 BSS가 송신한 것인지, 혹은 같은 BSS가 송신한 것인지, 혹은 다른 BSS가 송신한 것인지 등을 파악할 수 있다. 또한 PPDU가 어느 BSS가 송신한 것인지, 혹은 같은 BSS가 송신한 것인지, 혹은 다른 BSS가 송신한 것인지 등을 파악하는 데에 있어서 MAC header를 참조할 수도 있다. MAC header의 Address 필드 중에 BSSID가 있으면 같은 BSS가 송신한 것으로 파악할 수 있고, Address 필드 중에 BSSID가 없으면 다른 BSS가 송신했거나 어떤 BSS가 송신했는지 알 수 없는 것으로 파악할 수 있다.

<34> 본 발명의 일 실시예에 따르면 OBSS들이 같은 BSS color를 사용하는 경우가 있을 수 있다. 이 상황을 아래에서 BSS color collision(BSS color 충돌)이라고 부르겠다.

<36> Intra-PPDU Power Save

<37> 도 5는 본 발명의 일 실시예에 따른 intra-PPDU power save를 나타낸 도면이다.

<38> 도 5를 참조하면 STA가 PPDU를 detection(감지)했을 때 PPDU가 특정 조건을 만족시킬 때 doze state로 들어갈 수 있다.

<39> 본 발명의 일 실시예에 따르면

<40> An HE non-AP STA that is in awake state (see 11.2.2.2 (STA Power Management modes)) and has dot11IntraPPDUPowerSaveOptionActivated equal to true operates in intra-PPDU power save mode.

<41> An HE non-AP STA that is in intra-PPDU power save mode may enter the doze state until the end of a received PPDU when one of the following conditions is met:

<42> - The PPDU is an HE MU PPDU with:

<43> ===The value of the RXVECTOR parameter BSS_COLOR equal to the BSS color of the BSS with which the STA is associated and,

<44> ===The value of the RXVECTOR parameter UL_FLAG is equal to 0 and,

<45> ===The values obtained from the RXVECTOR parameter STA_ID_LIST do not match the identifier of the STA or the broadcast identifier(s) intended for

the STA

<46> - The PPDU is an HE MU PPDU, HE SU PPDU, or HE extended range SU PPDU with:

<47> ===The value of the RXVECTOR parameter BSS_COLOR equal to the BSS color of the BSS with which the STA is associated and,

<48> ===The value of the RXVECTOR parameter UL_FLAG is equal to 1

<49> - The PPDU is an HE trigger-based PPDU with:

<50> ===The value of the RXVECTOR parameter BSS_COLOR equal to the BSS color of the BSS with which the STA is associated

<51> An HE STA that is in intra-PPDU power save mode and has entered doze state shall continue to operate its NAV timer and consider the medium busy during doze state and shall transition into awake state at the end of the PPDU.

<52> NOTE – The STA can contend for access to the medium immediately on the expiry of the NAV timer.

<54> Awake state에 있고 dot11IntraPPDUPowerSaveOptionActivated가 true로 되어 있는 HE non-AP STA는 intra-PPDU power save mode로 작동한다.

<55> Intra-PPDU power save mode에 있는 HE non-AP STA는 다음 조건 중 하나를

만족할 때 수신한 PPDU의 끝까지 doze state로 들어갈 수 있다.

<56> - PPDU가 HE MU PPDU이고

<57> ===RXVECTOR parameter BSS_COLOR 값이 그 STA가 association된 BSS의 BSS color와 같고,

<58> ===RXVECTOR parameter UL_FLAG 값이 0이고,

<59> ===RXVECTOR parameter STA_ID_LIST 값들이 그 STA의 identifier와 일치하지 않거나 그 STA에게 intend된 broadcast identifier(s)가 아닐 때.

<60> - PPDU가 HE MU PPDU, HE SU PPDU, 또는 HE extended range SU PPDU이고,

<61> ===RXVECTOR parameter BSS_COLOR 값이 그 STA가 association된 BSS의 BSS color와 같고,

<62> ===RXVECTOR parameter UL_FLAG 값이 1일 때

<63> - PPDU가 HE trigger-based PPDU이고,

<64> ===RXVECTOR parameter BSS_COLOR 값이 그 STA가 association된 BSS의 BSS color과 같을 때

<66> Intra-PPDU power save mode에 있고 doze state에 들어간 HE STA는 NAV timer를 계속 작동시켜야 하고 doze state동안 medium 상태를 busy로 판단해야 하고, 그 PPDU의 끝에서 awake state로 바꿔어야 한다.

<67> NAV timer가 expire 되면 STA는 medium access를 위해 즉시 경쟁할 수 있다.

<69> 도 6은 본 발명의 일 실시예에 따른 BSS color collision이 발생한 경우 intra-PPDU power save를 나타낸 도면이다.

<70> 도 6과 앞서 설명한 Intra-PPDU power save를 참조하면 STA는 수신한 PPDU가 특정 조건을 만족할 때 doze state로 들어갈 수 있다. 만약 도 6과 같이 inter-BSS가 intra-BSS(또는 MYBSS)와 같은 BSS color를 사용할 경우, inter-BSS frame을 수신하여 BSS color가 같음을 확인했고 앞서 설명한 조건을 만족시킬 때 doze state로 들어갈 수 있다. 또한 inter-BSS frame 동안 doze state로 들어가게 되면 그동안 그 STA에 intend된 frame을 수신할 수 없는 문제가 발생한다.

<71> 본 발명의 일 실시예에 따르면 언급한 문제를 해결하기 위해 BSS color collision을 인지한 뒤부터는 같은 BSS color의 PPDU를 수신했을 때 intra-PPDU power save mode에 있는 STA가 doze state로 들어가지 않을 수 있다. 또는 수신한 프레임이 Intra-BSS인지 Inter-BSS인지 판단할 수 없는 경우에 intra-PPDU power save mode에 있는 STA가 doze state로 들어가지 않을 수 있다. 또는 BSS color collision을 인지한 뒤에 dot11IntraPPDUPowerSaveOptionActivated를 false로 설정할 수 있다. 또는 BSS color collision을 인지하면 BSS color에 기반한 동작을 하지 않을 수 있다. 또는 BSS color collision을 인지하면 같은 BSS color에 기반한 동작을 하지 않을 수 있다. 또는 BSS color collision을 인지한 뒤부터는 어떤 시

간까지 같은 BSS color의 PPDU를 수신했을 때 intra-PPDU power save mode에 있는 STA가 doze state로 들어가지 않을 수 있다. 또는 BSS color collision을 인지한 뒤에 어떤 시간까지 intra-PPDU power save mode로 동작하지 않을 수 있다. 언급한 어떤 시간은 예를 들면 BSS color collision이 해결되는 시간일 수 있다. 일 실시예로 특정 reserve된 BSS color(예를 들면 0)으로 동작하여 BSS color operation을 제한할 수 있고 그때까지일 수 있다. 또한 언급한 어떤 시간은 현재의 association이 끊어지는 시간일 수 있다. 또는 BSS color collision을 인지한 뒤에 STA는 doze state에 들어가지 않을 수 있다.

<73> Updating two NAVs

<74> 본 발명의 일 실시예에 따르면 STA는 다수의 NAV를 사용할 수 있다. 한가지 실시예로 STA는 2개의 NAV를 사용할 수 있다.

<75> Mandatory or optional support of two NAVs is TBD.

<76> For the two NAVs maintained by a HE STA, one is identified as Intra-BSS NAV, and the second one is identified as regular NAV.

<77> A STA that receives at least one valid frame in a PSDU and identifies the frame as Intra-BSS can update its Intra-BSS NAV with the information from any valid Duration field in the PSDU.

<78> A STA that receives at least one valid frame in a PSDU and identifies

the frame as Inter-BSS can update its regular NAV with the information from any valid Duration field in the PSDU.

<79> A STA that receives at least one valid frame in a PSDU and cannot identify the frame as Intra-BSS or Inter-BSS can update its regular NAV with the information from any valid Duration field in the PSDU.

<80> A STA that receives a valid HE-SIG-A in a HE PPDU and identifies the HE-SIG-A as Intra-BSS can update its Intra-BSS NAV with the information from the TXOP Duration field in the HE-SIG-A.

<81> A STA that receives a valid HE-SIG-A in a HE PPDU and identifies the HE-SIG-A as Inter-BSS can update its regular NAV with the information from the TXOP Duration field in the HE-SIG-A.

<82> When the received frame's RA is equal to the STA's own MAC address, the STA shall not update its Intra-BSS NAV or regular NAV with the information from the Duration field.

<83> When a STA receives both a valid HE-SIG-A in a HE PPDU and a valid frame in the PSDU of the HE PPDU, the STA shall not update its Intra-BSS NAV or regular NAV with the information from the TXOP Duration field in the HE-SIG-A.

<84> For all other received frames that are identified by the STA as Intra-

BSS, the STA shall update its Intra-BSS NAV when the received value of the Duration field is greater than the STA's current Intra-BSS NAV value.

<85> For all other received frames that are identified by the STA as Inter-BSS or cannot be identified as Intra-BSS or Inter-BSS, the STA shall update its regular NAV when the received value of the Duration field is greater than the STA's current regular NAV value.

<86> For all other received HE-SIG-As that are identified by the STA as Intra-BSS, the STA shall update its Intra-BSS NAV when the received value of the TXOP Duration field is greater than the STA's current Intra-BSS NAV value.

<87> For all other received HE-SIG-As that are identified by the STA as Inter-BSS, the STA shall update its Inter-BSS NAV when the received value of the TXOP Duration field is greater than the STA's current regular NAV value.

<89> 2개의 NAV 지원은 mandatory일 수 있고, 또는 optional일 수 있다.

<90> STA가 유지하는 2개의 NAV에 대해서, 하나의 NAV는 Intra-BSS NAV이고, 다른 하나는 regular NAV일 수 있다.

<91> PSDU에서 적어도 하나의 valid frame을 수신하고 그것을 Intra-BSS로 판단하는 STA는 PSDU의 어떠한 valid Duration 필드 정보로부터 그것의 Intra-BSS NAV를

업데이트할 수 있다.

<92> PSDU에서 적어도 하나의 valid frame을 수신하고 그것을 Inter-BSS로 판단하는 STA는 PSDU의 어떠한 valid Duration 필드 정보로부터 그것의 regular NAV를 업데이트할 수 있다.

<93> PSDU에서 적어도 하나의 valid frame을 수신하고 그것을 Intra-BSS인지 Inter-BSS인지 판단할 수 없는 STA는 PSDU의 어떠한 valid Duration 필드 정보로부터 그것의 regular NAV를 업데이트할 수 있다.

<94> HE PPDU의 valid HE-SIG-A를 수신하고 HE-SIG-A를 Intra-BSS로 판단하는 STA는 HE-SIG-A의 TXOP Duration 필드 정보로부터 그것의 Intra-BSS NAV를 업데이트할 수 있다.

<95> HE PPDU의 valid HE-SIG-A를 수신하고 HE-SIG-A를 Inter-BSS로 판단하는 STA는 HE-SIG-A의 TXOP Duration 필드 정보로부터 그것의 regular NAV를 업데이트할 수 있다.

<96> 수신한 프레임의 RA가 STA의 MAC address와 일치할 때 STA는 Duration 필드 정보로부터 그것의 Intra-BSS NAV 또는 regular NAV를 업데이트하면 안된다.

<97> STA가 HE PPDU의 valid HE-SIG-A와 HE PPDU의 PSDU의 valid frame을 모두 받았을 때 STA는 HE-SIG-A의 TXOP Duration 필드 정보로부터 그것의 Intra-BSS NAV 또는 regular NAV를 업데이트하면 안된다.

<98> STA에 의해 Intra-BSS로 판단되는 모든 다른 received frames에 대해, 수신

한 Duration 필드의 값이 STA의 현재 Intra-BSS NAV 값보다 클 때 그것의 Intra-BSS NAV를 업데이트 해야 한다.

<99> STA에 의해 Inter-BSS로 판단되거나 Intra-BSS인지 Inter-BSS인지 판단할 수 없는 모든 다른 received frames에 대해, 수신한 Duration 필드의 값이 STA의 현재 regular NAV 값보다 클 때 그것의 regular NAV를 업데이트 해야 한다.

<100> STA에 의해 Intra-BSS로 판단되는 모든 다른 HE-SIG-As에 대해, 수신한 TXOP Duration 필드의 값이 STA의 현재 Intra-BSS NAV 값보다 클 때 STA는 그것의 Intra-BSS NAV를 업데이트 해야 한다.

<101> STA에 의해 Inter-BSS로 판단되는 모든 다른 HE-SIG-As에 대해, 수신한 TXOP Duration 필드의 값이 STA의 현재 regular NAV 값보다 클 때 STA는 그것의 Inter-BSS NAV(또는 regular NAV)를 업데이트 해야 한다.

<103> Truncation of TXOP

<104> An HE STA that receives a CF-End frame should not reset its NAV if:

<105> - The CF-End did not originate from the STA's associated BSS or any BSS of a multi-BSSID set that the STA's associated BSS belongs to and the most recent NAV update was due to a PPDU originating from the STA's associated BSS or any BSS of a multi-BSSID set that the STA's associated BSS belongs to.

<106> - The CF-End originated from the STA's associated BSS or any BSS of a multi-BSSID set that the STA's associated BSS belongs to and the most recent NAV update was not due to a PPDU originating from the STA's associated BSS or any BSS of a multi-BSSID set that the STA's associated BSS belongs to.

<108> CF-End 프레임을 수신하는 HE STA는 다음의 경우에 그것의 NAV를 리셋하면 안된다.

<109> - CF-End가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 오지 않았고, 가장 최근의 NAV가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 온 PPDU에 의해 셋팅되었을 때

<110> - CF-End가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 왔고, 가장 최근의 NAV가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 오지 않은 PPDU에 의해 셋팅되었을 때

<112> A NAV is considered in virtual CS for a STA that is polled from a Trigger frame for UL MU transmission unless one of the following conditions is met:

<113> - The NAV was set by a frame originating from the AP sending the Trigger frame

<114> - The response generated by the STA contains an Ack frame or a BlockAck frame and the duration of the HE trigger-based PPDU is less than a TBD value

<115> - The NAV was set by a frame originating from an intra-BSS STA

<116> - The CS Required subfield in the Trigger frame is 0

<117> - Other condition TBD

<119> 다음 조건들 중 하나도 만족되지 않을 때 UL MU transmission을 위한 Trigger frame에 의해 poll 된 STA는 virtual CS에서 NAV를 고려한다.

<120> - NAV가 Trigger frame을 보낸 AP가 보낸 frame에 의해 셋팅되었을 때

<121> - STA가 보낼 response가 Ack frame이나 BlockAck frame을 포함하고 HE trigger-based PPDU의 duration이 TBD 값보다 작을 때

<122> - NAV가 intra-BSS STA가 보낸 frame에 의해 셋팅되었을 때

<123> - Trigger frame의 CS Required subfield가 0일 때

<124> - 그 외 TBD 조건

<126> 도 7은 본 발명의 일 실시예에 따른 BSS color collision이 발생한 경우 프레임 교환을 나타낸 도면이다.

<127> 도 7을 참조하면 STA는 Inter-BSS 프레임을 수신하고 Inter-BSS 프레임의 BSS color가 Intra-BSS와 같기 때문에 Intra-NAV 셋팅을 할 수 있다. 예를 들면 수신한 프레임이 SU UL PPDU이거나 MU PPDU인데 STA가 디코딩해야할 STA의 own STAID나 broadcast ID, multicast ID를 포함하고 있지 않거나 Trigger-based PPDU인 경우에 STA는 그 프레임이 자신에게 오는 프레임이 아니라고 판단하고 MAC decoding을 하지 않거나 MAC decoding을 할 수 없어서 HE-SIG-A의 TXOP Duration 필드로부터 NAV 셋팅을 할 수 있다. 그런데 수신한 프레임이 실제로는 Inter-BSS 프레임이지만 Inter-BSS가 같은 BSS color를 사용하기 때문에 수신한 프레임을 Intra-BSS 프레임으로 판단하는 경우가 발생할 수 있다. 그러한 경우에 two NAVs를 사용하는 STA의 경우에 Inter-BSS 프레임으로부터 Intra-NAV를 셋팅할 수 있다. 그러한 상태에서 STA가 Intra-BSS AP로부터 그 STA를 트리거하는 Trigger frame을 수신한 경우 셋팅되어있는 NAV가 intra-BSS STA가 보낸 frame에 의해 셋팅된 것이라 판단할 수 있기 때문에 Trigger frame에 NAV를 고려하지 않고 Trigger frame에 응답할 수 있고, 그러한 경우에 OBSS에 interference를 유발할 수 있다.

<129> 도 8은 본 발명의 일 실시예에 따른 BSS color collision을 인지한 이후 프레임 교환을 나타낸 도면이다.

<130> 도 8을 참조하면 도 7에서 언급한 문제를 해결하기 위해 STA는 Inter-BSS frame으로부터 regular NAV(또는 inter-BSS NAV 또는 non-intra-BSS NAV)를 셋팅할 수 있다.

<131> 일 실시예로 STA가 BSS color collision을 인지한 후에 STA는 수신한 프레임의 BSS color가 Intra-BSS의 BSS color와 같을 때 HE-SIG-A의 TXOP Duration에 기반하여 Intra-BSS NAV를 업데이트하지 않을 수 있다. 또는 STA가 BSS color collision을 인지한 후에 STA는 수신한 프레임이 Intra-BSS인지 Inter-BSS인지 판단할 수 없을 때 HE-SIG-A의 TXOP Duration에 기반하여 Intra-BSS NAV를 업데이트하지 않을 수 있다. BSS color collision을 인지한 후에는 수신한 PPDU의 BSS color가 Intra-BSS의 BSS color와 같을 때 수신한 프레임이 Intra-BSS 프레임인지 Inter-BSS 프레임인지 HE-SIG-A 정보만 가지고 판단할 수 없게 된다. 이러한 경우에 STA가 BSS color collision을 인지한 이후 도면과 같이 Intra-BSS와 같은 BSS color를 쓰는 frame을 수신한 경우에 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 업데이트할 수 있다. 이때 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 업데이트하는 것은 MAC decoding을 할 수 없을 때로 제한할 수도 있다. Regular NAV가 셋팅되어 있는 때에 Intra-BSS AP로부터 Trigger frame을 수신하게 되면 NAV가 Intra-BSS의 프레임에 의해 셋팅되었다고 판단하지 않게 되고 NAV를 고려할 수 있다. 그리고 OBSS에 interference를 주지 않을 수 있게 된다.

<132> 또는 BSS color collision을 인지한 후에 STA는 RXVECTOR parameter BSS_COLOR 값에 따라 doze state로 들어가지 않을 수 있다.

<133> 또한 STA가 BSS color collision을 인지한 후에 STA가 수신한 프레임의 BSS color가 Intra-BSS의 BSS color와 같을 때 MAC decoding을 계속할 수 없는 경우에 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 업데이트할 수 있다.

<134> 또한 STA가 BSS color collision을 인지한 후에 STA가 수신한 프레임의 BSS color가 Intra-BSS의 BSS color와 같을 때 MAC decoding을 계속할 수 있는 경우에 MAC header의 MAC address에 기반하여 Intra-BSS NAV 또는 regular NAV를 업데이트 할 수 있다.

<135> 또다른 실시예로 STA가 BSS color collision을 인지한 후에 STA는 같은 BSS color에 기반한 operation들을 하지 않을 수 있다.

<136> 또다른 실시예로 STA가 BSS color collision을 인지한 후에 STA는 BSS color에 기반한 operation들을 하지 않을 수 있다.

<138> 도 9는 본 발명의 일 실시예에 따른 BSS color collision이 발생한 경우 프레임 교환을 나타낸 도면이다.

<139> 도 9을 참조하면 STA는 Inter-BSS 프레임을 수신하고 Inter-BSS 프레임의 BSS color가 Intra-BSS와 같기 때문에 regular NAV 셋팅이 안될 수 있다. 예를 들면 수신한 프레임이 SU UL PPDU이거나 MU PPDU인데 STA가 디코딩해야할 STA의 own STAID나 broadcast ID, multicast ID를 포함하고 있지 않거나 Trigger-based PPDU인 경우에 STA는 그 프레임이 자신에게 오는 프레임이 아니라고 판단하고 MAC decoding을 하지 않거나 MAC decoding을 할 수 없게 되고 HE-SIG-A의 TXOP Duration 필드에 기반하여 NAV 셋팅을 할 수 있다. 그런데 수신한 프레임이 실제로는 Inter-BSS 프레임이지만 Inter-BSS가 같은 BSS color를 사용하기 때문에 수신한

프레임을 Intra-BSS 프레임으로 판단하는 경우가 발생할 수 있다. 그러한 경우에 two NAVs를 사용하는 STA의 경우에 Inter-BSS 프레임으로부터 regular NAV 셋팅이 안될 수 있다. 도면을 참조하면 Intra-BSS STA가 Intra-BSS NAV를 셋팅할 수 있다. Intra-BSS NAV가 셋팅되어 있을 때 STA가 Inter-BSS frame을 수신하고 그 수신한 프레임의 BSS color가 Intra-BSS의 BSS color와 같으면 수신한 프레임을 Intra-BSS로 판단하고 regular NAV를 셋팅하지 않을 수 있다(수신한 프레임의 TXOP Duration이 더 길면 Intra-BSS NAV를 업데이트하거나 수신한 프레임의 TXOP Duration이 더 짧으면 Intra-BSS NAV 업데이트를 하지 않을 수 있다.). 그러한 상태에서 STA가 Intra-BSS에서 보낸 CF-End를 수신하면 Intra-BSS NAV 를 리셋할 수 있다. 그러면 STA는 OBSS에 interference를 유발할 수 있다.

<141> 도 10은 본 발명의 일 실시예에 따른 BSS color collision을 인지한 이후 프레임 교환을 나타낸 도면이다.

<142> 도 10을 참조하면 도 8에서 언급한 문제를 해결하기 위해 STA는 Inter-BSS frame으로부터 regular NAV(또는 inter-BSS NAV 또는 non-intra-BSS NAV)를 셋팅할 수 있다.

<143> 일 실시예로 STA가 BSS color collision을 인지한 후에 STA는 수신한 프레임의 BSS color가 Intra-BSS의 BSS color와 같을 때 HE-SIG-A의 TXOP Duration에 기반하여 Intra-BSS NAV를 업데이트하지 않을 수 있다. 또는 STA가 BSS color collision을 인지한 후에 STA는 수신한 프레임이 Intra-BSS인지 Inter-BSS인지 판

단할 수 없을 때 HE-SIG-A의 TXOP Duration에 기반하여 Intra-BSS NAV를 업데이트 하지 않을 수 있다. BSS color collision을 인지한 후에는 수신한 PPDU의 BSS color가 Intra-BSS의 BSS color와 같을 때 수신한 프레임이 Intra-BSS 프레임인지 Inter-BSS 프레임인지 HE-SIG-A 정보만 가지고 판단할 수 없게 된다. 이러한 경우에 STA가 BSS color collision을 인지한 이후 도면과 같이 Intra-BSS와 같은 BSS color를 쓰는 frame을 수신한 경우에 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 업데이트할 수 있다. 이때 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 업데이트하는 것은 MAC decoding을 할 수 없을 때로 제한할 수도 있다. Regular NAV가 셋팅되어 있는 때에 regular NAV가 Intra-BSS의 프레임에 의해 셋팅되었다고 판단하지 않게 되고 Intra-BSS STA로부터 CF-End를 수신하게 되면 regular NAV를 리셋하지 않을 수 있다(Intra-BSS NAV도 셋팅되어있는 경우에는 Intra-BSS NAV만 리셋할 수 있다.). 그리고 OBSS에 interference를 주지 않을 수 있게 된다.

<144> 또한 STA가 BSS color collision을 인지한 후에 STA가 수신한 프레임의 BSS color가 Intra-BSS의 BSS color와 같을 때 MAC decoding을 계속할 수 없는 경우에 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 업데이트할 수 있다.

<145> 또한 STA가 BSS color collision을 인지한 후에 STA가 수신한 프레임의 BSS color가 Intra-BSS의 BSS color와 같을 때 MAC decoding을 계속할 수 있는 경우에 MAC header의 MAC address에 기반하여 Intra-BSS NAV 또는 regular NAV를 업데이트 할 수 있다.

<146> 도면을 추가 설명하면 BSS color collision을 인식한 후에 STA가 Intra-BSS frame을 수신하면 BSS color만 보고서는 Intra-BSS 인지 Inter-BSS 인지 판단할 수 없게 된다. 그러한 경우 STA는 Intra-BSS NAV 또는 regular NAV를 설정하게 된다. 예를 들면 수신한 프레임의 MAC을 decoding할수 있거나 해야하는 경우 MAC header의 MAC address를 확인하여 Intra-BSS로 판단하고 Duration 필드에 기반하여 Intra-BSS NAV를 설정할 수 있고, MAC을 decoding할 수 없거나 할 필요가 없는 경우 HE-SIG-A의 TXOP Duration에 기반하여 regular NAV를 설정할 수 있다. 이러한 상태에서 Intra-BSS와 같은 BSS color를 사용하는 Inter-BSS frame을 수신하면 MAC을 디코딩할 수 없거나 할 필요가 없는 경우에 수신한 프레임을 Intra-BSS라고 판단할 수 없으므로 regular NAV를 셋팅하거나 기존에 있던 regular NAV를 업데이트하거나 TXOP Duration이 기존에 있던 regular NAV보다 짧아서 업데이트하지 않을 수 있다. 즉, regular NAV가 남아있게 된다. 이러한 상태에서 Intra-BSS로부터 CF-End를 수신해도 그 CF-End가 regular NAV를 리셋하지는 못할 수 있다. 따라서 OBSS에 interference를 주지 않게 된다.

<147> 또다른 실시예로 STA가 BSS color collision을 인지한 후에 STA는 같은 BSS color에 기반한 operation들을 하지 않을 수 있다.

<148> 또다른 실시예로 STA가 BSS color collision을 인지한 후에 STA는 BSS color에 기반한 operation들을 하지 않을 수 있다.

<150> 또다른 실시예로 NAV가 Intra-BSS에 의해 셋팅되었는지 Inter-BSS에 의해 셋

팅되었는지 판단할 수 없는 경우에 CF-End를 수신하면 그 NAV를 리셋하지 않을 수 있다.

<151> 또는 NAV가 Intra-BSS에 의해 셋팅되었는지 Inter-BSS에 의해 셋팅되었는지 판단할 수 없는 경우에 Inter-BSS로부터 CF-End를 수신하면 그 NAV를 리셋하지 않을 수 있다.

<153> 본 발명의 일 실시예에 따르면 CF-End 프레임을 수신하는 HE STA는 다음의 경우에 그것의 NAV를 리셋하지 않을 수 있다.

<154> - CF-End가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 오지 않았고, 가장 최근의 NAV가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 온 PPDU에 의해 셋팅되었을 때

<155> - CF-End가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 왔고, 가장 최근의 NAV가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 오지 않은 PPDU에 의해 셋팅되었을 때

<156> - 가장 최근의 NAV가 Intra-BSS에 의해 셋팅되었는지 Inter-BSS에 의해 셋팅되었는지 판단할 수 없을 때

<158> 또한 본 발명의 일 실시예에 따르면 CF-End 프레임을 수신하는 HE STA는 다음의 경우에 그것의 NAV를 리셋하지 않을 수 있다.

<159> - CF-End가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 오지 않았고, 가장 최근의 NAV가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 온 PPDU에 의해 셋팅되었을 때

<160> - CF-End가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 왔고, 가장 최근의 NAV가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 오지 않은 PPDU에 의해 셋팅되었을 때

<161> - CF-End가 STA가 association된 BSS나 association된 BSS가 속한 multi-BSSID set의 any BSS로부터 오지 않았고, 가장 최근의 NAV가 Intra-BSS에 의해 셋팅되었는지 Inter-BSS에 의해 셋팅되었는지 판단할 수 없을 때

<163> 도 11은 본 발명의 일 실시예에 따른 BSS color collision 감지 과정을 나타낸 도면이다.

<164> 도 11을 참조하면 STA는 패킷 수신 과정에서 BSS color collision 을 감지할 수 있다. 일 실시예로 STA는 패킷 수신 과정에서 MAC decoding을 할 수 있고 BSS color collision이 발생한 경우 MAC header의 MAC address로부터 BSS color

collision을 감지할 수 있다.

<165> 예를 들면 STA가 HE SU PPDU를 수신한 경우, L-SIG signaling을 통해 SU PPDU임을 판단하거나 L-SIG signaling과 HE-SIG-A의 modulation을 통해 extended range SU PPDU임을 판단할 수 있다. 그리고 HE-SIG-A의 BSS color 가 Intra-BSS의 BSS color와 같고 UL/DL flag가 DL을 가리키고 있는 경우 디코딩을 계속할 수 있다. HE-SIG-A의 BSS color 가 Intra-BSS의 BSS color와 같고 UL/DL flag가 UL을 가리키고 있는 경우 디코딩을 계속할 수도 있고 계속하지 않을 수도 있다. 디코딩을 계속하는 경우 MAC header의 MAC address 필드가 2개 이상 있는 경우 이 중 적어도 하나가 자신이 속한 BSSID나 자신이 속한 BSS가 속한 multi-BSSID set의 BSSID가 아닌 경우 BSS color collision이 발생한 것으로 판단할 수 있다.

<166> 또다른 예를 들면 STA가 HE MU PPDU를 수신한 경우, L-SIG signaling과 HE-SIG-A의 modulation을 통해 MU PPDU임을 판단할 수 있다. 그리고 HE-SIG-A의 BSS color가 Intra-BSS의 BSS color와 같고, HE-SIG-B에서의 STAID가 STA가 수신해야할 STAID(STA의 own STAID나 broadcast/multicast STAID)를 포함하고 있는 경우 디코딩을 계속할 수 있다. 디코딩을 계속하는 경우 MAC header의 MAC address 필드가 2개 이상 있는 경우 이 중 적어도 하나가 자신이 속한 BSSID나 자신이 속한 BSS가 속한 multi-BSSID set의 BSSID가 아닌 경우 BSS color collision이 발생한 것으로 판단할 수 있다.

<168> 본 발명의 일 실시예로 STA가 BSS color collision을 인지하거나 BSS color

collision을 피할 수 없음을 인지하면 BSS color 값으로 특정 reserve된 값, 예를 들면 0,을 사용할 수 있다. 또한 BSS color 0값으로 셋팅되어있는 프레임을 수신하는 intended recipient는 BSS color collision이나 BSS color collision을 피할 수 없음을 보고받은 것으로 할 수 있다.

<170> 본 발명의 일 실시예로 PPDU를 수신하는 STA가 BSS color 기반 operation을 하지 않도록 BSS color 값으로 특정 reserve된 값, 예를 들면 0,을 사용할 수 있다. 또한 이러한 BSS color 값을 사용하는 PPDU를 전송하기 위한 채널 엑세스 동작에서는 기존의 채널 엑세스(또는 Color code based CCA가 아닌 채널 엑세스 또는 detected frame이 intra-BSS frame인지 아닌지를 구분하여 다른 CCA level을 적용하지 않는 채널 엑세스)를 할 수 있다. 또한 Legacy PPDU를 전송할 때 PPDU를 수신하는 STA가 수신한 프레임이 intra-BSS인지 아닌지에 따른 operation을 하지 않도록 하는 시그날링을 포함시킬 수 있다. 예를 들면 MAC address의 BW signaling 기법을 사용할 수 있다. 또는 MAC header에서 기존에 특정 frame에서 고정된 값을 사용하거나 reserved인 필드를 사용하여 시그날링할 수 있다.

<172> 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.

<173> 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 아는 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.

<174> 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】

<175> 100 : 스테이션

200 : 액세스 포인트

제출 일자 : 2016-03-12

【특허청구범위】

【청구항 1】

무선랜을 위한 방법, 장치 및 시스템.

제출 일자 : 2016-03-12

【요약서】

【요약】

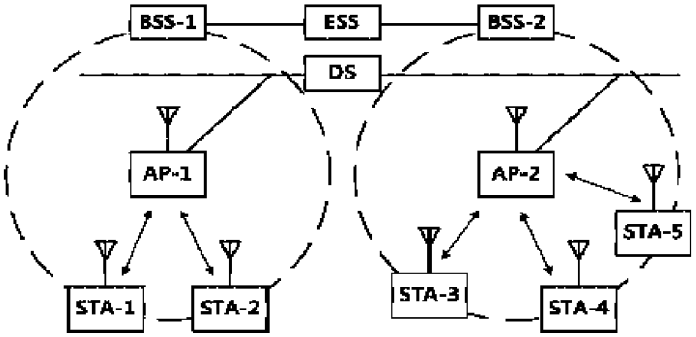
본 발명은 무선랜을 위한 장치, 시스템 및 무선랜 통신 방법에 관한 것으로, 본 발명의 실시예에 따르면 무선랜에서 BSS 컬러 충돌이 발생했을 때 잘못된 동작을 방지하기 위한 다양한 방법, 장치 및 시스템이 제공될 수 있다.

【대표도】

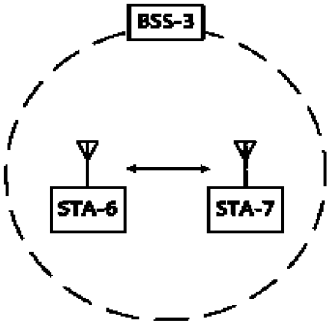
도 8

【도면】

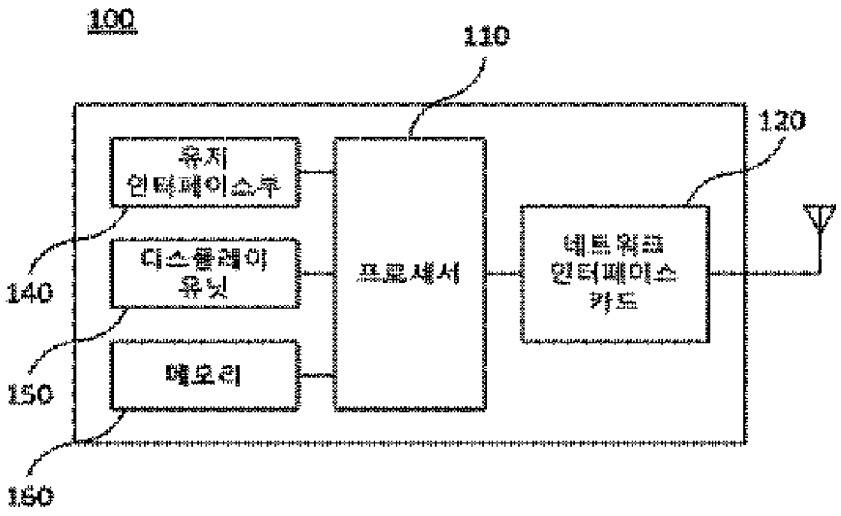
【도 1】


BSS-1
ESS
BSS-2
DS
AP-1
AP-2
STA-5
STA-1
STA-2
STA-3
STA-4

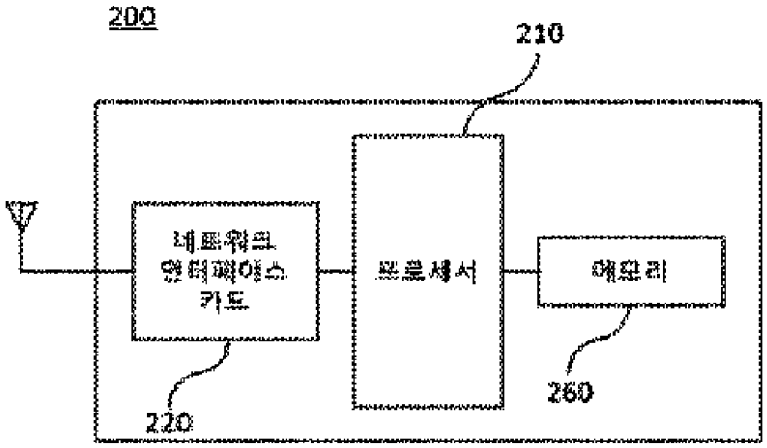
【도 2】


BSS-3
STA-6
STA-7

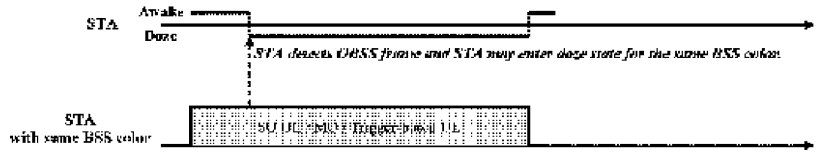
【도 3】


100
110
120
유저
인터페이스부
디스플레이
유닛
프로세서
네트워크
인터페이스
카드
메모리
140
150
160

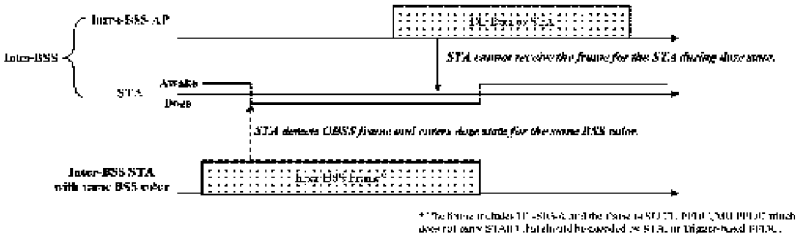
【도 4】


200
210
네트워크
인터페이스
카드
프로세서
메모리
220
260

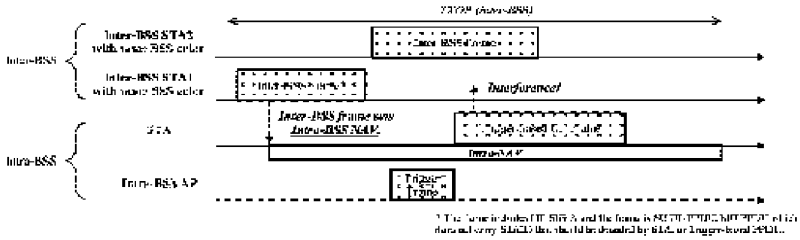
【도 5】


STA
Awake
Doze
STA with same BSS color

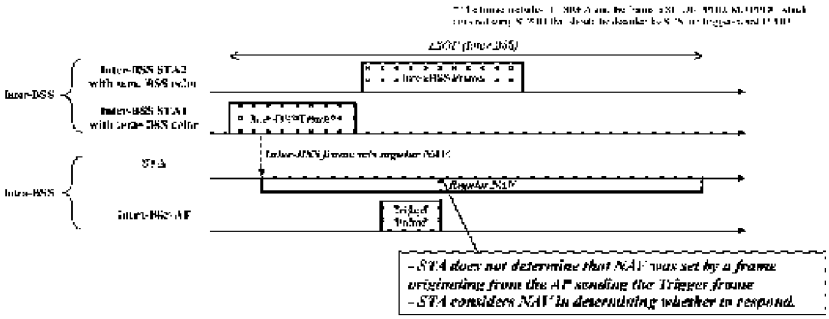
【도 6】


Intra-BSS
Intra-BSS AP
STA
Awake
Doze
Inter-BSS STA
with same BSS color

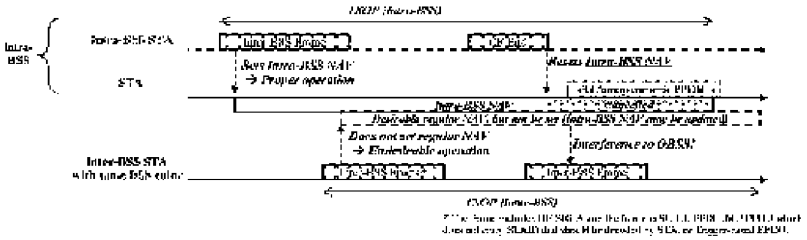
【도 7】


Intra-BSS
Inter-BSS STA2
with same BSS color
Inter-BSS STA1
with same BSS color
STA
Intra-BSS AP

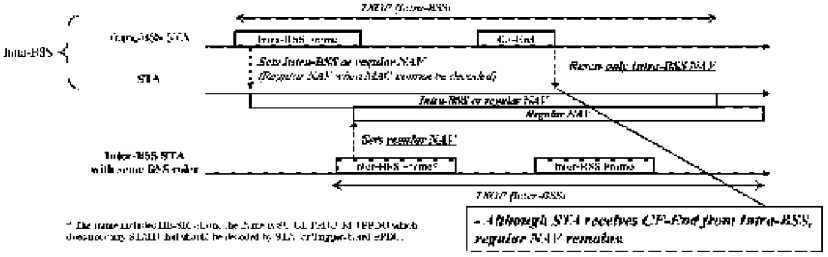
【도 8】


Inter-BSS
Inter-BSS STA2
with same BSS color
Inter-BSS STA1
with inter-BSS color
Inter-BSS
STA
Inter-BSS AP
Regular NAV
- STA does not determine that NAV was set by a frame originating from the AP sending the Trigger frame
- STA considers NAV in determining whether to respond.

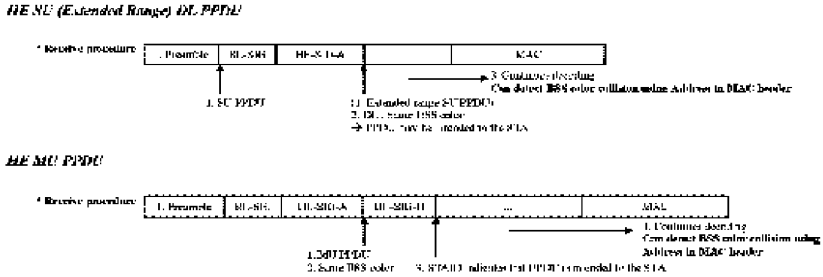
【도 9】


Intra-BSS
Intra-BSS STA
STA
Sets Intra-BSS NAV
→ Proper operation
Resets Intra-BSS NAV
Intra-BSS NAV
Does not set regular NAV
→ Endeavorable operation
Interference to OBSS!
Inter-BSS STA
with same BSS color

【도 10】


Intra-BSS
STA
Sets Intra-BSS or regular NAV
Resets only Intra-BSS NAV
Intra-BSS or regular NAV
Regular NAV
Sets regular NAV
Inter-BSS STA
with same BSS color
- Although STA receives CF-End from Intra-BSS, regular NAV remains.

【도 11】



대 한 민 국 특 허 청
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【발명의 국문명칭】 맥 헤더에 컨트롤 정보를 포함시키기 위한 방법, 장치 및 시스템

【발명의 영문명칭】 METHOD, APPARATUS, AND SYSTEM FOR INCLUDING CONTROL INFORMATION IN MAC HEADER

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【출원언어】 국어

【이 발명을 지원한 국가연구개발사업】

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【연구사업명】 정보통신방송표준개발지원

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대리인 임국일 (서명 또는 인)

【수수료】

【출원료】	0	면	46,000 원
【가산출원료】	30	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		

【발명의 설명】

【발명의 명칭】

맥 헤더에 컨트롤 정보를 포함시키기 위한 방법, 장치 및 시스템{METHOD, APPARATUS, AND SYSTEM FOR INCLUDING CONTROL INFORMATION IN MAC HEADER}

【기술분야】

<1> 본 발명은 맥 헤더에 컨트롤 정보를 포함시키는 방법으로서, 더욱 상세하게는 무선랜에서 맥 헤더의 HT Control 필드에서 Aggregated Control을 사용하는 다양한 방법, 장치 및 시스템에 관한 것이다.

【배경기술】

<2> 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 기기들을 가정이나 기업 또는 특정 서비스 제공지역에서 무선으로 인터넷에 접속할 수 있도록 하는 기술이다.

<3> IEEE(Institute of Electrical and Electronics Engineers) 802.11은 2.4GHz 주파수를 이용한 초기의 무선랜 기술을 지원한 이래, 다양한 기술의 표준을 실용화 또는 개발 중에 있다. 먼저, 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.

<4> 그리고 무선랜에서 취약점으로 지적되어온 통신 속도에 대한 한계를 극복하기 위하여 제정된 기술 규격으로서 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 수 있다.

<5> 무선랜의 보급이 활성화되고 또한 이를 이용한 어플리케이션이 다양화됨에 따라, IEEE 802.11n이 지원하는 데이터 처리 속도보다 더 높은 처리율(Very High Throughput, VHT)을 지원하기 위한 새로운 무선랜 시스템에 대한 필요성이 대두되었다. 이 중 IEEE 802.11ac는 5GHz 주파수에서 넓은 대역폭(80MHz~160MHz)을 지원

한다. 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. 이론적으로, 이 규격에 따르면 다중 스테이션의 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 2.4GHz/5GHz 대신 60GHz 밴드를 사용해 데이터를 전송하는 방식으로 IEEE 802.11ad가 있다. IEEE 802.11ad는 빔포밍 기술을 이용하여 최대 7Gbps의 속도를 제공하는 전송규격으로서, 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.

<6> 한편, 최근에는 802.11ac 및 802.11ad 이후의 차세대 무선랜 표준으로서, 고밀도 환경에서의 고효율 및 고성능의 무선랜 통신 기술을 제공하기 위한 논의가 계속해서 이루어지고 있다. 즉, 차세대 무선랜 환경에서는 고밀도의 스테이션과 AP(Access Point)의 존재 하에 실내/외에서 높은 주파수 효율의 통신이 제공되어야 하며, 이를 구현하기 위한 다양한 기술들이 필요하다.

【발명의 내용】

【해결하려는 과제】

<7> 본 발명은 전술한 바와 같이 고밀도 환경에서의 고효율/고성능의 무선랜 통신을 제공하기 위한 목적을 가지고 있다.

【과제의 해결 수단】

<8> 본 발명의 실시예에 따르면, 무선랜을 위한 장치, 시스템 및 무선랜 통신 방법이 제공될 수 있다.

【발명의 효과】

<9> 본 발명의 실시예에 따르면, 맥 헤더에 컨트롤 정보를 효율적으로 포함시킬 수 있는 방법을 제공한다. 본 발명은 무선랜을 이용하는 스테이션 내지 액세스 포인트, 셀룰러 통신을 이용하는 스테이션 내지 기지국 등 다양한 통신 디바이스에 사용 가능하다.

【도면의 간단한 설명】

<10> 도 1은 본 발명의 일 실시예에 따른 무선랜 시스템을 나타낸 도면.

도 2는 본 발명의 다른 실시예에 따른 무선랜 시스템을 나타낸 도면.

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

도 4는 본 발명의 일 실시예에 따른 액세스 포인트의 구성을 나타낸 블록도.

도 5는 본 발명의 일 실시예에 따른 MAC 프레임 포맷을 나타낸 도면.

도 6은 본 발명의 일 실시예에 따른 HT Control 필드의 변형(variant)들을 나타낸 도면.

도 7은 본 발명의 일 실시예에 따른 HT Control 필드 HE variant의 Aggregated Control 서브필드와 Aggregated Control 서브필드의 Control 서브필드를 나타낸 도면.

도 8은 본 발명의 일 실시예에 따른 HT Control 필드 HE variant의 Aggregated Control 서브필드의 Control 서브필드를 나타낸 도면.

도 9는 본 발명의 일 실시예에 따른 맥 프레임 포맷 및 HT Control 필드 HE variant 구조를 나타낸 도면.

도 10은 본 발명의 일 실시예에 따른 맥 프레임 포맷 및 HT Control 필드 HE variant 구조를 나타낸 도면.

도 11은 본 발명의 일 실시예에 따른 맥 프레임 포맷 및 HT Control 필드 HE variant 구조를 나타낸 도면.

도 12는 본 발명의 일 실시예에 따른 맥 프레임 포맷 및 HT Control 필드 HE variant 구조를 나타낸 도면.

도 13은 본 발명의 일 실시예에 따른 맥 프레임 포맷 및 HT Control 필드 HE variant와 Frame Body 구조를 나타낸 도면.

【발명을 실시하기 위한 구체적인 내용】

<11> 본 명세서에서 사용되는 용어는 본 발명에서의 기능을 고려하면서 가능한 현재 널리 사용되는 일반적인 용어를 선택하였으나, 이는 당 분야에 종사하는 기술자의 의도, 관례 또는 새로운 기술의 출현 등에 따라 달라질 수 있다. 또한 특정 경

우는 출원인이 임의로 선정한 용어도 있으며, 이 경우 해당되는 발명의 설명 부분에서 그 의미를 기재할 것이다. 따라서 본 명세서에서 사용되는 용어는, 단순한 용어의 명칭이 아닌 그 용어가 가진 실질적인 의미와 본 명세서의 전반에 걸친 내용을 토대로 해석되어야 함을 밝혀두고자 한다.

<12> 명세서 전체에서, 어떤 구성이 다른 구성과 "연결"되어 있다고 할 때, 이는 "직접적으로 연결"되어 있는 경우뿐 아니라, 그 중간에 다른 구성요소를 사이에 두고 "전기적으로 연결"되어 있는 경우도 포함한다. 또한 어떤 구성이 특정 구성요소를 "포함"한다고 할 때, 이는 특별히 반대되는 기재가 없는 한 다른 구성요소를 제외하는 것이 아니라 다른 구성요소를 더 포함할 수 있는 것을 의미한다. 이에 더하여, 특정 임계값을 기준으로 "이상" 또는 "이하"라는 한정 사항은 실시예에 따라 각각 "초과" 또는 "미만"으로 적절하게 대체될 수 있다.

<13> 도 1은 본 발명의 일 실시예에 따른 무선랜 시스템을 도시하고 있다. 무선랜 시스템은 하나 또는 그 이상의 베이직 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.

<14> 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.

<15> 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 비 액세스 포인트(Non-AP) 스테이션뿐만 아니라 액세스 포인트(AP)를 모두 포함한다. 또한, 본 명세서에서는 스테이션과 AP 등의 무선랜 통신 디바이스를 모두 포함하는 개념으로서 '단말'이라는 용어가 사용될 수 있다. 무선 통신을 위한 스테이션은 프로세서(Processor)와 트랜시버(transceiver)를 포함하고, 실시예에 따라 유저 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 수행할 수 있다. 그리고, 트랜시버는 상기 프로세서와 기능적으로 연결되어 있으며 스테이션을 위하여 무선 네트워크를 통해 프레임을 송수신한다.

<16> 액세스 포인트(Access Point, AP)는 자신에게 결합된(associated) 스테이션을 위하여 무선 매체를 경유하여 분배시스템(DS)에 대한 접속을 제공하는 개체이다. 인프라스트럭쳐 BSS에서 비 AP 스테이션들 사이의 통신은 AP를 경유하여 이루어지는 것이 원칙이지만, 다이렉트 링크가 설정된 경우에는 비AP 스테이션들 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.

<17> 복수의 인프라스트럭쳐 BSS는 분배 시스템(DS)을 통해 상호 연결될 수 있다. 이때, 분배 시스템을 통하여 연결된 복수의 BSS를 확장 서비스 세트(Extended Service Set, ESS)라 한다.

<18> 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.

<19> 도 2에 도시된 BSS-3는 독립 BSS이며 AP를 포함하지 않기 때문에, 모든 스테이션(STA-6, STA-7)이 AP와 접속되지 않은 상태이다. 독립 BSS는 분배 시스템으로의 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.

<20> 도 3은 본 발명의 일 실시예에 따른 스테이션(100)의 구성을 나타낸 블록도이다.

<21> 도시된 바와 같이, 본 발명의 실시예에 따른 스테이션(100)은 프로세서(110), 네트워크 인터페이스 카드(NIC, 120), 유저 인터페이스부(140), 디스플레이 유닛(150) 및 메모리(160)를 포함할 수 있다.

<22> 먼저, 네트워크 인터페이스 카드(120)는 무선랜 접속을 수행하기 위한 모듈이며, 스테이션(100)을 위한 패킷 전송과 수신을 수행한다. 네트워크 인터페이스 카드(120)는 스테이션(100)에 내장되거나 외장으로 구비될 수 있으며, 실시예에 따라 서로 다른 주파수 밴드를 이용하는 적어도 하나의 네트워크 인터페이스 카드 모듈을 포함할 수 있다. 이를 테면, 상기 네트워크 인터페이스 카드는 2.4GHz, 5GHz 및 60GHz 등의 서로 다른 주파수 밴드의 네트워크 인터페이스 카드 모듈을 포함할 수 있다. 일 실시예에 따르면, 스테이션(100)은 6GHz 이상의 주파수 밴드를 이용하는 네트워크 인터페이스 카드 모듈과, 6GHz 이하의 주파수 밴드를 이용하는 네트워크 인터페이스 카드 모듈을 구비할 수 있다. 각각의 네트워크 인터페이스 카드 모듈은 해당 네트워크 인터페이스 카드 모듈이 지원하는 주파수 밴드의 무선랜 규격에 따라 AP 또는 외부 스테이션과 무선 통신을 수행할 수 있다. 네트워크 인터페이스 카드(120)는 스테이션(100)의 성능 및 요구 사항에 따라 한 번에 하나의 네트워크 인터페이스 카드 모듈만을 동작시키거나 동시에 다수의 네트워크 인터페이스 카드 모듈을 함께 동작시킬 수 있다. 스테이션(100)이 복수의 네트워크 인터페이스 카드 모듈을 포함할 경우, 각 네트워크 인터페이스 카드 모듈은 각각 독립된 형태로 구비될 수도 있으며, 하나의 칩으로 통합되어 구비될 수도 있다.

<23> 다음으로, 유저 인터페이스부(140)는 스테이션(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 스테이션(100)을 제어할 수 있다. 또한, 유저 인터페이스부(140)는 다양한

출력 수단을 이용하여 프로세서(110)의 명령에 기초한 출력을 수행할 수 있다.

<24> 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 스테이션(100)에서 사용되는 제어 프로그램 및 그에 따른 각종 데이터를 저장한다. 이러한 제어 프로그램에는 스테이션(100)이 AP 또는 외부 스테이션과 접속을 수행하는데 필요한 접속 프로그램이 포함될 수 있다.

<25> 본 발명의 프로세서(110)는 다양한 명령 또는 프로그램을 실행하고, 스테이션(100) 내부의 데이터를 프로세싱 할 수 있다. 또한, 상기 프로세서(110)는 상술한 스테이션(100)의 각 유닛들을 제어하며, 유닛들 간의 데이터 송수신을 제어할 수 있다. 본 발명의 실시예에 따르면, 프로세서(110)는 메모리(160)에 저장된 AP와의 접속을 위한 프로그램을 실행하고, AP가 전송한 통신 설정 메시지를 수신할 수 있다. 또한, 프로세서(110)는 통신 설정 메시지에 포함된 스테이션(100)의 우선 조건에 대한 정보를 판독하고, 스테이션(100)의 우선 조건에 대한 정보에 기초하여 AP에 대한 접속을 요청할 수 있다. 이에 대한 구체적인 실시예는 추후 기술하기로 한다.

<26> 도 3에 도시된 스테이션(100)은 본 발명의 일 실시예에 따른 블록도로서, 분리하여 표시한 블록들은 디바이스의 엘리먼트들을 논리적으로 구별하여 도시한 것이다. 따라서 상술한 디바이스의 엘리먼트들은 디바이스의 설계에 따라 하나의 칩

으로 또는 복수의 칩으로 장착될 수 있다. 또한, 본 발명의 실시예에서 상기 스테이션(100)의 일부 구성들, 이를 테면 유저 인터페이스부(140) 및 디스플레이 유닛(150) 등은 스테이션(100)에 선택적으로 구비될 수 있다.

<27> 도 4는 본 발명의 일 실시예에 따른 AP(200)의 구성을 나타낸 블록도이다.

<28> 도시된 바와 같이, 본 발명의 실시예에 따른 AP(200)는 프로세서(210), 네트워크 인터페이스 카드(220) 및 메모리(260)를 포함할 수 있다. 도 4에서 AP(200)의 구성 중 도 3의 스테이션(100)의 구성과 동일하거나 상응하는 부분에 대해서는 중복적인 설명을 생략하도록 한다.

<29> 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, 상기 AP(200)의 네트워크 인터페이스 카드(220) 또한 서로 다른 주파수 밴드를 이용하는 복수의 네트워크 인터페이스 카드 모듈을 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 네트워크 인터페이스 카드 모듈과, 6GHz 이하의 주파수 밴드를 이용하는 네트워크 인터페이스 카드 모듈을 구비할 수 있다. 각각의 네트워크 인터페이스 카드 모듈은 해당 네트워크 인터페이스 카드 모듈이 지원하는 주파수 밴드의 무선랜 규격에 따라 스테이션과 무선 통신을 수행할 수 있다. 상기 네트워크 인터페이스 카드(220)는 AP(200)의 성능 및 요구 사항에 따라 한 번에 하나의 네트워크 인터페이스 카드 모

듈만을 동작시키거나 동시에 다수의 네트워크 인터페이스 카드 모듈을 함께 동작시킬 수 있다.

<30> 다음으로, 메모리(260)는 AP(200)에서 사용되는 제어 프로그램 및 그에 따른 각종 데이터를 저장한다. 이러한 제어 프로그램에는 스테이션의 접속을 관리하는 접속 프로그램이 포함될 수 있다. 또한, 프로세서(210)는 AP(200)의 각 유닛들을 제어하며, 유닛들 간의 데이터 송수신을 제어할 수 있다. 본 발명의 실시예에 따르면, 프로세서(210)는 메모리(260)에 저장된 스테이션과의 접속을 위한 프로그램을 실행하고, 하나 이상의 스테이션에 대한 통신 설정 메시지를 전송할 수 있다. 이때, 통신 설정 메시지에는 각 스테이션의 접속 우선 조건에 대한 정보가 포함될 수 있다. 또한, 프로세서(210)는 스테이션의 접속 요청에 따라 접속 설정을 수행한다. 이에 대한 구체적인 실시예는 추후 기술하기로 한다.

<32> 도 5는 본 발명의 일 실시예에 따른 MAC 프레임 포맷을 나타낸 도면이다.

<33> 도 5를 참조하면 MAC 프레임 포맷은 Frame Control, Duration/ID, Address 1, Address 2, Address 3, Sequence Control, Address 4, QoS Control, HT Control Frame Body, FCS 등의 필드로 이루어질 수 있고, 각 필드의 사이즈를 도면에서 각 필드 위쪽에 나타내었다. 이 중 일부 필드는 프레임 타입이나 서브타입 또는 특정 서브필드 값에 따라 존재하지 않을 수도 있다. Frame Control, Duration/ID, Address 1, FCS는 모든 프레임에 존재한다.

<35> 도 6은 본 발명의 일 실시예에 따른 HT Control 필드의 변형(variant)들을 나타낸 도면이다.

<36> 도 6을 참조하면 HT Control 필드는 몇가지 다른 형식의 필드로 존재할 수 있다. 또한 HT Control 필드는 총 32비트(4바이트)로 이루어질 수 있다. 예를 들면 HT Control 필드의 종류, 형식으로 HT variant, VHT variant, HE variant가 있을 수 있고, HT Control 필드의 B0, B1 비트로 이들을 구분할 수 있다. B0 비트가 0인 경우 HT Control 필드는 HT variant이며 HT Control 필드의 B1 이하 필드는 도 6에 표시한 것과 같이 HT Control Middle, AC Constraint, RDG/More PPDU 서브필드로 구성된다. B0 비트가 1인 경우 HT Control 필드는 VHT variant 또는 HE variant이며, 이 둘은 B1 필드를 통해 구분된다. B0 비트가 1이고, B1 비트가 0인 경우 HT Control 필드는 VHT variant이며 HT Control 필드의 B2 이하 필드는 도 6에 표시한 것과 같이 VHT Control Middle, AC Constraint, RDG/More PPDU 서브필드로 구성된다. B0 비트가 1이고, B1 비트가 1인 경우 HT Control 필드는 HE variant이며 HT Control 필드의 B2 이하 필드는 Aggregated Control(A-Control) 서브필드가 된다. A-Control 서브필드에는 각종 Control 정보를 담을 수 있다.

<38> 도 7은 본 발명의 일 실시예에 따른 HT Control 필드 HE variant의 Aggregated Control 서브필드와 Aggregated Control 서브필드의 Control 서브필드

를 나타낸 도면이다.

<39> 도 7을 참조하면 도 6에서 언급한 HT Control 필드가 HE variant인 경우에 존재하는 Aggregated Control 서브필드가 (a)와 같을 수 있고, (a)의 각 Control 서브필드는 (b)와 같은 수 있다. 도 7(a)를 참조하면 A-Control 서브필드에는 한개 혹은 한개 이상의 Control 서브필드가 연속적으로 존재하여 여러 가지 컨트롤 정보를 맥 헤더에 유연하게 담을 수 있다. 또한 A-Control 서브필드에 Control 서브필드들을 넣고 남은 자리는 Padding으로 채울 수 있다. Padding으로 A-Control 서브필드를 30비트로, 즉, HE variant를 32비트로 맞출 수 있고, 0값으로 채울 수 있다. 도 7(b)를 참조하면 Control 서브필드는 Control ID 서브필드와 Control Information 서브필드로 구성될 수 있다. Control ID 서브필드는 Control Information에 실리는 정보 혹은 Control 서브필드의 종류를 지시할 수 있고, 4비트로 이루어질 수 있다. 또한 Control ID 서브필드 값에 따라 Control Information에 담기는 정보의 종류와 그 길이가 정해질 수 있다. 또한 Control 서브필드에 들어가는 정보로는 UL MU response scheduling, Receive operation mode indication, HE link adaptation, UL PPDU Triggering, BlockAck Request, Buffer status report request 등이 있을 수 있다.

<40> 본 발명의 일 실시예로 A-Control 서브필드에 들어가는 Control 서브필드는 Control ID 순서대로 넣을 수 있다. Control ID 순서대로 넣지 않거나 자유롭게 넣는 경우 Control ID 0과 Padding 사이에 ambiguity가 발생하게 되지만 Control ID를 순서대로 A-Control 서브필드의 Control 서브필드를 구성한다면 이 ambiguity를

해결할 수 있다. A-Control 서브필드에 Control ID 0이 들어가는 경우, 이어지는 Control ID 자리에 0이 또 나오는 경우에 그것을 Padding으로 판단할 수 있다. 또한 A-Control 서브필드에 Control ID 0이 들어가지 않는 경우, 첫번째 Control ID로 0이 아닌 값이 나올 것이고, 이어지는 Control ID 자리에 0이 또 나오는 경우에 그것을 Padding으로 판단할 수 있다. A-Control 서브필드를 앞에서부터 봤을 때 Control ID 위치에 0이 두번 나오거나 0이 아닌 Control ID가 나왔다가 Control ID 위치에 0이 나오거나 더이상 Control 서브필드가 들어갈 자리가 부족할 때 A-Control 서브필드 안의 Control 정보가 더이상 없는 것으로 판단할 수 있다.

<41> 또다른 실시예로 특정 Control ID 값을 A-Control 서브필드의 Control 서브필드가 끝났다는 것을 지시하는 용도로 사용할 수 있다. 즉, Control ID 위치에 A-Control 서브필드의 Control 서브필드가 끝났다는 것을 지시하는 용도로 사용하는 Control ID 값이 오면 Control Information이 이어지지 않고 더이상 Control 서브필드가 없는 것으로 판단할 수 있다. 즉 Padding이 이어져 오거나 A-Control 서브필드가 끝날 수 있다. 또는 더이상 Control ID 서브필드가 들어갈 자리가 부족할 때 A-Control 서브필드 안의 Control 정보가 더이상 없는 것으로 판단할 수 있다.

<43> 도 8은 본 발명의 일 실시예에 따른 HT Control 필드 HE variant의 Aggregated Control 서브필드의 Control 서브필드를 나타낸 도면이다.

<44> 도 8을 참조하면 Control 서브필드는 Control ID, End of Control, Control Information 등의 서브필드로 구성될 수 있다. 예를 들면 4비트의 Control ID와 1

비트의 End of Control 서브필드를 가질 수 있다. End of Control 서브필드는 A-Control 서브필드 내에서 마지막 Control 서브필드를 지시할 수 있다. 도 7(b)의 실시예에서는 도 8의 실시예에서와 달리 Control 서브필드가 Control ID, Control Information 서브필드로 구성되고, Control ID 0과 Padding 간의 ambiguity를 없애기 위해 A-Control 서브필드를 Control ID 순서대로 구성할 수 있었다. 도 8에서와 같이 A-Control 서브필드 내의 마지막 Control 서브필드를 지시하는 End of Control 서브필드가 있으면 Control ID 순서와 상관없이 Control 서브필드를 자유롭게 배치할 수 있다. 또는 더이상 Control 서브필드가 들어갈 자리가 부족할 때 A-Control 서브필드 안의 Control 정보가 더이상 없는 것으로 판단할 수 있다.

<46> 도 9는 본 발명의 일 실시예에 따른 맥 프레임 포맷 및 HT Control 필드 HE variant 구조를 나타낸 도면이다.

<47> 도 9를 참조하면 HT Control 필드가 HE variant일 때 HT Control 필드는 variable 길이일 수 있다. 도 6 또는 7을 참조하면 HT Control 필드 HE variant에는 Aggregated Control 서브필드에 Control 정보가 이어지는 형태로 들어가게 되는데 A-Control 서브필드가 30비트, HT Control 필드가 32비트로 한정되어 있으면 다양한 Control 정보 또는 여러개의 Control 정보를 Aggregated Control 서브필드에 넣는 것이 어려울 수 있다. 따라서 이를 해결하기 위해 HT Control 필드 HE variant의 길이를 가변으로 가질 수 있다. 도 9를 참조하면 도 6의 HE variant Aggregated Control 서브필드와 비교하여 확장될 수 있다. 이 경우에 HE variant

HT Control 필드가 존재하는 경우 기본으로 32비트의 HT Control 필드를 갖되, Control 정보를 담기에 A-Control 서브필드가 모자라는 경우 A-Control 필드를 확장하고 A-Control 필드가 더 길게 이어진다는 것을 지시하기 위해서 More A-Control 서브필드를 사용할 수 있다. 예를 들어 More A-Control 서브필드가 1로 셋팅되면 A-Control 서브필드가 더 이어진다는 것을 나타낼 수 있다. 또한 확장된 Aggregated Control 서브필드들에도 계속적으로 More A-Control 서브필드가 있어서 A-Control 서브필드 확장 용도로 계속 사용할 수 있다. 이때 확장되는 A-Control 서브필드는 포맷을 바이트 단위로 맞추기 위해 32비트 단위일 수 있고, HE variant 임을 나타내기 위해 VHT, HE 서브필드가 이어지는 A-Control이 확장될 때도 존재하거나 Control 정보를 넣을 공간을 더 만들기 위해 확장된 A-Control 부분에는 VHT, HE 서브필드가 생략될 수 있다. 또는 첫번째, 기본 A-Control 서브필드의 길이를 유지하기 위해 이어지는 A-Control 서브필드는 30비트 단위일 수 있고, HE variant 임을 나타내기 위해 VHT, HE 서브필드가 이어지는 A-Control이 확장될 때도 존재하거나 Control 정보를 넣을 공간을 더 만들기 위해 확장된 A-Control 부분에는 VHT, HE 서브필드가 생략될 수 있다. 또한 More A-Control 서브필드의 위치는 도면과 같은 위치에 오거나 HE 서브필드 다음에 오거나 확장되는 A-Control 필드의 가장 앞에 올 수 있다. 또한 확장되는 A-Control 서브필드에 VHT, HE 서브필드가 존재하지 않는 경우 More A-Control 서브필드 위치는 가장 첫번째, 기본 HE variant HT Control 필드에서의 More A-Control 서브필드의 위치와 다를 수 있다.

<49> 도 10은 본 발명의 일 실시예에 따른 맥 프레임 포맷 및 HT Control 필드 HE variant 구조를 나타낸 도면이다.

<50> 도 10을 참조하면 HT Control 필드가 HE variant일 때 HT Control 필드는 variable 길이일 수 있다. 도 6 또는 7을 참조하면 HT Control 필드 HE variant에는 Aggregated Control 서브필드에 Control 정보가 이어지는 형태로 들어가게 되는데 A-Control 서브필드가 30비트, HT Control 필드가 32비트로 한정되어 있으면 다양한 Control 정보 또는 여러개의 Control 정보를 Aggregated Control 서브필드에 넣는 것이 어려울 수 있다. 따라서 이를 해결하기 위해 HT Control 필드 HE variant의 길이를 가변으로 가질 수 있다. 도 10을 참조하면 HE variant에 Control 서브필드가 계속적으로 이어질 수 있고, HT Control HE variant의 끝을 지시하는 Control ID 값(Control ID indicating "End")이 나오면 HT Control HE variant를 끝낼 수 있다.

<52> 도 11은 본 발명의 일 실시예에 따른 맥 프레임 포맷 및 HT Control 필드 HE variant 구조를 나타낸 도면이다.

<53> 도 11을 참조하면 HT Control 필드가 HE variant일 때 HT Control 필드는 variable 길이일 수 있다. 도 6 또는 7을 참조하면 HT Control 필드 HE variant에는 Aggregated Control 서브필드에 Control 정보가 이어지는 형태로 들어가게 되는데 A-Control 서브필드가 30비트, HT Control 필드가 32비트로 한정되어 있으면 다

양한 Control 정보 또는 여러개의 Control 정보를 Aggregated Control 서브필드에 넣는 것이 어려울 수 있다. 따라서 이를 해결하기 위해 HT Control 필드 HE variant의 길이를 가변으로 가질 수 있다. 도 11을 참조하면 HE variant에 Control 서브필드가 계속적으로 이어질 수 있고, 각 Control 서브필드는 도 8과 같이 Control ID, End of Control, Control Information으로 구성될 수 있다. 이때 예를 들면 1비트의 End of Control 서브필드로 마지막 Control 서브필드를 지시하고 HT Control HE variant를 끝낼 수 있다.

<55> 도 12는 본 발명의 일 실시예에 따른 맥 프레임 포맷 및 HT Control 필드 HE variant 구조를 나타낸 도면이다.

<56> 도 12를 참조하면 HT Control 필드가 HE variant일 때 HT Control 필드는 variable 길이일 수 있다. 도 6 또는 7을 참조하면 HT Control 필드 HE variant에는 Aggregated Control 서브필드에 Control 정보가 이어지는 형태로 들어가게 되는데 A-Control 서브필드가 30비트, HT Control 필드가 32비트로 한정되어 있으면 다양한 Control 정보 또는 여러개의 Control 정보를 Aggregated Control 서브필드에 넣는 것이 어려울 수 있다. 따라서 이를 해결하기 위해 HT Control 필드 HE variant의 길이를 가변으로 가질 수 있다. 도 12를 참조하면 HE variant에 Control 서브필드가 계속적으로 이어질 수 있는데 Control 서브필드들, Aggregated Control의 길이를 알리기 위해 Length 서브필드를 삽입할 수 있다. 수신자는 Length 서브필드를 해석함으로써 HT Control HE variant 필드의 끝을 알 수 있다. 한가지 실시

예로 Length 서브필드는 이어지는 Control 서브필드의 개수 - 1 값을 나타낼 수 있다. 또한 Length 서브필드가 이어지는 Control 서브필드의 개수 - 1을 나타내는 경우 Length 서브필드는 Control ID와 같은 비트수를 가질 수 있다. 또다른 실시예로 Length 서브필드는 Aggregated Control이 확장되는 단위에 따라 그 개수를 지시할 수 있다. 예를 들면 Aggregated Control이 바이트 단위로 들어날 수 있는 경우, Length 서브필드는 Aggregated Control의 총 바이트 수 혹은 기본에서 추가된 바이트 수를 나타낼 수 있다. 또다른 예로 Aggregated Control이 32비트 혹은 30비트 단위로 확장되는 경우 Length 서브필드는 32비트 혹은 30비트 단위로 Aggregated Control의 총 단위수를 나타내거나 기본에서 추가된 단위수를 나타낼 수 있다. 또한 Length 서브필드가 Aggregated Control의 총 단위수를 나타내고 기본 HE variant 길이가 32비트로 정해져 있는 경우 기본 HE variant에만 VHT, HE, Length 필드가 존재하고 확장되는 Aggregated Control 부분에는 VHT, HE, Length 중 일부 혹은 전부가 생략될 수 있으므로, 가장 처음 단위의 비트수와 확장되는 그 다음부터의 단위의 비트수는 다를 수 있다.

<58> 도 13은 본 발명의 일 실시예에 따른 맥 프레임 포맷 및 HT Control 필드 HE variant와 Frame Body 구조를 나타낸 도면이다.

<59> 도 13을 참조하면 Frame Body에 Control 정보가 포함될 수 있다. 도 6 또는 7을 참조하면 HT Control 필드 HE variant에는 Aggregated Control 서브필드에 Control 정보가 이어지는 형태로 들어가게 되는데 A-Control 서브필드가 30비트,

HT Control 필드가 32비트로 한정되어 있으면 다양한 Control 정보 또는 여러개의 Control 정보를 Aggregated Control 서브필드에 넣는 것이 어려울 수 있다. 따라서 이를 해결하기 위해 Control 정보의 일부를 Frame Body에 포함시킬 수 있다. 일 실시예로 HT Control HE variant에 Control 서브필드가 연속적으로 이어지는데, 특정 Control ID에 대해서는 Control Information이 바로 이어지지 않고, 다음 Control 정보 혹은 Padding 혹은 Frame Body가 나올 수 있다. 그리고 언급한 특정 Control ID에 해당하는 Control Information은 Frame Body에 포함될 수 있다. 또한 HT Control 필드의 길이는 4바이트로 고정시킬 수 있다. 예를 들면 Frame Body의 앞부분에 해당 Control Information이 올 수 있다. Control Information이 Control ID에 바로 이어지지 않고 Frame Body에 포함되는 특정 Control ID로는 Control Information의 길이가 특정값 이상인 것을 포함할 수 있다. 예를 들면 BlockAck 또는 BlockAck Request와 같이 필요로 하는 Control Information 길이가 긴 경우에 대해서는 Control Information을 Frame Body에 포함시킬 수 있다. 또한 HT Control 안에 Control Information이 Control ID 바로 뒤에 이어지지 않는 Control ID가 여러개 있는 경우 그것들의 배치 순서에 따라 Frame Body에 포함되는 해당 Control Information들의 순서를 정할 수 있다. 도면을 참조하면 Control ID m, Control ID m+1 등에 해당하는 Control Information 길이가 길기 때문에 해당 Control Information을 Frame Body에 포함시켰다. 또한 Control ID m, Control ID m+1 순서대로 해당하는 Control Information을 Frame Body에 포함시켰다.

<60> 또다른 실시예로 HT Control HE variant 필드의 길이를 4바이트로 유지하고

Control ID와 Control Information을 포함하는 Control 서브필드를 계속적으로 배치시키는데 Control 정보를 모두 담기에 HE variant의 공간이 부족한 경우 Frame Body도 이용하여 Control 서브필드를 포함시킬 수 있다. 이 경우 Frame Body에서 Control 서브필드와 실제 Frame Body를 구분하기 위한(혹은 Control 정보의 끝을 알기 위한) indicator를 HT Control 필드 혹은 Frame Body 필드에 포함시킬 수 있다. 예를 들면 Indicator로 특정 Control ID 값을 사용할 수도 있고, Control 서브필드에 끝을 나타내는 비트를 사용할 수도 있다. 혹은 전체 Control 정보의 길이 혹은 Frame Body에 있는 Control 정보의 길이를 지시할 수도 있다. 이 방법에 대해서는 도 8에서 도 12에서 언급한 방법들을 활용할 수 있다.

<62> 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.

<63> 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 아는 것으로 해석해야 한다. 예를 들어, 단일형으로 설명되어 있는 각 구성 요소

는 분산되어 실시될 수도 있으며, 마찬가지로 분산된 것으로 설명되어 있는 구성 요소들도 결합된 형태로 실시될 수 있다.

<64> 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】

<65> 100 : 스테이션

200 : 액세스 포인트

제출 일자 : 2016-03-04

【특허청구범위】

【청구항 1】

무선랜을 위한 방법, 장치 및 시스템.

33-27

제출 일자 : 2016-03-04

【요약서】

【요약】

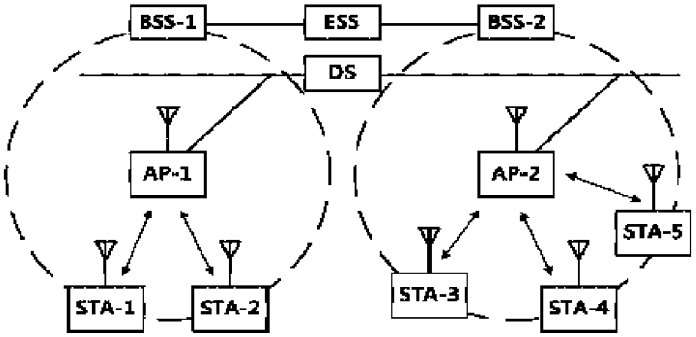
본 발명은 무선랜을 위한 장치, 시스템 및 무선랜 통신 방법에 관한 것으로, 본 발명의 실시예에 따르면 맥 헤더에 컨트롤 정보를 포함시키기 위한 방법, 장치 및 시스템이 제공될 수 있다.

【대표도】

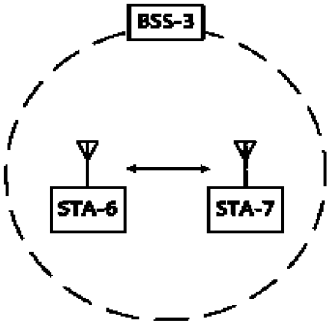
도 12

【도면】

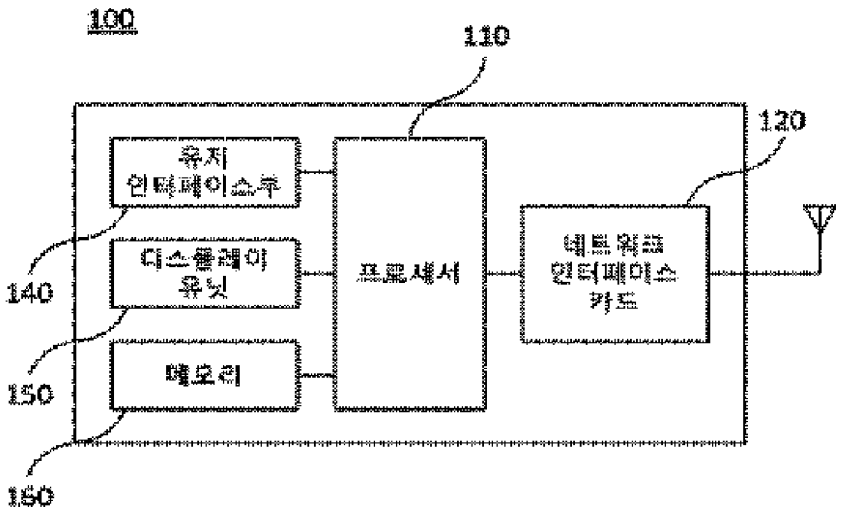
【도 1】


BSS-1
ESS
BSS-2
DS
AP-1
AP-2
STA-5
STA-1
STA-2
STA-3
STA-4

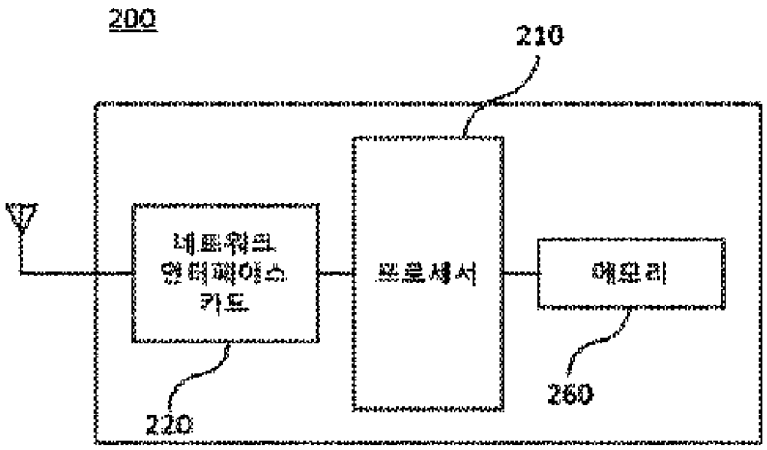
【도 2】


BSS-3
STA-6
STA-7

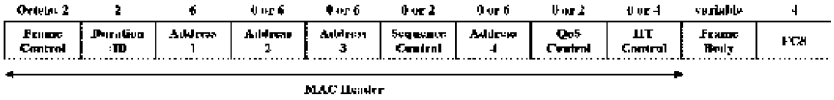
【도 3】


100
110
120
유저
인터페이스부
디스플레이
유닛
프로세서
네트워크
인터페이스
카드
메모리
140
150
160

【도 4】


200
210
네트워크
인터페이스
카드
프로세서
메모리
220
260

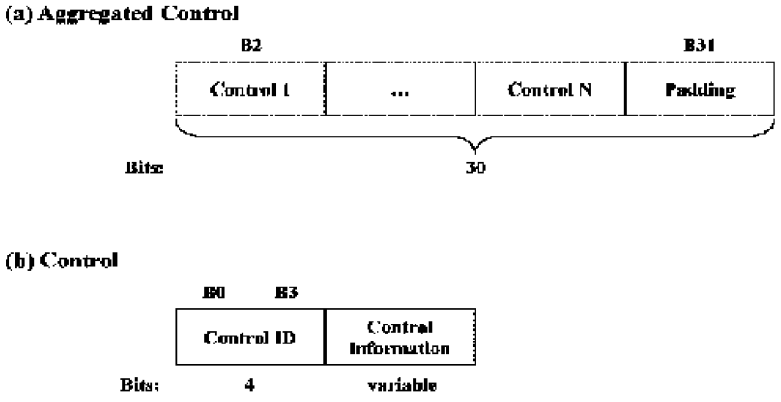
【도 5】



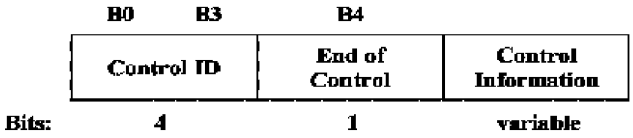
【도 6】

Variant	B0 (value)	B1 (value)	B2 - B29	B30	B31
HT variant	VHT (0)	HT Control Middle		AC Constraint	RDG/More PPDU
VHT variant	VHT (1)	HE (0)	VHT Control Middle	AC Constraint	RDG/More PPDU
HE variant	VHT (1)	HE (1)	Aggregated Control		

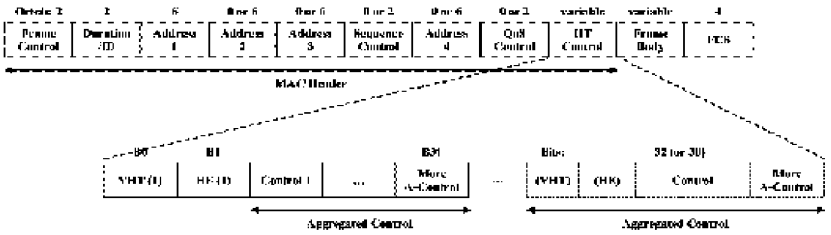
【도 7】



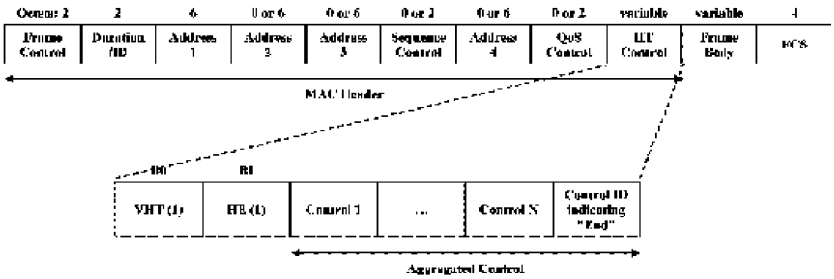
【도 8】


B0
B3
B4
Control ID
End of Control
Control Information
Bits:
4
1
variable

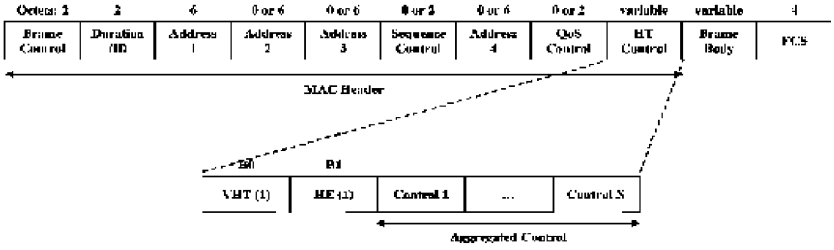
【도 9】


Octets: 2
2
6
0 or 6
0 or 6
0 or 2
0 or 6
0 or 2
variable
variable
4
Frame Control
Duration /ID
Address 1
Address 2
Address 3
Sequence Control
Address 4
QoS Control
HT Control
Frame Body
FCS
MAC Header
B0
B1
B30
B31
Bits:
32 (or 30)
VHT (1)
HE (1)
Control 1
...
More A-Control
(VHT)
(HE)
Control
More A-Control
Aggregated Control
Aggregated Control

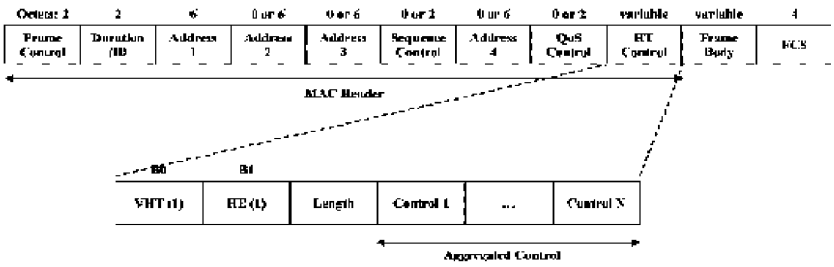
【도 10】


Octets: 2
2
6
0 or 6
0 or 6
0 or 2
0 or 6
0 or 2
variable
variable
4
Frame Control
Duration /ID
Address 1
Address 2
Address 3
Sequence Control
Address 4
QoS Control
HT Control
Frame Body
FCS
MAC Header
B0
B1
VHT (1)
HE (1)
Control 1
...
Control N
Control ID indicating "End"
Aggregated Control

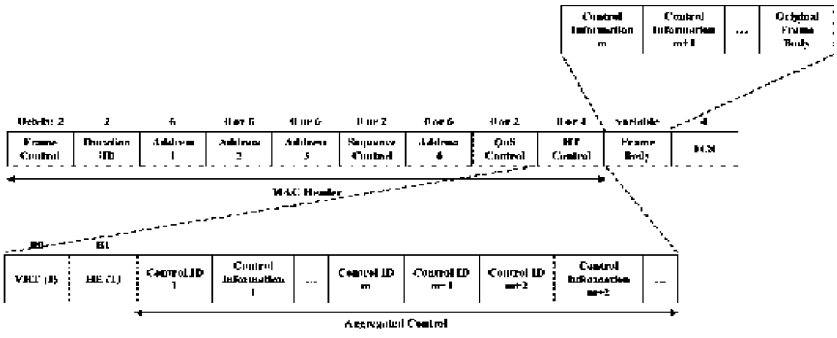
【도 11】


Octets: 2
2
6
0 or 6
0 or 6
0 or 2
0 or 6
0 or 2
variable
variable
4
Frame Control
Duration /ID
Address 1
Address 2
Address 3
Sequence Control
Address 4
QoS Control
HT Control
Frame Body
FCS
MAC Header
B0
B1
VHT (1)
HE (1)
Control 1
...
Control N
Aggregated Control

【도 12】


Octets: 2
2
6
0 or 6
0 or 6
0 or 2
0 or 6
0 or 2
variable
variable
4
Frame Control
Duration /ID
Address 1
Address 2
Address 3
Sequence Control
Address 4
QoS Control
HT Control
Frame Body
FCS
MAC Header
B0
B1
VHT (1)
HE (1)
Length
Control 1
...
Control N
Aggregated Control

【도 13】


Control Information m
Control Information m+1
...
Original Frame Body
Octets: 2
2
6
0 or 6
0 or 6
0 or 2
0 or 6
0 or 2
0 or 4
variable
4
Frame Control
Duration /ID
Address 1
Address 2
Address 3
Sequence Control
Address 4
QoS Control
HT Control
Frame Body
FCS
MAC Header
B0
B1
VHT (1)
HE (1)
Control ID 1
Control Information 1
...
Control ID m
Control ID m+1
Control ID m+2
Control Information m+2
...
Aggregated Control

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 16/121,546

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	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	660
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	760
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	*			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	*				x 460 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1720

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.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/121,546	09/04/2018	2414	1720	B-9587CON 631613-2	20	3

CONFIRMATION NO. 9775

36716
LADAS & PARRY
5670 WILSHIRE BOULEVARD, SUITE 2100
LOS ANGELES, CA 90036-5679

FILING RECEIPT

OC000000102945208

Date Mailed: 10/10/2018

Receipt is acknowledged of this non-provisional 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 APPLICANT, 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 Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections 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**

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Power of Attorney: The patent practitioners associated with Customer Number 36716

Domestic Priority data as claimed by applicant

This application is a CON of PCT/KR2017/002407 03/06/2017

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 10-2016-0026684 03/04/2016
REPUBLIC OF KOREA 10-2016-0029975 03/12/2016
REPUBLIC OF KOREA 10-2016-0044465 04/11/2016
REPUBLIC OF KOREA 10-2016-0057597 05/11/2016
REPUBLIC OF KOREA 10-2016-0114821 09/07/2016

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: 10/10/2018

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/121,546**

Projected Publication Date: 01/17/2019

Non-Publication Request: No

Early Publication Request: No

Title

WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET

Preliminary Class

370

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

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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

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

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

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign

patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

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

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

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

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

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

NOT GRANTED

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

SelectUSA

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

PTO/SB/80 (11-08)
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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(b).

I hereby appoint:

☑ Practitioners associated with the Customer Number: 36716

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(b).

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

☑ The address associated with Customer Number: 36716

OR

☐ Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address:

SK TELECOM CO., LTD.
65, Eulji-ro, Jung-gu
Seoul 04539 Republic of Korea

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

SIGNATURE of Assignee of Record

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

Signature	Jungho Park	Date	Jun 8, 2018
Name	Jungho, Park	Telephone	82-2-6100-3465
Title	C.E.O. of SK TELECOM CO., LTD.		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

Privacy Act Statement

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

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

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

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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:

■ Practitioners associated with Customer Number: 36716

OR

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

Name	Registration Number	Name	Registration Number

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

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

■ The address associated with Customer Number: 36716

OR

☐	Firm or Individual Name			
	Address			
	City		State	Zip
	Country			
	Telephone		Email	

Assignee Name and Address: WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC.
5F 216 Hwangsaeul-ro Bundang-gu
Seongnam-si, Gyeonggi-do 13595 Republic of Korea

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

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

Signature		Date	Feb 22, 2017
Name	JINSAM KWAK	Telephone	
Title	CEO OF WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC.		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
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9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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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.: _____ Filed/Issue Date: _____

Titled: WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET

WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC., a INSTITUTE

(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:

   SK TELECOM CO., LTD.

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

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

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

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

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

A. ☑ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ 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.

/Young Seok Koo 76,255/	September 4, 2018
Signature	Date
YOUNG SEOK KOO	76,255
Printed or Typed Name	Title or Registration Number

[Page 2 of 2]

Privacy Act Statement

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

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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.: _____ Filed/Issue Date: _____

Titled: WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET

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:

   WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC.

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

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

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

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

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

A. ☑ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

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      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.

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STATEMENT UNDER 37 CFR 3.73(c)

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☐ 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.

/Young Seok Koo 76,255/	September 4, 2018
Signature	Date
YOUNG SEOK KOO	76,255
Printed or Typed Name	Title or Registration Number

[Page 2 of 2]

Privacy Act Statement

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

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

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

ASSIGNMENT

WHEREAS, I/we, Geonjung KO of Gyeonggi-do, Republic of Korea, Juhyung SON of Gyeonggi-do, Republic of Korea, Woojin AHN of Gyeonggi-do, Republic of Korea, and Jinsam KWAK of Gyeonggi-do, Republic of Korea ("Assignor"), am/are the inventor(s) of an invention entitled "WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET" that is the subject matter of: (check all that apply)

[x] an application for Letters Patent which claims the priority to Korean Patent Application No. 10-2016-0026684 filed on March 4, 2016.

[x] an application for Letters Patent which claims the priority to Korean Patent Application No. 10-2016-0029975 filed on March 12, 2016.

[x] an application for Letters Patent which claims the priority to Korean Patent Application No. 10-2016-0044465 filed on April 11, 2016.

[x] an application for Letters Patent which claims the priority to Korean Patent Application No. 10-2016-0057597 filed on May 11, 2016.

[x] an application for Letters Patent which claims the priority to Korean Patent Application No. 10-2016-0114821 filed on September 7, 2016.

[x] an application made under the Patent Cooperation Treaty which is identifiable at WIPO by or claiming the benefit of or priority to Application No. PCT/KR2017/002407 filed on March 6, 2017,

[x] an application for Letters Patent which is identifiable in the Patent Office of _____ by Application No. _____ filed on _____;

WHEREAS, (1) WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC., an institute organized and existing under the laws of Republic of Korea ("Assignee"), and having offices at 5F, 216 Hwangsaeul-ro Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea 13595 and (2) SK TELECOM CO., LTD., a corporation organized and existing under the laws of Republic of Korea ("Assignee"), and having offices at 65, Eulji-ro Jung-gu, Seoul 04539, Republic of Korea, are desirous of acquiring the entire right, title and interest in and to the invention, the applications, and any and all Letters Patent or similar foreign or domestic legal protection

[x] in the United States
[ ] in all other countries or jurisdictions;

"NOW THEREFORE, for good and valuable consideration, the receipt and adequacy of which is hereby acknowledged,

a) I/we agree to transfer, and
b) I/we do hereby transfer,

to Assignee, its successors and assigns, effective as of March 4, 2016 *nunc pro tunc*, my/our entire right, title and interest in the above named countries and jurisdictions in and to the following including the right to sue for past infringement: the invention, the above-identified applications, all applications from which any of the above-identified applications claim priority, corresponding U.S. and non-U.S. applications, any continuation, division, renewal, or substitute for the applications, all Letters Patent, any reissue, re-examination, or similar legal protection issuing related to the Letters Patent, and all rights and benefits under any applicable treaty or convention, and I/we authorize the Director of the United States Patent and

Trademark Office or foreign equivalent to issue the Letters Patent or similar legal protection to the Assignee."

I/We authorize the Assignee, its successors and assigns, to insert in this instrument the filing date(s) and application numbers when ascertained. I/We further authorize the Assignee, its successors and assigns, or anyone it may properly designate, to apply for Letters Patent or similar legal protection, in its own name if desired, in the above named countries and jurisdictions and appoint Assignee the common representative in the above identified international application and any international application for the invention.

I/We represent to the Assignee, its successors and assigns, that I/we shall not execute any writing or do any act whatsoever conflicting with this Assignment. I/We, my/our executors or administrators, will at any time upon request, without additional consideration, but at the expense of the Assignee, its successors and assigns, execute and deliver to Assignee or its legal representatives such additional writings and do such additional acts as the Assignee, its successors and assigns, may deem desirable to perfect its enjoyment of this grant, and render all assistance in making application for and obtaining, maintaining, and enforcing the Letters Patent or similar legal protection on the invention in any and all countries and jurisdictions, including without limitation providing testimony in any related interference, litigation or proceeding. To the extent that I/we, my/our executors or administrators are unable or unavailable to execute and deliver to Assignee or its legal representatives such additional writings and do such additional acts as Assignee, its successors and assigns may deem desirable to perfect its enjoyment of this grant, and render all assistance in making application for and obtaining, maintaining, and enforcing the Letters Patent or similar legal protection on the invention in any and all countries and jurisdictions, I/we, my/our executors or administrators hereby authorize Assignee, its successors and assigns to act on my/our behalf/behalves.

If any provision(s) of this Assignment are held unenforceable or in conflict with the law of any jurisdiction, the validity of the remaining provisions will not be affected by such holding and the part held unenforceable in or in conflict with the law of one jurisdiction will remain in effect for other jurisdictions until held unenforceable or in conflict with the law of that jurisdiction.

Geonjung KO

(Inventor / Assignor)

Aug 28 2018

Date

Juhyung SON

(Inventor / Assignor)

28. Aug. 2018

Date

Woojin AHN

(Inventor / Assignor)

28. Aug. 2018

Date

Jinsam KWAK

(Inventor / Assignor)

Aug. 28. 2018

Date

Form PTO-1449 (Modified) Page 1 of 1	ATTY DOCKET NO. B-9587CON 631613-2	U.S. SERIAL NO. N/A
LIST OF PATENTS AND PUBLICATIONS STATEMENT	APPLICANT WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. and SK TELECOM CO., LTD.	FILING DATE OR 371 © DATE Concurrently Herewith
		GROUP NO. N/A

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	ISSUE/PUBL. DATE	NAME	CLASS	SUB-CLASS	FILING DATE or 102 (e) DATE, IF APPROPRIATE
	1.	2015/0264617	Sep. 17, 2015	Choudhury et el.			Mar. 14, 2014

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY	CLASS	SUB-CLASS	TRANSLATION
	2.	2015/112780	Jul. 30, 2015	WO			
	3.	2016/021792	Feb. 11, 2016	WO			Espacenet
	4.	2015/120488	Aug. 13, 2015	WO			
	5.	2017/150954	Sep. 8, 2017	WO			Espacenet

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER INITIAL	REFERENCE NUMBER	DOCUMENT
	6.	International Search Report for PCT/KR2017/002407 mailed on July 13, 2017 and its English translation from WIPO (now published as WO 2017/150954)
	7.	Written Opinion of the International Searching Authority for PCT/KR2017/002407 mailed on July 13, 2017 and its English translation from WIPO (now published as WO 2017/150954)
	8.	WILUS. "BSS Color Settings for a Multiple BSSID Set", doc.: IEEE 802.11-16/0042rl, pp. 1-11, 18 January 2016

EXAMINER	*DATE CONSIDERED*

EXAMINER: Initial if reference 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.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2017/002407

A. CLASSIFICATION OF SUBJECT MATTER

H04W 74/00(2009.01)i, H04W 74/08(2009.01)i, H04W 84/12(2009.01)i, H04W 28/06(2009.01)i, H04B 7/26(2006.01)i, H04L 27/26(2006.01)i, H04W 28/04(2009.01)i, H04W 24/02(2009.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H04W 74/00; H04W 52/02; H04W 72/04; H04W 36/30; H04W 36/00; G06F 11/00; H04W 84/12; H04W 74/08; H04W 28/06; H04B 7/26; H04L 27/26; H04W 28/04; H04W 24/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Utility models and applications for Utility models: IPC as above

Japanese Utility models and applications for Utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & Keywords: BSS color, inter-BSS, intra-BSS, PPDU, NAV

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WILUS, "BSS Color Settings for a Multiple BSSID Set", doc. : IEEE 802.11-16/0042r1, pp. 1-11, 18 January 2016 See slides 2, 4-5, 7-8.	6,17-19
A		1-5,7-16,20
A	WO 2015-112780 A1 (MEDIATEK SINGAPORE PTE. LTD.) 30 July 2015 See claims 1-21; and figures 7-8.	1-20
A	WO 2016-021792 A1 (LG ELECTRONICS INC.) 11 February 2016 See paragraphs [0060]-[0138]; and figures 4-10.	1-20
A	WO 2015-120488 A1 (MEDIATEK INC.) 13 August 2015 See claims 1-8; and figures 1-3.	1-20
A	US 2015-0264617 A1 (NOKIA CORPORATION) 17 September 2015 See paragraph [0050]; and figure 4.	1-20

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 JULY 2017 (13.07.2017)	**13 JULY 2017 (13.07.2017)**

Name and mailing address of the ISA/KR
Korean Intellectual Property Office
Government Complex-Daejeon, 189 Seonsa-ro, Daejeon 302-701, Republic of Korea
Facsimile No. +82-42-481-8578

Authorized officer

Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2017/002407

Patent document cited in search report	Publication date	Patent family member	Publication date
WO 2015-112780 A1	30/07/2015	US 2016-0174079 A1	16/06/2016
WO 2016-021792 A1	11/02/2016	KR 10-2017-0030564 A	17/03/2017
WO 2015-120488 A1	13/08/2015	EP 3061296 A1 US 2016-0353275 A1	31/08/2016 01/12/2016
US 2015-0264617 A1	17/09/2015	EP 2930997 A1	14/10/2015

Form PCT/ISA/210 (patent family annex) (January 2015)

특 허 협 력 조 약

PCT

국 제 조 사 보 고 서

(PCT 제 18 조 및 PCT규칙 43 및 44)

출원인 또는 대리인의 서류참조기호 WILP170023WO	추가적인 조치	서식 PCT/ISA/220 및 아래 5.(해당하는경우) 참조
국제출원번호 **PCT/KR2017/002407**	국제출원일 *(일/월/년)* 06 March 2017 (06.03.2017)	(최) 우선일 *(일/월/년)* 04 March 2016 (04.03.2016)
출원인 주식회사 윌러스표준기술연구소		

본 국제조사보고서는 본 국제조사기관에 의하여 작성되었으며 PCT 제18조의 규정에 따라 출원인에게 송부됩니다. 이 국제조사보고서의 사본은 국제사무국에 송부됩니다.

본 국제조사보고서는 총 **3** 매로 구성되어 있습니다.

☒ 본 보고서에서 인용된 각 선행기술 문헌의 사본도 첨부되어 있습니다.

1. **보고서의 기초**
   a. **언어**와 관련하여, 국제조사는 아래에 기초하여 수행되었습니다.
      ☒ 출원시의 언어로 된 국제출원
      ☐ 국제조사를 위해 _____ 로 번역되어 제출된 국제출원의 번역문(PCT규칙 12.3(a) 및 23.1(b))
   b. ☐ 본 국제조사보고서는 PCT규칙 91의 규정에 따라 당해 기관이 허가하였거나 또는 당해 기관에 통보된 **명백한 잘못의 정정**을 고려하여 작성되었습니다(PCT규칙 43.6의2(a)).
   c. ☐ 국제출원에 개시된 **핵산염기 및/또는 아미노산 서열**에 관하여는 제1기재란을 참조하십시오.
2. ☐ **일부 청구항은 조사할 수 없습니다**(제2기재란 참조).
3. ☐ **발명의 단일성이 결여되어 있습니다**(제3기재란 참조).
4. **발명의 명칭**과 관련하여,
   ☒ 출원인이 제출한 대로 승인합니다.
   ☐ 본 국제조사기관이 다음과 같이 발명의 명칭을 작성하였습니다:
5. **요약서**와 관련하여,
   ☒ 출원인이 제출한 대로 승인합니다.
   ☐ PCT규칙 38.2의 규정에 따라 본 기관이 제4기재란에 표시된 대로 요약서를 작성하였습니다. 출원인은 본 국제조사보고서의 발송일부터 1월 이내에 본 기관에 의견를 제출할 수 있습니다.
6. **도면**과 관련하여,
   a. 요약서와 함께 공개될 **도면**은 제 45 도이며
      ☒ 출원인이 제안하였습니다.
      ☐ 출원인이 도면의 번호를 제안하지 않았기 때문에 본 기관이 선택하였습니다.
      ☐ 본 도면이 발명의 특징을 더 잘 나타내고 있기 때문에 본 기관이 선택하였습니다.
   b. ☐ 요약서와 함께 공개될 도면이 없습니다.

국 제 조 사 보 고 서

국제출원번호
PCT/KR2017/002407

A. 발명이 속하는 기술분류(국제특허분류(IPC))

H04W 74/00(2009.01)i, H04W 74/08(2009.01)i, H04W 84/12(2009.01)i, H04W 28/06(2009.01)i, H04B 7/26(2006.01)i, H04L 27/26(2006.01)i, H04W 28/04(2009.01)i, H04W 24/02(2009.01)i

B. 조사된 분야

조사된 최소문헌(국제특허분류를 기재)
H04W 74/00; H04W 52/02; H04W 72/04; H04W 36/30; H04W 36/00; G06F 11/00; H04W 84/12; H04W 74/08; H04W 28/06; H04B 7/26; H04L 27/26; H04W 28/04; H04W 24/02

조사된 기술분야에 속하는 최소문헌 이외의 문헌
한국등록실용신안공보 및 한국공개실용신안공보: 조사된 최소문헌란에 기재된 IPC
일본등록실용신안공보 및 일본공개실용신안공보: 조사된 최소문헌란에 기재된 IPC

국제조사에 이용된 전산 데이터베이스(데이터베이스의 명칭 및 검색어(해당하는 경우))
eKOMPASS(특허청 내부 검색시스템) & 키워드: BSS color, inter-BSS, intra-BSS, PPDU, NAV

C. 관련 문헌

카테고리*	인용문헌명 및 관련 구절(해당하는 경우)의 기재	관련 청구항
X	WILUS, `BSS Color Settings for a Multiple BSSID Set`, doc.: IEEE 802.11-16/0042r1, pp. 1-11, 2016.01.18 슬라이드 2, 4-5, 7-8 참조.	6,17-19
A		1-5,7-16,20
A	WO 2015-112780 A1 (MEDIATEK SINGAPORE PTE. LTD.) 2015.07.30 청구항 1-21; 및 도면 7-8 참조.	1-20
A	WO 2016-021792 A1 (엘지전자 주식회사) 2016.02.11 단락 [0060]-[0138]; 및 도면 4-10 참조.	1-20
A	WO 2015-120488 A1 (MEDIATEK INC.) 2015.08.13 청구항 1-8; 및 도면 1-3 참조.	1-20
A	US 2015-0264617 A1 (NOKIA CORPORATION) 2015.09.17 단락 [0050]; 및 도면 4 참조.	1-20

☐ 추가 문헌이 C(계속)에 기재되어 있습니다.

☒ 대응특허에 관한 별지를 참조하십시오.

* 인용된 문헌의 특별 카테고리:

"A" 특별히 관련이 없는 것으로 보이는 일반적인 기술수준을 정의한 문헌

"E" 국제출원일보다 빠른 출원일 또는 우선일을 가지나 국제출원일 이후에 공개된 선출원 또는 특허 문헌

"L" 우선권 주장에 의문을 제기하는 문헌 또는 다른 인용문헌의 공개일 또는 다른 특별한 이유(이유를 명시)를 밝히기 위하여 인용된 문헌

"O" 구두 개시, 사용, 전시 또는 기타 수단을 언급하고 있는 문헌

"P" 우선일 이후에 공개되었으나 국제출원일 이전에 공개된 문헌

"T" 국제출원일 또는 우선일 후에 공개된 문헌으로, 출원과 상충하지 않으며 발명의 기초가 되는 원리나 이론을 이해하기 위해 인용된 문헌

"X" 특별한 관련이 있는 문헌. 해당 문헌 하나만으로 청구된 발명의 신규성 또는 진보성이 없는 것으로 본다.

"Y" 특별한 관련이 있는 문헌. 해당 문헌이 하나 이상의 다른 문헌과 조합하는 경우로 그 조합이 당업자에게 자명한 경우 청구된 발명은 진보성이 없는 것으로 본다.

"&" 동일한 대응특허문헌에 속하는 문헌

국제조사의 실제 완료일	국제조사보고서 발송일
2017년 07월 13일 (13.07.2017)	2017년 07월 13일 (13.07.2017)

ISA/KR의 명칭 및 우편주소
대한민국 특허청
(35208) 대전광역시 서구 청사로 189,
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서식 PCT/ISA/210 (두 번째 용지) (2015년 1월)

국 제 조 사 보 고 서
대응특허에 관한 정보

국제출원번호
PCT/KR2017/002407

국제조사보고서에서 인용된 특허문헌	공개일	대응특허문헌	공개일
WO 2015-112780 A1	2015/07/30	US 2016-0174079 A1	2016/06/16
WO 2016-021792 A1	2016/02/11	KR 10-2017-0030564 A	2017/03/17
WO 2015-120488 A1	2015/08/13	EP 3061296 A1 US 2016-0353275 A1	2016/08/31 2016/12/01
US 2015-0264617 A1	2015/09/17	EP 2930997 A1	2015/10/14

PATENT COOPERATION TREATY

TRANSLATION

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	13.07.2017
Applicant's or agent's file reference: WILP170023WO	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/KR2017/002407	06.03.2017	04.03.2016

International Patent Classification (IPC) or both national classification and IPC
H04W74/00(2009.01)i, H04W74/08(2009.01)i, H04W84/12(2009.01)i, H04W28/06(2009.01)i, H04B7/26(2006.01)i, H04L27/26(2006.01)i, H04W 28/04(2009.01)i, H04W24/02(2009.01)i

Applicant
WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I — Basis of the opinion
- ☐ Box No. II — Priority
- ☐ Box No. III — Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV — Lack of unity of invention
- ☒ Box No. V — Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI — Certain documents cited
- ☐ Box No. VII — Certain defects in the international application
- ☐ Box No. VIII — Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/KR	Date of completion of this opinion	Authorized officer
Facsimile No.		Telephone No.

Form PCT/ISA/237 (cover sheet) (January 2015)

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/KR2017/002407

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

☒ the international application in the language in which it was filed

☐ a translation of the international application into _____ , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:

a. ☐ forming part of the international application as filed:

☐ in the form of an Annex C/ST.25 text file.

☐ on paper or in the form of an image file.

b. ☐ furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.

c. ☐ furnished subsequent to the international filing date for the purposes of international search only:

☐ in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).

☐ on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/KR2017/002407

Box No. V **Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-20	YES
	Claims	None	NO
Inventive step (IS)	Claims	1-5, 7-16, 20	YES
	Claims	6, 17-19	NO
Industrial applicability (IA)	Claims	1-20	YES
	Claims	None	NO

2. Citations and explanations:

Reference is made to the following documents:

D1: WILUS, "BSS Color Settings for a Multiple BSSID Set", doc.: IEEE 802.11-16/0042r1, pp. 1-11, 18 January 2016

D2: WO 2015-112780 A1 (MEDIATEK SINGAPORE PTE. LTD.) 30 July 2015

D3: WO 2016-021792 A1 (LG ELECTRONICS INC.) 11 February 2016

D4: WO 2015-120488 A1 (MEDIATEK INC.) 13 August 2015

D5: US 2015-0264617 A1 (NOKIA CORPORATION) 17 September 2015

2.1 Novelty and Inventive Step

2.1.1 Claims 1-5

The invention as set forth in claim 1 is different from the inventions disclosed in the cited documents in that the former relates to "a wireless communication terminal which transmits a predesignated value as a BSS color when

the wireless communication terminal fails to receive information for signalling of the BSS color". Further, said difference would not be obvious to a person skilled in the art even in view of the cited documents. Therefore, the invention as set forth in claim 1 is novel and involves an inventive step (PCT Article 33(2) and (3)).

Claims 2-5 are dependent claims referring to claim 1, and are thus novel and involve an inventive step (PCT Article 33(2) and (3)).

2.1.2 Claims 6-16

Document D1, which is the closest prior art to the invention as set forth in claim 6, discloses "a wireless communication terminal comprising features of: receiving a frame by an STA (see D1: slide 7); and determining whether the frame is an inter-BSS frame or an intra-BSS frame (see D1: slide 7), and performing channel access (see D1: slide 8)".
There is a difference in that document D1 does not explicitly disclose the feature set forth in claim 6 wherein "an intra-BSS PPDU indicates a PPDU transmitted from a BSS identical to a BSS including the wireless communication terminal, and an inter-BSS PPDU indicates a PPDU transmitted from a BSS different from the BSS including the wireless communication terminal". However, said difference could be easily derived by a person skilled in the art from the feature disclosed in document D1 wherein "an intra-BSS frame indicates a frame transmitted in the same multiple BSSID set (see D1: slide

7), and an inter-BSS frame is a different frame from that corresponding to MAC addresses of VAPs of the STA (see D1: slide 7)". Therefore, the invention as set forth in claim 6 lacks an inventive step in view of document D1 (PCT Article 33(3)).

The invention as set forth in claim 7 is different from the inventions disclosed in the cited documents in that the former further includes a feature wherein "when a PPDU satisfies both an inter-BSS PPDU condition and an intra-BSS PPDU condition, the PPDU is identified as the inter-BSS PPDU". Further, said difference would not be obvious to a person skilled in the art even in view of the cited documents. Therefore, the invention as set forth in claim 7 is novel and involves an inventive step (PCT Article 33(2) and (3)).

The invention as set forth in claim 8 is different from the inventions disclosed in the cited documents in that the former further includes a feature wherein "when it is impossible to identify whether the PPDU is an inter-BSS PPDU or an intra-BSS PPDU, the processor sets a basic NAV, which is not an intra-BSS NAV, on the basis of the PPDU, the intra-BSS NAV is set on the basis of a PPDU transmitted from the same BSS as that for the wireless communication terminal, and the basic NAV is set on the basis of a PPDU transmitted from a BSS that is different from the BSS for the wireless communication terminal". Further, said difference would not be obvious to a person skilled in the art even in view of the cited documents. Therefore, the invention as set forth in claim 8 is novel and involves an inventive step (PCT Article 33(2) and

(3)).

The invention as set forth in claim 9 is different from the inventions disclosed in the cited documents in that the former further includes a feature wherein "when the wireless communication terminal is unable to identify whether the PPDU is an intra-BSS PPDU or an inter-BSS PPDU on the basis of the BSS color, the processor does not set an intra-BSS NAV on the basis of the BSS color and TXOP Duration field of HE-SIG A field of the PPDU, and sets the intra-BSS NAV on the basis of the PPDU transmitted from the same BSS as that for the wireless communication terminal". Further, said difference would not be obvious to a person skilled in the art even in view of the cited documents. Therefore, the invention as set forth in claim 9 is novel and involves an inventive step (PCT Article 33(2) and (3)).

Claims 10 and 11 are dependent claims referring directly or indirectly to claim 9, and are thus novel and involve an inventive step (PCT Article 33(2) and (3)).

The invention as set forth in claim 12 is different from the inventions disclosed in the cited documents in that the former further includes a feature wherein "when the wireless communication terminal is unable to identify whether the PPDU is an intra-BSS PPDU or an inter-BSS PPDU on the basis of the BSS color, the processor does not enter a power save mode on the basis of the BSS color and the PPDU". Further, said difference would not be obvious to a person skilled in the art even in view of the cited documents. Therefore, the invention as set

forth in claim 12 is novel and involves an inventive step (PCT Article 33(2) and (3)).

The invention as set forth in claim 13 is different from the inventions disclosed in the cited documents in that the former further includes a feature wherein "when the wireless communication terminal is an AP, and the PPDU is a PPDU on the basis of a trigger transmitted from a wireless communication terminal which is not triggered by the wireless communication terminal, the PPDU is determined as an inter-BSS PPDU". Further, said difference would not be obvious to a person skilled in the art even in view of the cited documents. Therefore, the invention as set forth in claim 13 is novel and involves an inventive step (PCT Article 33(2) and (3)).

The invention as set forth in claim 14 is different from the inventions disclosed in the cited documents in that the former further includes a feature wherein "when the wireless communication terminal is an AP, and the PPDU is a PPDU including a trigger frame, the processor determines the PPDU as an inter-BSS PPDU". Further, said difference would not be obvious to a person skilled in the art even in view of the cited documents. Therefore, the invention as set forth in claim 14 is novel and involves an inventive step (PCT Article 33(2) and (3)).

Claims 15 and 16 are dependent claims referring directly or indirectly to claim 14, and are thus novel and involve an inventive step (PCT Article 33(2) and (3)).

2.1.3 Claims 17-20

Box No. V **Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

Document D1, which is the closest prior art to the invention as set forth in claim 17, discloses "a wireless communication terminal including a feature of receiving a PPDU (see D1: slide 2)".
There is a difference in that document D1 does not explicitly disclose the feature set forth in claim 17 wherein "when the BSS color indicated by the PPDU has a predesignated value, an operation on the basis of the BSS color is not performed". However, said difference could be easily derived by a person skilled in the art from the feature disclosed in document D1 wherein "on the basis of the BSS color of the received PPDU, the STA enters a doze state without transmitting a frame (see D1: slide 5)". Therefore, the invention as set forth in claim 17 lacks an inventive step in view of document D1 (PCT Article 33(3)).

The additional technical feature set forth in claim 18 could be easily derived from the feature, disclosed in document D1, of "performing a spatial reuse operation on the basis of the BSS color of the received PPDU (see D1: slide 2)". Therefore, the invention as set forth in claim 18 lacks an inventive step in view of document D1 (PCT Article 33(3)).

The additional technical feature set forth in claim 19 could be easily derived from the feature disclosed in document D1 wherein "the frame detected on the basis of the BSS color is determined as an inter-BSS frame or an intra-BSS frame (see D1: slide 4)". Therefore, the invention as set forth in claim 19 lacks an inventive

step in view of document D1 (PCT Article 33(3)).

The invention as set forth in claim 20 is different from the inventions disclosed in the cited documents in that the former further includes a feature wherein "the predesignated value is a reserved value that is not used for a BSS color when the AP selects the BSS color". Further, said difference would not be obvious to a person skilled in the art even in view of the cited documents. Therefore, the invention as set forth in claim 20 is novel and involves an inventive step (PCT Article 33(2) and (3)).

2.2 Industrial Applicability

The invention as set forth in claims 1-20 is industrially applicable (PCT Article 33(4)).

특허협력조약

발신: 국제조사기관

수신:
임국일

대한민국 06776 서울시 서초구 마방로 48, 2층

PCT

국제조사기관의 견해서

(PCT규칙 43의2.1)

발송일 *(일/월/년)*	2017년 07월 13일 (13.07.2017)
출원인 또는 대리인의 서류참조기호 WILP170023WO	**추가적인 조치** 아래 2를 참조

국제출원번호	국제출원일 *(일/월/년)*	우선일 *(일/월/년)*
PCT/KR2017/002407	2017년 03월 06일 (06.03.2017)	2016년 03월 04일 (04.03.2016)

국제특허분류(IPC)
H04W 74/00(2009.01)i, H04W 74/08(2009.01)i, H04W 84/12(2009.01)i, H04W 28/06(2009.01)i, H04B 7/26(2006.01)i, H04L 27/26(2006.01)i, H04W 28/04(2009.01)i, H04W 24/02(2009.01)i

출원인
주식회사 윌러스표준기술연구소

1. 본 견해서는 다음 기재란에 관한 내용을 포함합니다.

- ☒ 제1기재란 견해서의 기초
- ☐ 제2기재란 우선권
- ☐ 제3기재란 신규성, 진보성 및 산업상이용가능성에 관한 견해 부작성
- ☐ 제4기재란 발명의 단일성 결여
- ☒ 제5기재란 신규성, 진보성 또는 산업상이용가능성에 관한 견해(PCT규칙 43의2.1(a)(i)), 이를 뒷받침하는 인용문헌 및 설명
- ☐ 제6기재란 특이 인용문헌
- ☐ 제7기재란 국제출원의 흠결
- ☐ 제8기재란 국제출원에 관한 의견

2. **추가적인 조치**

국제예비심사가 청구되면, 본 견해서는 국제예비심사기관("IPEA")의 견해서로 간주될 것입니다. 다만, 출원인이 본 기관 이외의 기관을 IPEA로 선택하고, 그 선택된 IPEA가 PCT규칙 66.1의2(b)에 따라 본 국제조사기관의 견해서가 위와 같이 간주되지 않을 것임을 국제사무국에 통보한 경우에는 그러하지 않습니다.

본 견해서가 상기와 같이 IPEA의 견해서로 간주되는 경우, 출원인은 서식 PCT/ISA/220의 발송일로부터 3월 또는 우선일부터 22월 중 늦게 만료되는 날 이전에 의견서 및 보정서(해당하는 경우)를 IPEA에 제출할 수 있습니다.

다른 선택사항에 대하여는 서식 PCT/ISA/220에 대한 안내문을 참조하십시오.

ISA/KR의 명칭 및 우편주소	본 견해서의 완료일	심사관
대한민국 특허청 (35208) 대전광역시 서구 청사로 189, 4동 (둔산동, 정부대전청사) 팩스번호 +82-42-481-8578	2017년 07월 13일 (13.07.2017)	이성영 전화번호 +82-42-481-3535

서식 PCT/ISA/237 (표지) (2015년 1월)

국제조사기관의 견해서

국제출원번호
PCT/KR2017/002407

제1기재란 본 견해서의 기초

1. **언어**와 관련하여, 본 견해서는 아래에 기초하여 작성되었습니다.

☒ 출원시의 언어로 된 국제출원

☐ 국제조사를 위하여 _____ 로 번역되어 제출된 국제출원의 번역문
(PCT규칙 12.3(a) 및 23.1(b))

2. ☐ 본 견해서는 PCT규칙 91에 따라 당해 기관이 허가하였거나 당해 기관에 통보된 **명백한 잘못의 정정**을 고려하여 작성되었습니다(PCT규칙 43의2.1(a)).

3. ☐ 국제출원에 개시된 핵산염기 및/또는 아미노산 서열과 관련하여, 본 견해서는 아래에 기초하여 작성되었습니다.

a. ☐ 아래의 형태로 출원시 국제출원의 일부를 구성하는 서열목록

☐ 부록 C/ST.25 텍스트 파일

☐ 서면 혹은 이미지 파일

b. ☐ PCT 규칙 13의3.1(a)에 따라 국제출원과 함께 국제조사만을 목적으로 부록 C/ST.25 텍스트 파일의 형태로 제출된 서열목록

c. ☐ 국제조사만을 목적으로 국제출원일 이후에 아래 형태로 제출된 서열목록

☐ 부록 C/ST.25 텍스트 파일 (규칙 13의3.1(a))

☐ 서면 혹은 이미지 파일 (규칙 13의3.1(b) 및 시행세칙 713)

4. ☐ 추가로 서열목록에 대하여 하나 이상의 버전이나 사본이 제출된 경우, 후속 버전 또는 추가된 사본에 기재되어 있는 정보가 출원시 출원의 일부를 구성하는 정보와 동일하거나 또는 출원시의 개시범위를 벗어나지 않는다는 진술서가 제출되었습니다.

5. 추가 의견:

국제조사기관의 견해서

국제출원번호
PCT/KR2017/002407

제5기재란 신규성, 진보성 또는 산업상이용가능성에 관한 견해(PCT규칙 43의2.1(a)(i)), 이를 뒷받침하는 인용문헌 및 설명

1. 견해

신규성 (N)	청구항	1-20	있음
	청구항	없음	없음
진보성 (IS)	청구항	1-5,7-16,20	있음
	청구항	6,17-19	없음
산업상 이용가능성 (IA)	청구항	1-20	있음
	청구항	없음	없음

2. 인용문헌 및 설명:

참고한 인용문헌은 다음과 같습니다.

D1: WILUS, 'BSS Color Settings for a Multiple BSSID Set', doc.: IEEE 802.11-16/0042r1, pp. 1-11, 2016.01.18
D2: WO 2015-112780 A1 (MEDIATEK SINGAPORE PTE. LTD.) 2015.07.30
D3: WO 2016-021792 A1 (엘지전자 주식회사) 2016.02.11
D4: WO 2015-120488 A1 (MEDIATEK INC.) 2015.08.13
D5: US 2015-0264617 A1 (NOKIA CORPORATION) 2015.09.17

2.1 신규성 및 진보성
2.1.1 청구항 제1항-제5항
청구항 제1항에 기재된 발명은 '무선 통신 단말이 BSS 컬러를 시그널링하는 정보를 수신하지 못한 경우, 미리 지정된 값을 BSS 컬러로 전송하는 무선 통신 단말'인 점에서 상기 인용문헌에 기재된 발명과 차이가 있으며, 상기 차이는 상기 인용문헌을 고려해 보아도 통상의 지식을 가진 자에게 자명하지도 않습니다. 따라서, 청구항 제1항에 기재된 발명은 신규성 및 진보성이 있습니다 (PCT 제33조(2) 및 (3)).

청구항 제2항-제5항은 청구항 제1항을 인용하고 있는 종속항이므로, 신규성 및 진보성이 있습니다(PCT 제33조(2) 및 (3)).

2.1.2 청구항 제6항-제16항
청구항 제6항에 기재된 발명과 가장 근접한 인용문헌 D1에는 'STA이 프레임을 수신하는 것(D1: 슬라이드 7 참조); 및 상기 프레임이 Inter-BSS 프레임인지 Intra-BSS 프레임인지를 결정하고(D1: 슬라이드 7 참조), 채널 액세스를 수행하는 것(D1: 슬라이드 8 참조)을 포함하는 무선 통신 단말'이 기재되어 있습니다.
다만, 청구항 제6항의 특징인 'Intra-BSS PPDU는 무선 통신 단말이 포함된 BSS와 동일한 BSS에서 전송된 PPDU를 나타내고, inter-BSS PPDU는 상기 무선 통신 단말이 포함

추가 기재란에 계속

추가 기재란

이전 기재란의 공간이 충분하지 아니한 경우.
제5 기재란의 연속

된 BSS와 다른 BSS에서 전송되는 PPDU를 나타내는 것'이 상기 인용문헌 D1에 명시적으로 기재되어 있지 않다는 점에서 차이가 있으나, 이러한 차이는 통상의 지식을 가진 자에게 상기 인용문헌 D1의 'intra-BSS 프레임은 동일한 멀티플 BSSID 셋에서 전송된 프레임을 나타내고(D1: 슬라이드 7 참조), inter-BSS 프레임은 STA의 VAPs의 MAC 주소와 다른 프레임인 것(D1: 슬라이드 7 참조)'으로부터 용이하게 도출 가능합니다. 따라서 청구항 제6항에 기재된 발명은 인용문헌 D1에 의하여 진보성이 없습니다(PCT 제33조(3)).

청구항 제7항에 기재된 발명은 'PPDU가 Inter-BSS PPDU 조건과 Intra-BSS PPDU 조건을 모두 만족하는 경우, 상기 PPDU를 Inter-BSS PPDU로 식별하는 것'을 더 포함한다는 점에서 상기 인용문헌들에 기재된 발명과 차이가 있으며, 상기 차이는 상기 인용문헌을 고려해 보아도 통상의 지식을 가진 자에게 자명하지도 않습니다. 따라서 청구항 제7항에 기재된 발명은 신규성 및 진보성이 있습니다(PCT 제33조(2) 및 (3)).

청구항 제8항에 기재된 발명은 '프로세서는, PPDU가 Inter-BSS PPDU인지 Intra-BSS PPDU인지 식별할 수 없는 경우, 상기 PPDU를 기초로 Intra-BSS NAV가 아닌 basic NAV를 설정하고, 상기 Intra-BSS NAV는 무선 통신 단말과 동일한 BSS에서 전송된 PPDU를 기초로 설정되고, 상기 Basic NAV는 상기 무선 통신 단말과 다른 BSS에서 전송된 PPDU를 기초로 설정되는 것'을 더 포함한다는 점에서 상기 인용문헌들에 기재된 발명과 차이가 있으며, 상기 차이는 상기 인용문헌을 고려해 보아도 통상의 지식을 가진 자에게 자명하지도 않습니다. 따라서 청구항 제8항에 기재된 발명은 신규성 및 진보성이 있습니다(PCT 제33조(2) 및 (3)).

청구항 제9항에 기재된 발명은 '프로세서는 무선 통신 단말이 BSS 컬러를 기초로 PPDU가 Intra-BSS PPDU인지 Inter-BSS PPDU인지 식별할 수 없는 경우, 상기 BSS 컬러 및 PPDU의 HE-SIG-A 필드의 TXOP Duration 필드를 기초로 Intra-BSS NAV를 설정하지 않는 상기 Intra-BSS NAV는 상기 무선 통신 단말과 동일한 BSS에서 전송된 PPDU를 기초로 설정되는 것'을 더 포함한다는 점에서 상기 인용문헌들에 기재된 발명과 차이가 있으며, 상기 차이는 상기 인용문헌을 고려해 보아도 통상의 지식을 가진 자에게 자명하지도 않습니다. 따라서 청구항 제9항에 기재된 발명은 신규성 및 진보성이 있습니다(PCT 제33조(2) 및 (3)).

청구항 제10항 및 제11항은 청구항 제9항을 직, 간접적으로 인용하고 있는 종속항이므로, 신규성 및 진보성이 있습니다(PCT 제33조(2)와 (3)).

다음 페이지에 계속

추가 기재란

이전 기재란의 공간이 충분하지 아니한 경우.
이전 기재란의 연속

청구항 제12항에 기재된 발명은 '무선 통신 단말이 BSS 컬러를 기초로 PPDU가 Intra-BSS PPDU인지 Inter-BSS PPDU인지 식별할 수 없는 경우, 상기 BSS 컬러 및 상기 PPDU를 기초로 파워 세이브 모드에 진입하지 않는 것'을 더 포함한다는 점에서 상기 인용문헌들에 기재된 발명과 차이가 있으며, 상기 차이는 상기 인용문헌을 고려해 보아도 통상의 지식을 가진 자에게 자명하지도 않습니다. 따라서 청구항 제12항에 기재된 발명은 신규성 및 진보성이 있습니다(PCT 제33조(2) 및 (3)).

청구항 제13항에 기재된 발명은 '무선 통신 단말이 AP이고, PPDU가 상기 무선 통신 단말이 트리거링하지 않은 무선 통신 단말로부터 전송된 트리거를 기초로 하는 PPDU인 경우, 상기 PPDU를 Inter-BSS PPDU로 판단되는 것'을 더 포함한다는 점에서 상기 인용문헌들에 기재된 발명과 차이가 있으며, 상기 차이는 상기 인용문헌을 고려해 보아도 통상의 지식을 가진 자에게 자명하지도 않습니다. 따라서 청구항 제13항에 기재된 발명은 신규성 및 진보성이 있습니다(PCT 제33조(2) 및 (3)).

청구항 제14항에 기재된 발명은 '프로세서는 무선 통신 단말이 AP이고, PPDU가 트리거 프레임을 포함하는 PPDU인 경우, 상기 PPDU를 Inter-BSS PPDU로 판단하는 것'을 더 포함한다는 점에서 상기 인용문헌들에 기재된 발명과 차이가 있으며, 상기 차이는 상기 인용문헌을 고려해 보아도 통상의 지식을 가진 자에게 자명하지도 않습니다. 따라서 청구항 제14항에 기재된 발명은 신규성 및 진보성이 있습니다(PCT 제33조(2) 및 (3)).

청구항 제15항 및 제16항은 청구항 제14항을 직, 간접적으로 인용하고 있는 종속항이므로, 신규성 및 진보성이 있습니다(PCT 제33조(2)와 (3)).

2.1.3 청구항 제17항-제20항
청구항 제17항에 기재된 발명과 가장 근접한 인용문헌 D1에는 'PPDU를 수신하는 것(D1: 슬라이드 2 참조)를 포함하는 무선 통신 단말'이 기재되어 있습니다.
다만, 청구항 제17항의 특징인 'PPDU가 나타내는 BSS 컬러가 미리 지정된 값일 경우, 상기 BSS 컬러를 기초로 하는 동작을 수행하지 않는 것'이 상기 인용문헌 D1에 명시적으로 기재되어 있지 않다는 점에서 차이가 있으나, 이러한 차이는 통상의 지식을 가진 자에게 상기 인용문헌 D1의 'STA은 수신된 PPDU의 BSS 컬러에 기초해서, 프레임을 전송하지 않고, doze 상태로 진입하는 것(D1: 슬라이드 5 참조)'으로부터 용이하게 도출 가능합니다. 따라서 청구항 제17항에 기재된 발명은 인용문헌 D1에 의하여 진보성이 없습니다(PCT 제33조(3)).

다음 페이지에 계속

추가 기재란

이전 기재란의 공간이 충분하지 아니한 경우.
이전 기재란의 연속

청구항 제18항에 추가된 기술적 특징은 인용문헌 D1의 '수신된 PPDU의 BSS 컬러에 기초해서 spatial reuse 동작을 수행하는 것(D1: 슬라이드 2 참조)'으로부터 용이하게 도출할 수 있습니다. 따라서 청구항 제18항에 기재된 발명은 인용문헌 D1에 의해서 진보성이 없습니다(PCT 제33조(3)).

청구항 제19항에 추가된 기술적 특징은 인용문헌 D1의 'BSS 컬러에 기초해서 검출된 프레임을 inter 혹은 intra-BSS 프레임으로 판단하는 것(D1: 슬라이드 4 참조)'으로부터 용이하게 도출할 수 있습니다. 따라서 청구항 제19항에 기재된 발명은 인용문헌 D1에 의해서 진보성이 없습니다(PCT 제33조(3)).

청구항 제20항에 기재된 발명은 '미리 지정된 값은 AP가 BSS 컬러 선택 시 BSS 컬러로 사용되지 않는 리저브드(reserved) 값인 것'을 더 포함한다는 점에서 상기 인용문헌들에 기재된 발명과 차이가 있으며, 상기 차이는 상기 인용문헌을 고려해 보아도 통상의 지식을 가진 자에게 자명하지도 않습니다. 따라서 청구항 제20항에 기재된 발명은 신규성 및 진보성이 있습니다(PCT 제33조(2) 및 (3)).

2.2 산업상 이용가능성
청구항 제1항-제20항에 기재된 발명은 산업상 이용가능합니다(PCT 제33조(4)).

[DESCRIPTION]

[Invention Title]

WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET

[Technical Field]

The present invention relates to a wireless communication method and a wireless communication terminal in a situation where a basic service set overlaps.

[Background Art]

In recent years, with supply expansion of mobile apparatuses, a wireless communication technology that can provide a rapid wireless Internet service to the mobile apparatuses has been significantly spotlighted. The wireless communication 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.

One of most famous wireless communication technology is wireless LAN technology. 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 Orthogonal Frequency Division Multiplexing (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 communication technology standards after the 802.11ac and 802.11ad, discussion for providing a high-efficiency and high-performance wireless communication technology in a high-density environment is continuously performed. That is, in a next-generation wireless communication technology environment, communication having high frequency efficiency needs to be provided indoors/outdoors under the presence of high-density terminals and base terminals and various technologies for implementing the communication are required.

Especially, as the number of devices using a wireless communication technology increases, it is necessary to efficiently use a predetermined channel. Therefore, required is a technology capable of efficiently using bandwidths by simultaneously transmitting data between a plurality of terminals and base terminals.

[Disclosure]

[Technical Problem]

An embodiment of the present invention is to provide a wireless communication method and a wireless communication terminal in a situation where a basic service set overlaps.

[Technical Solution]

According to an embodiment of the present invention, a wireless communication terminal that communicates wirelessly includes: a transceiver; and a processor. The processor is configured to transmit a BSS color indicating a BSS including the wireless communication terminal when communicating with another wireless communication terminal through the transceiver, and transmit a predetermined value as the BSS color when the wireless communication terminal fails to receive information signaling the BSS color.

When the wireless communication terminal fails to make any association with a wireless communication terminal, which is an AP, the processor may transmit a predetermined value as the BSS color.

When the wireless communication terminal receives signaling information indicating that an operation based on the BSS color is not allowed, the processor may be configured to transmit a predetermined value as the BSS color.

The predetermined value may be 0.

A PLCP Protocol Data Unit (PPDU) signaling the predetermined value as the BSS color may not be identified as an Inter-BSS PPDU or an Intra-BSS PPDU based on the BSS color, which is the predetermined value, the Intra-BSS PPDU may indicate a PPDU transmitted from the same BSS as the BSS including the wireless communication terminal, and the Inter-BSS PPDU may indicate a PPDU transmitted from a BSS other than the BSS including the wireless communication terminal.

According to an embodiment of the present invention, a wireless communication terminal that communicates wirelessly includes: a transceiver; and a processor. The processor is configured to receive a PLCP Protocol Data Unit (PPDU) through the transceiver and access a channel based on whether the PPDU is an Inter-BSS PPDU or an Intra-BSS PPDU, the Intra-BSS PPDU indicates a PPDU transmitted from the same BSS as the BSS including the wireless communication terminal, and the Inter-BSS PPDU indicates a PPDU transmitted from a BSS other than the BSS including the wireless communication terminal.

When the PPDU satisfies both an Inter-BSS PPDU condition and an Intra-BSS PPDU condition, the PPDU may be identified as an Inter-BSS PPDU.

When the PPDU is not identified as the Inter-BSS PPDU or the Intra-BSS PPDU, the processor may set a Basic NAV instead of an Intra-BSS Network Allocation Vector (NAV) based on the PPDU, the Intra-BSS NAV may be set based on the PPDU transmitted from the same BSS as the wireless communication terminal, and the Basic NAV may be set

based on the PPDU transmitted from the BSS other than that of the wireless communication terminal

When the wireless communication terminal is not able to identify whether the PPDU is the Intra-BSS PPDU or the Inter-BSS PPDU based on the BSS color, the processor may be configured not to set an Intra-BSS Network Allocation Vector (NAV) based on the BSS color and a TXOP Duration field of an HE-SIG-A field of the PPDU, and the Intra-BSS NAV may be set based on the PPDU transmitted from the same BSS as that of the wireless communication terminal.

When receiving signaling information indicating that an operation based on the BSS color is not allowed, the processor may be configured not to set the Intra-BSS NAV based on the BSS color and the TXOP Duration field of the HE-SIG-A field of the PPDU.

When the wireless communication terminal is recognize that the BSS color of the BSS including the wireless communication terminal is the same as the BSS color of another BSS, an Intra-BSS NAV may not be set based on the BSS color and the TXOP Duration field of the HE-SIG-A field of the PPDU.

When the wireless communication terminal is not able to identify whether the PPDU is the Intra-BSS PPDU or the Inter-BSS PPDU based on the BSS color, the processor may be configured not to enter a power save mode based on the BSS color.

When the wireless communication terminal is an AP and the PPDU is a trigger-based PPDU transmitted from a wireless communication terminal that is not triggered by the wireless communication terminal, the processor may be configured to determine that the PPDU is an Inter-BSS PPDU.

When the wireless communication terminal is an AP and the PPDU is a PPDU including a trigger frame, the processor may be configured to determine that the PPDU is

an Inter-BSS PPDU.

The processor may be configured to determine whether the PPDU includes the trigger frame based on information related to a Spatial Reuse (SR) operation included in the PPDU.

Based on that information related to the SR operation included in the PPDU indicates whether the SR operation is restrictively allowed or the SR operation is delayed while the PPDU is transmitted, the processor may be configured to determine whether the PPDU includes the trigger frame.

According to an embodiment of the present invention, a wireless communication terminal that communicates wirelessly includes: a transceiver; and a processor. The processor is configured to receive a PLCP Processing Data Unit (PPDU) through the transceiver, and not to perform an operation based on the BSS color when the BSS color indicated by the PPDU is a predetermined value.

When the BSS color indicated by the PPDU is a predetermined value, the processor may not perform the SR operation for the PPDU.

When the BSS color indicated by the PPDU is a predetermined value, the processor may regard the PPDU as an Intra-BSS PPDU.

The predetermined value may be a reserved value that is not used in the BSS color when the AP selects the BSS color.

[Advantageous Effects]

An embodiment of the present invention provides a wireless communication method and a wireless communication terminal in a situation where a basic service set overlaps.

[Description of Drawings]

FIG. 1 shows a wireless LAN system according to an embodiment of the present

invention.

FIG. 2 shows a wireless LAN system according to another embodiment of the present invention.

FIG. 3 shows a block diagram illustrating a configuration of a station according to an embodiment of the inventive concept.

FIG. 4 shows a block diagram illustrating a configuration of an access point according to an embodiment of the present invention.

FIG. 5 shows a process that a station sets an access point and a link according to an embodiment of the present invention.

FIG. 6 shows that a wireless communication terminal according to an embodiment of the present invention enters a power save mode based on a BSS color.

FIG. 7 shows that a wireless communication terminal according to an embodiment of the present invention enters a power save mode during inter-BSS color collision.

FIG. 8 shows the operation of setting a NAV by a wireless communication terminal according to an embodiment of the present invention when a BSS color collision occurs.

FIG. 9 shows a NAV setting operation of a wireless communication terminal according to another embodiment of the present invention when a BSS color collision occurs.

FIG. 10 shows an operation of a wireless communication terminal according to an embodiment of the present invention to determine whether to reset a NAV based on a CF-End frame when a BSS color collision occurs.

FIG. 11 shows an operation of a wireless communication terminal according to another embodiment of the present invention to determine whether to reset a NAV based on a CF-End frame when a BSS color collision occurs.

FIG. 12 shows an operation of a wireless communication terminal recognizing a BSS color collision according to an embodiment of the present invention.

FIG. 13 shows a MAC frame format of a Clear To Send (CTS) frame and an ACK frame according to an embodiment of the present invention.

FIG. 14 shows an operation in which a wireless communication terminal according to an embodiment of the present invention sets a NAV based on an RTS frame and a CTS

frame.

FIG. 15 shows a format of an 802.11a PPDU according to an embodiment of the present invention.

FIG. 16 shows a format of a service field of a PPDU according to an embodiment of the present invention.

FIG. 17 shows an operation of setting a NAV according to an embodiment of FIG. 15 to FIG. 16 by a wireless communication terminal according to an embodiment of the present invention.

FIG. 18 shows a method of setting a partial AID and a Group ID field of VHT-SIG-A by a wireless communication terminal according to an embodiment of the present invention.

FIG. 19 shows a method of determining whether a corresponding PPDU is an Inter-BSS PPDU or an Intra-BSS PPDU based on whether a PPDU received by a wireless communication terminal is a downlink PPDU according to an embodiment of the present invention.

FIG. 20 shows a method for identifying whether a MAC frame received is an Intra-BSS frame or an Inter-BSS frame based on SR-related information by a wireless communication terminal according to an embodiment of the present invention.

FIG. 21 shows a method for a wireless communication terminal to determine whether the corresponding PPDU is an Inter-BSS PPDU or an Intra-BSS PPDU when the PPDU received by the wireless communication terminal according to the embodiment of the present invention satisfies both the Inter-BSS PPDU condition and the Intra-BSS PPDU condition.

FIG. 22 shows a case where a wireless communication terminal according to an embodiment of the present invention enters a power save state based on a MAC header of a frame received by the wireless communication terminal.

FIG. 23 shows a case where, when a wireless communication terminal according to an embodiment of the present invention is included in a BSS corresponding to a multiple BSSID set, the wireless communication terminal enters a power save state based on a MAC header of a frame received by the wireless communication terminal.

FIG. 24 shows the format of the HE-SIG-B field according to an embodiment of the present invention.

FIG. 25 is a view illustrating a MAC frame format according to an embodiment of the present invention.

FIG. 26 is a view illustrating a variant of an HT Control field according to an embodiment of the present invention.

FIG. 27 shows the format of the A-Control subfield according to an embodiment of the present invention.

FIG. 28 shows the format of an A-Control sub-field of a control sub-field according to another embodiment of the present invention.

FIGS. 29 to 33 show a frame format and an HE variant format of an HT Control field according to another embodiment of the present invention.

FIG. 34 shows a format of a trigger frame according to an embodiment of the present invention.

FIG. 35 shows the format of a Common Info field and a Per User Info field of a trigger frame according to the embodiment of the present invention.

FIG. 36 shows a Common Info field and a Per User Info field of a trigger frame according to another embodiment of the present invention.

FIG. 37 shows a Trigger Dependent Common Info field and a Trigger Dependent Per User Info field of an MU-BAR type trigger frame according to an embodiment of the present invention.

FIG. 38 shows the format of the Trigger Dependent Common Info field of the MU-BAR type trigger frame according to an embodiment of the present invention.

FIG. 39 shows a format of an MU-BAR type trigger frame for GCR according to an embodiment of the present invention.

FIG. 40 shows a format of an MU-BAR type trigger frame for GCR according to an embodiment of the present invention.

FIG. 41 shows the format of the BAR Control field and the encoding value of the BlockACKReq variant according to an embodiment of the present invention.

FIG. 42 shows the format of the BAR Information field according to an

embodiment of the present invention.

FIG. 43 shows a BAR Information field according to another embodiment of the present invention.

FIG. 44 shows a trigger frame structure according to another embodiment of the present invention.

FIG. 45 shows the operation of a wireless communication terminal according to an embodiment of the present invention.

[Mode for Carrying out the Invention]

Preferred embodiments of the present invention will be described below in more detail with reference to the accompanying drawings. The present invention may, however, be embodied in different forms and should not be constructed as limited to the embodiments set forth herein. Parts not relating to description are omitted in the drawings in order to clearly describe the present invention and like reference numerals refer to like elements throughout.

Furthermore, when it is described that one comprises (or includes or has) some elements, it should be understood that it may comprise (or include or has) only those elements, or it may comprise (or include or have) other elements as well as those elements if there is no specific limitation.

This application claims priority to and the benefit of Korean Patent Application Nos. 10-2016-0026684 (2016.03.04), Nos. 10-2016-0029975 (2016.03.12), Nos. 10-2016-0044465 (2016.04.11), Nos. 10-2016-0057597(2016.05.11), and Nos. 10-2016-0114821 (2016.09.07) filed in the Korean Intellectual Property Office and the embodiments and mentioned items described in the respective applications are included in the Detailed Description of the present application.

FIG. 1 is a diagram illustrating a wireless communication system according to an embodiment of the present invention. For convenience of description, an embodiment of the present invention is described through the wireless LAN system. 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 concept including a wireless LAN communication device such as non-AP STA, or an AP, or 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.

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 communication system

according to another embodiment of the present invention. For convenience of description, another embodiment of the present invention is described through the wireless LAN system. 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 physical layer frame, 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 and receive module using different frequency bands. For example, the transceiver 120 may include transmit and 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 and receive module using a frequency band of 6 GHz or more and a transmit and receive module using a frequency band of 6 GHz or less. The respective transmit and 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 and receive module. The transceiver 120 may operate only one transmit and receive module at a time or simultaneously operate multiple transmit and receive modules together according to the performance and requirements of the station 100. When the station 100 includes a plurality of transmit and receive modules, each transmit and 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 may be a modulator and/or demodulator which modulates wireless signal transmitted to the transceiver 120 and demodulates wireless signal received from the transceiver 120. 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 and 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 and 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 and receive module using a frequency band of 6 GHz or more and a transmit and receive module using a frequency band of 6 GHz or less. The respective transmit and receive modules may perform wireless communication with the station according to a wireless LAN standard of a frequency band supported by the corresponding transmit and receive module. The transceiver 220 may operate only one transmit and receive module at a time or simultaneously operate multiple transmit and 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 may be a modulator and/or demodulator which modulates wireless signal transmitted to the transceiver 220 and demodulates wireless signal received from the transceiver 220. The processor 210 controls various operations such as radio 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).

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.

In a specific embodiment, the AP 200 may be a wireless communication terminal that allocates a communication medium resource and performs scheduling in an independent network, such as an ad-hoc network, which is not connected to an external distribution service. In addition, the AP 200 may be at least one of a base station, an eNB, and a transmission point TP.

Due to the spread of mobile devices and the supply of wireless communication, wireless communication terminals are increasingly communicating in a dense environment. Particularly, the number of cases where a wireless communication terminal communicates in an environment in which a plurality of BSSs are overlapped is increasing. When multiple BSSs are overlapped, the communication efficiency of the wireless communication terminal may be degraded due to interference with other wireless communication terminals. In particular, when a frequency band is used through a contention procedure, a wireless communication terminal may not secure even a transmission opportunity due to interference with other wireless communication terminals. To solve this problem, a wireless communication terminal may perform a spatial reuse (SR) operation. Specifically, the SR operation may include an operation of accessing the channel depending on whether the received frame is a MAC frame transmitted from a BSS including a wireless communication terminal or a MAC frame transmitted from another BSS. For convenience of description, when a frame is used without any description in the following description, it is assumed to refer to a MAC frame.

In a specific embodiment, the operation of accessing the channel may include a setting NAV and resetting NAV operation, a CCA operation, and a deferral operation. For example, the wireless communication terminal may adjust a Clear Channel Assessment (CCA) threshold value according to whether a frame received by the wireless communication terminal is a frame transmitted from a BSS including a wireless communication terminal or a frame transmitted from an OBSS. Also, the wireless communication terminal may adjust the transmission power of the PPDU to be transmitted according to the CCA threshold value adjustment during the SR operation.

Specifically, the wireless communication terminal may apply the CCA threshold value according to whether the received PPDU is Inter-BSS PPDU or Intra-BSS PPDU while the received PPDU is being transmitted. In the specific embodiment, the CCA threshold value according to whether the received PPDU is Inter-BSS PPDU or Intra-BSS PPDU while the payload of the received PPDU is being transmitted may be applied. Also, the wireless communication terminal may receive the first PPDU and receive the second PPDU while applying the CCA threshold according to whether the first PPDU is the Inter-BSS PPDU or the Intra-BSS PPDU. Specifically, the wireless communication terminal may apply the CCA threshold value according to whether the received PPDU is Inter-BSS PPDU or Intra-BSS PPDU while the received PPDU is being transmitted. Specifically, when the wireless communication terminal receives the Inter-BSS PPDU and applies the CCA threshold value corresponding to the Inter-BSS PPDU, it may receive the Intra-BSS PPDU. At this time, the wireless communication terminal may apply the CCA threshold value corresponding to the Intra-BSS PPDU instead of the CCA threshold value corresponding to the Inter-BSS PPDU. However, when the wireless communication terminal receives the Intra-BSS PPDU and applies the CCA threshold value corresponding to the Intra-BSS PPDU, and the wireless communication terminal may receive the Inter-BSS PPDU while the transmission of the Intra-BSS PPDU is not completed. At this time, the wireless communication terminal may maintain the CCA threshold value corresponding to the Intra-BSS PPDU until the transmission of the intra-BSS PPDU is completed. Specifically, the wireless communication terminal may not apply the CCA threshold value corresponding to the inter-BSS PPDU until the transmission of the Intra-BSS PPDU is completed. In the above-described operations, the CCA threshold value corresponding to the Inter-BSS PPDU may be equal to or greater than the CCA threshold value corresponding to the Intra-BSS PPDU.

In addition, the wireless communication terminal may enter the power save mode depending on whether the frame received by the wireless communication terminal is a frame transmitted from a BSS including a wireless communication terminal or a frame transmitted from an OBSS.

For convenience of explanation, a BSS including a wireless communication

terminal is referred to as Intra-BSS, and a basic service set overlapped with Intra-BSS is referred to as an Overlapped Basic Service Set (OBSS). In addition, a BSS different from the Intra-BSS is referred to as Inter-BSS. In addition, a frame transmitted in the Intra-BSS is referred to as an Intra-BSS frame, and a frame transmitted in the OBSS is referred to as an OBSS frame or an Inter-BSS frame. In addition, the PPDU transmitted from the Intra-BSS is referred to as an Intra-BSS PPDU, and the PPDU transmitted from the OBSS is referred to as an OBSS PPDU or an Inter-BSS PPDU.

FIG. 6 shows that a wireless communication terminal according to an embodiment of the present invention enters a power save mode based on a BSS color.

The non-AP wireless communication terminal may enter the power save mode when the recipient of the PPDU transmitted in the Intra-BSS does not include the non-AP wireless communication terminal. Specifically, the non-AP wireless communication terminal may enter the power save mode under the following conditions. When the PPDU received by the non-AP wireless communication terminal is the HE-MU-PPDU, the BSS color value signaled by the corresponding PPDU indicates the BSS associated with the wireless communication terminal, the corresponding PPDU is not an uplink PPDU, the non-AP wireless communication terminal is not included in the address of the receiving wireless communication terminal which is signaled by the PPDU, and it is not a broadcast address indicating a non-AP wireless communication terminal, the non-AP wireless communication terminal may enter the power save mode. Also, when the PPDU received by the non-AP wireless communication terminal is any one of the HE-MU-PPDU, the HE-SU-PPDU, and the HE-extended range SU-PPDU, the BSS color value signaled by the corresponding PPDU indicates the BSS with which the non-AP wireless communication terminal is associated, and the corresponding PPDU is an uplink PPDU, the non-AP wireless communication terminal may enter the power save mode. Also, when the PPDU received by the non-AP wireless communication terminal is a trigger-based PPDU and the BSS color value signaled by the PPDU indicates a BSS associated with a non-AP wireless communication terminal, the non-AP wireless communication terminal may enter the power save mode. In a specific embodiment, the non-AP wireless communication terminal

may determine whether the PPDU is a PPDU for uplink transmission according to the UL_FLAG value of the RXVECTOR. In addition, the non-AP wireless communication terminal may determine whether the wireless communication terminal is included in the address of the receiving wireless communication terminal that the PPDU signals according to the STA_ID_LIST of the RXVECTOR. Also, the non-AP wireless communication terminal may leave the power save mode at the time when the corresponding PPDU is not transmitted. At this time, the RXVECTOR is a parameter set indicating the information of the PPDUs received from the module of the physical layer by the module of the MAC layer when the wireless communication terminal receives the PPDU.

Also, the non-AP wireless communication terminal may determine that the wireless medium is busy in a power save state. Accordingly, the wireless communication terminal does not access the wireless medium in the power save state. In addition, the non-AP wireless communication terminal may operate a network allocation vector (NAV) timer in a power save mode and access the wireless medium when the NAV timer expires. Also, when the power save mode option of the non-AP wireless communication terminal is activated and the current state of the non-AP wireless communication terminal is not in the power save mode, the non-AP wireless communication terminal may enter the power save mode. At this time, the state where the power save mode option is activated may be a case where the value of dot11IntraPPDUPowerSaveOptionActivated is True. Also, the power save mode is referred to as a doze state, and a state that is not a power save mode may be referred to as an awake state.

In the embodiment of FIG. 6, the station STA detects a PPDU signaling the same BSS color as that of the BSS in which the station is included. At this time, the station STA identifies the detected PPDU as Intra-BSS PPDU based on the BSS color. Thus, the station STA may enter the power save mode. Specifically, when at least one of the above conditions is satisfied, the station STA may enter the power save mode. In addition, the station STA leaves the power save mode at the time when transmission of the corresponding PPDU is terminated.

Since the size of the field indicating the BSS color is limited, different BSSs may

be set to the same BSS color. For convenience of description, a case where different BSSs correspond to the same BSS color is referred to as Inter-BSS color collision or BSS color collision.

FIG. 7 shows that a wireless communication terminal according to an embodiment of the present invention enters a power save mode during Inter-BSS color collision.

When Inter-BSS color collision occurs and the non-AP wireless communication terminal receives the Inter-BSS PPDU signaling the same BSS color as that of the BSS associated with the non-AP wireless communication terminal, the non-AP wireless communication terminal may enter the power save mode. Accordingly, the non-AP wireless communication terminal may not receive the PPDU transmitted by the AP associated with the non-AP wireless communication terminal as in the embodiment of FIG. 7. At this time, the BSS color signaled by the PPDU may be the BSS color signaled by the BSS color field of the PPDU. Specifically, the BSS color that the PPDU signals may be the BSS color that the BSS color field of the HE-SIG-A of the PPDU signals.

Therefore, when the wireless communication terminal is not able to identify the BSS to which the corresponding PPDU is transmitted based on the BSS color signaled by the PPDU, the wireless communication terminal may not perform the operation based on the BSS color. Specifically, when the wireless communication terminal is not able to identify the BSS based on the BSS color signaled by the PPDU, the wireless communication terminal may not perform an operation based on the BSS color that is the same as that of the inter-BSS. For example, when the wireless communication terminal is not able to identify the BSS based on the BSS color signaled by the PPDU, even when the wireless communication terminal receives the PPDU indicating the same BSS color as that of the Inter-BSS, the wireless communication terminal may not treat the PPDU as Inter-BSS PPDU.

When the non-AP wireless communication terminal is not able to identify whether the PPDU is an Inter-BSS PPDU or an Intra-BSS PPDU based on the BSS color signaled by the PPDU, the non-AP wireless communication terminal may not enter the power save mode based on the BSS color signaled by the PPDU. Specifically, when the non-AP wireless communication terminal recognizes a BSS color collision, the non-AP wireless

communication terminal may not enter the power save mode based on the BSS color signaled by the PPDU. In a specific embodiment, the non-AP wireless communication terminal may not enter the power save mode based on the BSS color value from a time when the BSS color collision is recognized to a predetermined time point. In another specific embodiment, the non-AP wireless communication terminal may not operate in the Intra-PPDU power save mode based on the BSS color value from a time when the BSS color collision is recognized to a predetermined time point. Also, the predetermined time point may indicate a time point at which the BSS color collision is resolved. In another specific embodiment, the predetermined time point may be a time point at which the association of the AP with the non-AP wireless communication terminal is disassociated. In yet another specific embodiment, the non-AP wireless communication terminal may stop entering power save mode from when the non-AP wireless communication terminal detects a BSS color collision.

In addition, when the wireless communication terminal is not able to identify whether the PPDU is an Inter-BSS PPDU or an Intra-BSS PPDU based on the BSS color signaled by the PPDU, the wireless communication terminal may not set the NAV based on the BSS color. Specifically, when the wireless communication terminal is not able to identify whether the PPDU is the Inter-BSS PPDU or the Intra-BSS PPDU based on the BSS color signaled by the PPDU, the wireless communication terminal may not set the Intra-BSS NAV based on the BSS color and the TXOP Duration field of the HE-SIG-A field. First, the operation of the wireless communication terminal to set two NAVs will be described, and when the wireless communication terminal is not able to identify whether the PPDU is the Inter-BSS PPDU or the Intra-BSS PPDU based on the BSS color signaled by the PPDU, a method of setting the NAV by the wireless communication terminal will be described.

The wireless communication terminal may maintain two NAVs, that is, an Intra-BSS NAV set based on the PPDU identified as the Intra-BSS PPDU and a Basic NAV set based on the PPDU identified as the Inter-BSS PPDU. At this time, the wireless communication terminal may set the Basic NAV based on the PPDU that may not be identified as the Inter-BSS PPDU or the Intra-BSS PPDU. Specifically, the wireless

communication terminal may maintain two NAVs through the following operations.

When the wireless communication terminal receives at least one valid frame from the PSDU and identifies the frame as an Intra-BSS frame, the wireless communication terminal may set the Intra-BSS NAV based on the valid Duration field value of the PSDU. In addition, when the wireless communication terminal receives at least one valid frame from the PSDU and identifies the frame as an Inter-BSS frame, the wireless communication terminal may set the Basic NAV based on the valid Duration field value of the PSDU. Also, when the wireless communication terminal receives at least one valid frame from the PSDU and may not determine the frame as an Intra-BSS frame or Inter-BSS frame, the wireless communication terminal may set the Basic NAV based on the valid Duration field value of the PSDU.

The wireless communication terminal receives the signaling field of the PPDU including the BSS identification information from the PPDU, and the wireless communication terminal may set two NAVs based on the BSS identification information that the signaling field of the PPDU signals. At this time, the PPDU may be the HE-PPDU, and the signaling field of the PPDU may be the HE-SIG-A field. In addition, the BSS identification information may be a BSS color. Also, the wireless communication terminal may set the NAV based on the TXOP Duration field of the HE-SIG-A field. Specifically, when the wireless communication terminal receives the signaling field of the PPDU including the BSS identification information from the PPDU and the BSS identification information that the signaling field of the PPDU signals is identified as Intra-BSS, the wireless communication terminal may set the Intra-BSS NAV based on the signaling field of the PPDU. Further, when the wireless communication terminal receives the signaling field of the PPDU including the BSS identification information from the PPDU, and the BSS identification information that the signaling field of the PPDU signals is identified as Inter-BSS, the wireless communication terminal may set the Basic NAV based on the signaling field of the PPDU.

When the Receiver Address RA of the frame received by the wireless communication terminal is the same as the MAC address of the wireless communication terminal, the wireless communication terminal may not set the Intra-BSS NAV or the Basic

NAV from the Duration field of the corresponding frame. In addition, when the wireless communication terminal receives the valid signaling field of the PPDU from the PPDU and receives a valid PSDU from the corresponding PPDU, the wireless communication terminal may not set the Intra-BSS NAV or the Basic NAV based on the TXOP Duration field included in the signaling field of the corresponding PPDU.

When the value of the duration field of the frame identified as the Intra-BSS frame by the wireless communication terminal is larger than the value of the current Intra-BSS NAV, the wireless communication terminal may set the Intra-BSS NAV based on the value of the duration field of the frame. When the value of the Duration field of the frame in which the wireless communication terminal is not able to identify whether the frame is the Intra-BSS frame or the Inter-BSS frame is larger than the value of the current basic NAV, the wireless communication terminal may set the Basic NAV based on the Duration field value of the frame.

When the value of the TXOP Duration field of the signaling field of the PPDU identified by the wireless communication terminal as Intra-BSS PPDU is larger than the value of the current intra-BSS NAV, the wireless communication terminal may set the Intra-BSS NAV based on the TXOP Duration field value of the signaling field of the PPDU identified as the Intra-BSS PPDU. In addition, when the value of the TXOP Duration field of the signaling field of the PPDU identified by the wireless communication terminal as the Inter-BSS PPDU is larger than the value of the current basic NAV, the wireless communication terminal may set the Basic NAV based on the TXOP Duration field value of the signaling field of the corresponding PPDU.

When the wireless communication terminal receives the CF-End frame, the wireless communication terminal may reset the NAV. At this time, the wireless communication terminal may determine whether to reset the NAV according to the BSS from which the CF-End frame is transmitted. Specifically, the wireless communication terminal may reset the currently set NAV when the BSS from which the PPDU setting the currently set NAV is transmitted and the BSS from which the CF-End frame is transmitted are the same. Additionally, the wireless communication terminal may not reset the NAV when the BSS from which the PPDU setting the currently set NAV is transmitted and the

BSS from which the CF-End frame is transmitted are different. In a specific embodiment, when the wireless communication terminal receives the CF-End frame from the BSS which does not correspond to the BSS indicated by the multiple BSSID set including Inter-BSS or the BSSID of the Intra-BSS, and the latest NAV is set by the PPDU transmitted from any of the BSSs indicated by the multiple BSSID set including the Intra-BSS or the BSSID of the Intra-BSS, the wireless communication terminal may not reset the NAV. In another specific embodiment, when the wireless communication terminal receives the CF-End frame from the BSS, which is one of the BSSs indicated by the multiple BSSID sets including the Intra-BSS or Intra-BSS BSSID and the most recent NAV is set by a PPDU that does not correspond to the BSS indicated by the set of multiple BSSIDs including the BSSID of the Inter-BSS or the Intra-BSS, the wireless communication terminal may not reset the NAV.

The trigger frame transmitted by the AP may trigger the uplink transmission of the wireless communication terminal receiving the trigger frame. At this time, the wireless communication terminal may start UL MU transmission based on the trigger frame without considering the NAV according to a certain condition. Specifically, when the NAV is set by the frame transmitted by the AP that transmitted the trigger frame, the wireless communication terminal may start the UL MU transmission based on the trigger frame without considering the NAV. Also, when the response to be transmitted by the wireless communication terminal includes an ACK frame or a Block ACK frame and the duration of the trigger-based PPDU is smaller than a predetermined value, the wireless communication terminal may start the UL MU transmission based on the trigger frame without considering the NAV. Further, when the NAV is set by a frame transmitted by another wireless communication terminal included in the Intra-BSS, the wireless communication terminal may start the UL MU transmission based on the trigger frame without considering the NAV. Also, when a field indicating whether or not channel sensing is required of the trigger frame indicates that channel sensing is not required, the wireless communication terminal may start the UL MU transmission based on the trigger frame without considering the NAV. Specifically, the field indicating whether or not the trigger frame requires channel sensing may be a CS Required field.

However, when NAV is set as in the above embodiments, BSS color collision may occur. The NAV setting and transmission operation of the wireless communication terminal may be a problem. This will be described with reference to FIGS. 8 to 9.

FIG. 8 shows the operation of setting a NAV by a wireless communication terminal according to an embodiment of the present invention when a BSS color collision occurs.

In the embodiment of FIG. 8, the BSS color of the first BSS BSS1 including the first station STA1 and the BSS color of the second BSS BSS2 including the second station STA2 and the third station STA3 are the same. The first station STA1 receives the Inter-BSS frame transmitted by the second station STA2 included in the first BSS BSS1. At this time, the station STA identifies the Inter-BSS frame as an Intra-BSS frame based on the BSS color indicated by the HE-SIG-A field of the PPDU including the Inter-BSS frame. The first station STA1 sets the Intra-BSS NAV according to the value of the TXOP Duration field of the signaling field of the PPDU including the Inter-BSS frame. Then, the first station STA1 receives the trigger frame from the Intra-BSS AP of the Intra-BSS. As described above, when the NAV is set by a frame transmitted by another wireless communication terminal included in the Intra-BSS, the wireless communication terminal may start the UL MU transmission based on the trigger frame without considering the NAV. Therefore, the first station STA1 may start the uplink transmission based on the trigger frame transmitted by the AP of the first BSS BSS1. At this time, since the frame is being transmitted from the third station STA3 to the second station STA2, interference occurs in the second BSS BSS2 due to a Trigger-based UL Frame based on the trigger frame transmitted by the first station STA1. Therefore, there is a need for a method of operating a wireless communication terminal capable of minimizing the influence of a BSS color collision when the BSS color collision occurs. For example, in the embodiment of FIG. 8, when the first station STA1 sets the Basic NAV instead of the Intra-BSS NAV based on the frame transmitted by the second station STA2, it is possible to prevent interference occurring in the second BSS BSS2 by transmission of the first station STA1. This will be described with reference to FIG. 9.

FIG. 9 shows a NAV setting operation of a wireless communication terminal according to another embodiment of the present invention when a BSS color collision occurs.

When the wireless communication terminal is not able to identify whether the PPDU is the Intra-BSS PPDU or the Inter-BSS PPDU based on the BSS color value indicated by the signaling field of the PPDU, the wireless communication terminal may not set the intra-BSS NAV based on the TXOP Duration field indicated by the signaling field of the PPDU. As described above, the BSS color that the PPDU signals may be the BSS color that the BSS color field of the PPDU signals. Specifically, the BSS color that the PPDU signals may be the BSS color that the BSS color field of the HE-SIG-A of the PPDU signals. Specifically, when the wireless communication terminal may not determine whether the PPDU is the Intra-BSS PPDU or the Inter-BSS PPDU based on the BSS color value indicated by the signaling field of the PPDU, the wireless communication terminal may recognize the BSS color collision. Also, when the wireless communication terminal is not able to identify whether the PPDU is the Intra-BSS PPDU or the Inter-BSS PPDU based on the BSS color value indicated by the signaling field of the PPDU and other parameters and other conditions of the RXVECTOR, the wireless communication terminal may not set the Intra-BSS NAV based on the TXOP Duration field indicated by the signaling field of the PPDU. In a specific embodiment, when the wireless communication terminalis not able to identify whether the PPDU is the Intra-BSS PPDU or the Inter-BSS PPDU based on the BSS color value indicated by the signaling field of the PPDU, the wireless communication terminal may set the Basic NAV based on the TXOP Duration field indicated by the signaling field of the PPDU. At this time, when the wireless communication terminal is not able to identify whether the PPDU is the Intra-BSS PPDU or the Inter-BSS PPDU based on the BSS color value indicated by the signaling field of the PPDU and other parameters and other conditions of the RXVECTOR, the wireless communication terminal may set the Basic NAV based on the TXOP Duration field indicated by the signaling field of the PPDU. That is, when the wireless communication terminal is not able to identify whether the PPDU received is the Intra-BSS PPDU or the Inter-BSS PPDU, the wireless communication terminal may set the Basic NAV based on

the PPDU. Specifically, when the PPDU received by the wireless communication terminal may not be identified as Intra-BSS PPDU or Inter-BSS PPDU, the wireless communication terminal may set the Basic NAV based on the TXOP Duration field of the corresponding PPDU. At this time, the TXOP Duration field of the PPDU may be the TXOP Duration field of the HE-SIG-A field.

Also, when the wireless communication terminal is not able to identify whether the PPDU is the Intra-BSS PPDU or the Inter-BSS PPDU based on the BSS color value indicated by the signaling field of the PPDU and is able to identify whether the PPDU is an Intra-BSS PPDU or an Inter-BSS PPDU based on other parameters and other conditions of the RXVECTOR, the wireless communication terminal may set Intra-BSS NAV or Basic NAV based on other parameters or other conditions of the RXVECTOR. A case where the corresponding PPDU is not identified, based on other parameters and other conditions of the RXVECTOR, as Intra-BSS PPDU or Inter-BSS PPDU may include a case where the MAC frame included in the PPDU is not decoded. Also, a case where the corresponding PPDU is not identified, based on other parameters and other conditions of the RXVECTOR, as Intra-BSS PPDU or Inter-BSS PPDU may include a case where the corresponding PPDU is not identified as Intra-BSS PPDU or Inter-BSS PPDU through at least one of the format and use of the PPDU. The wireless communication terminal may prevent interference with transmission in the OBSS, which may occur with BSS color collision, through these embodiments.

In the embodiment of FIG. 9, the BSS color of the first BSS BSS1 including the first station STA1 and the BSS color of the second BSS BSS2 including the second station STA2 and the third station STA3 are the same. At this time, the first station STA1 may determine that the PPDU may not be identified whether the PPDU is the Intra-BSS PPDU or the Inter-BSS PPDU based on the BSS color value indicated by the HE-SIG-A field of the PPDU. For example, the first station STA1 may determine that a BSS color collision occurs. The first station STA1 receives the Inter-BSS frame transmitted by the second station STA2 included in the first BSS BSS1. However, since the first station STA1 may not be able to identify whether the PPDU is the Intra-BSS PPDU or the Inter-BSS PPDU based on the BSS color value indicated by the signaling field of the PPDU, the first station

STA1 sets a Basic NAV. Therefore, since the Basic NAV is set even when the first station STA1 receives the trigger frame from the AP of the first BSS BSS1, the first station STA1 does not start the uplink transmission based on the trigger.

As described above, when the wireless communication terminal maintains two NAVs, the wireless communication terminal may reset the NAV according to the BSS in which the CF-End frame is transmitted and the BSS in which the frame that sets the NAV is transmitted. Therefore, when the BSS color collision occurs, the operation of the wireless communication terminal may be problematic when the NAV is reset through the CF-End frame. This will be described with reference to FIGS. 10 and 11.

FIG. 10 shows an operation of a wireless communication terminal according to an embodiment of the present invention to determine whether to reset a NAV based on a CF-End frame when a BSS color collision occurs.

In the embodiment of FIG. 10, the first station STA1 and the second station STA2 are included in the first BSS BSS1. The third station STA3 is included in the second BSS BSS2. At this time, a BSS color collision occurs from which the first BSS BSS1 and the second BSS BSS2 use the same BSS color. The first station STA1 receives a frame (Intra-BSS Frame) from the second station STA2. The first station STA1 sets the intra-BSS NAV based on the frame transmitted from the second station STA2. Also, the first station STA1 receives a frame (Inter-BSS Frame) from the third station STA3. However, since the first BSS BSS1 and the second BSS BSS2 have the same BSS color, the first station STA1 identifies the frame received from the third station STA3 as an Intra-BSS frame. Therefore, the first station STA1 sets the intra-BSS NAV based on the frame received from the third station STA3. However, when the value of the Duration field indicated by the frame received from the third station STA3 is smaller than the value of the currently set NAV, the first station STA1 does not set the intra-BSS NAV. Then, the first station STA1 receives the CF-End frame from the second station STA2. The first station STA1 resets the Intra-BSS NAV based on the CF-End frame received from the second station STA2. Thereafter, the first station STA1 may transmit a frame even while attempting the transmission of the third station STA3. Therefore, the transmission of the first station STA1 may collide with the

transmission of the third station STA3.

The problems described in the embodiment of FIG. 10 may be solved through the embodiments described with reference to FIG. 10. However, even if the embodiments described with reference to FIG. 9 are followed, the operation of the wireless communication terminal receiving the CF-End frame may be a problem. This will be described with reference to FIG. 11.

FIG. 11 shows an operation of a wireless communication terminal according to another embodiment of the present invention to determine whether to reset a NAV based on a CF-End frame when a BSS color collision occurs.

As described above, the wireless communication terminal may determine whether to reset the NAV according to the BSS in which the CF-End frame is transmitted. Specifically, the wireless communication terminal may reset the currently set NAV when the BSS from which the PPDU setting the currently set NAV is transmitted and the BSS from which the CF-End frame is transmitted are the same. Additionally, the wireless communication terminal may not reset the NAV when the BSS from which the PPDU setting the currently set NAV is transmitted and the BSS from which the CF-End frame is transmitted are different.

Also, when the NAV is set by the PPDU that is not identified whether the PPDU is the Intra-BSS PPDU or the Inter-BSS PPDU based on the BSS color value indicated by the signaling field of the PPDU, the wireless communication terminal may not reset the NAV based on the CF-End frame transmitted from the Intra-BSS. Also, when the NAV is set by the PPDU that is not identified whether the PPDU is the Intra-BSS PPDU or the Inter-BSS PPDU based on the BSS color value indicated by the signaling field of the PPDU, the wireless communication terminal may not reset the NAV based on the CF-End frame transmitted from the BSS corresponding to the multiple-BSSID set including the BSSID corresponding to the BSS of the wireless communication terminal. Through this embodiment, the wireless communication terminal may prevent interference with transmission in the OBSS, which is caused by BSS color collision. In addition, as described above, the BSS color that the PPDU signals may be the BSS color that the BSS

color field of the PPDU signals. Specifically, the BSS color that the PPDU signals may be the BSS color that the BSS color field of the HE-SIG-A of the PPDU signals.

As described above, a case where the wireless communication terminal is not be able to identify whether the PPDU is the Intra-BSS PPDU or the Inter-BSS PPDU based on the BSS color value indicated by the signaling field of the PPDU may include a case where the wireless communication terminal recognizes a BSS color collision. A method of determining whether a wireless communication terminal collides with a BSS color will be described in detail with reference to FIG. 12.

FIG. 12 shows an operation of a wireless communication terminal recognizing a BSS color collision according to an embodiment of the present invention.

The wireless communication terminal may determine the BSS color collision based on the MAC header. Specifically, the wireless communication terminal may determine the BSS color collision based on the Address field of the MAC header. In a specific embodiment, if there are two or more MAC address fields in the MAC header, at least one of the MAC address fields corresponds to the BSSID of the Intra-BSS, or at least one of the MAC address fields corresponds to a multiple BSSID set in the BSSID including the BSSID of the Intra-BSS, the wireless communication terminal may determine the corresponding PPDU as an Intra-BSS PPDU. This is because in case of BSS color, collision may occur due to size limitation of BSS color field but the MAC address indicated by the Address field of the MAC header is a unique value for each wireless communication terminal and there is no possibility of collision.

However, the wireless communication terminal may determine that the destination of the MAC frame included in the PPDU is not the wireless communication terminal based on at least one of the signaling field of the PPDU and the PPDU format, and may not decode the MAC header. Specifically, when the non-AP wireless communication terminal receives the HE Single User (SU) PPDU, the BSS color indicated by the signaling field of the corresponding PPDU is equal to the BSS color of the Intra-BSS, and the corresponding PPDU is the downlink transmission PPDU, the non-AP wireless communication terminal may continue decoding. At this time, the non-AP wireless communication terminal may

determine that the corresponding PPDU is an SU PPDU through L-SIG signaling. Also, the non-AP wireless communication terminal may determine that the corresponding PPDU is an extended range SU PPDU based on the L-SIG signaling and the HE-SIG-A modulation method. Also, the non-AP wireless communication terminal may determine whether the corresponding PPDU is a PPDU for downlink transmission based on the DL/UL field of the HE-SIG-A field.

However, when the PPDU received by the non-AP wireless communication terminal is an uplink transmission PPDU, the non-AP wireless communication terminal may not decode the MAC frame included in the corresponding PPDU. This is because it is clear that the PPDU is a PPDU for uplink transmission and that the destination of the PPDU is not a non-AP wireless communication terminal. Also, when the PPDU received by the non-AP wireless communication terminal is an MU PPDU and the identifier of the non-AP wireless communication terminal is not included in the wireless communication terminal identifier (STAID) field of the signaling field of the PPDU, the non-AP wireless communication terminal may not decode the MAC frame included in the corresponding PPDU. At this time, the signaling field of the PPDU may be HE-SIG-B. Also, a case where the wireless communication terminal identifier (STAID) field of the signaling field of the PPDU does not include the identifier of the non-AP wireless communication terminal may include a case where the wireless communication terminal (STAID) field of the signaling field of the PPDU does not include a broadcast address/multicast address including a non-AP wireless communication terminal.

The non-AP wireless communication terminal may decode the MAC frame included in the corresponding PPDU even when it is clear that the destination of the MAC frame included in the PPDU is not a wireless communication terminal. Specifically, even when the destination of the MAC frame included in the PPDU is not a wireless communication terminal, the non-AP wireless communication terminal may decode the header of the MAC frame included in the PPDU. Specifically, a case where it is clear that the destination of the MAC frame included in the PPDU is not the wireless communication terminal may include a case where the corresponding PPDU described above is a HE Single User (SU) PPDU, the BSS color indicated by the signaling field of the

corresponding PPDU is the same as the BSS color of the Intra-BSS, and the corresponding PPDU is a downlink PPDU. In addition, a case where it is clear that the destination of the MAC frame included in the PPDU is not the wireless communication terminal may include a case where as described above, the identifier of the non-AP wireless communication terminal is not included in the wireless communication terminal identifier (STAID) field of the signaling field of the PPDU.

When the wireless communication terminal is not be able to identify whether the PPDU is the Intra-BSS PPDU or the Inter-BSS PPDU based on the BSS color value indicated by the signaling field of the PPDU, the other wireless communication terminals may not identify whether the PPDU transmitted from the corresponding BSS is the Intra-BSS PPDU or the Inter-BSS PPDU, so that it may malfunction. In addition, another wireless communication terminal is not able to identify whether the PPDU transmitted by the wireless communication terminal is the Intra-BSS PPDU or the Inter-BSS PPDU, so that the PPDU transmitted by the wireless communication terminal may cause malfunction of other wireless communication terminals. In order to prevent such a malfunction problem, the wireless communication terminal may operate as in the following embodiments.

Specifically, the wireless communication terminal may transmit the PPDU by including signaling information indicating that the operation based on the BSS color is not allowed in the signaling field of the PPDU. At this time, the wireless communication terminal receiving the PPDU including the signaling information indicating that the operation based on the BSS color is not allowed may not perform the operation based on the BSS color. In a specific embodiment, the wireless communication terminal may transmit the BSS color value indicated by the signaling field of the PPDU by setting it to a predetermined value. At this time, the predetermined value may be a reserved value which is not used in the BSS color when the BSS color is selected by the AP. For example, the predetermined value may be zero.

Further, when the wireless communication terminal receives the signaling information indicating that the operation based on the BSS color is not allowed, the

wireless communication terminal may not perform the operation based on the BSS color value. Specifically, when the BSS color value indicated by the signaling field of the PPDU received by the wireless communication terminal is a predetermined value, the wireless communication terminal may not perform the SR operation described above based on the BSS color value. In addition, the wireless communication terminal may transmit the PPDU by including the signaling information in the signaling field of the PPDU indicating that operation based on the BSS color is not allowed through the legacy PPDU. Specifically, the wireless communication terminal may transmit signaling information indicating that the operation based on the BSS color is not allowed even by using the BW signaling method of the MAC address or using the reserved bit of the MAC header.

In addition, when the wireless communication terminal receives the PPDU indicating the predetermined value in the BSS color, the wireless communication terminal may not perform the operation based on the BSS color. Specifically, when the wireless communication terminal receives a PPDU indicating a predetermined value as a BSS color, the wireless communication terminal may not perform the SR operation on the corresponding PPDU. In a specific embodiment, when the wireless communication terminal receives a PPDU indicating a predetermined value as a BSS color, the wireless communication terminal may treat the PPDU as an Intra-BSS PPDU. Accordingly, when the wireless communication terminal receives a PPDU indicating a predetermined value as a BSS color, the wireless communication terminal may not discard the corresponding PPDU.

In addition, the wireless communication terminal receiving the signaling information indicating that the operation based on the BSS color is not allowed may access the channel without using the SR operation. Specifically, the wireless communication terminal receiving the signaling information indicating that the operation based on the BSS color is not allowed may access the channel without using the BSS color value.

Even if the non-AP wireless communication terminal that does not receive the signaling signal for the BSS color arbitrarily selects the BSS color, this may cause the malfunction of the wireless communication terminal operating based on the BSS color. There is a need for a method to prevent this.

An AP operating a BSS may select a BSS color corresponding to the BSS. The non-AP wireless communication terminal may obtain the BSS color allocated to the non-AP wireless communication terminal from the BSS Color field included in the HE Operation element received from the AP. Specifically, the non-AP wireless communication terminal may receive the management frame from the AP associated with the non-AP wireless communication terminal, and obtain the BSS color allocated to the non-AP wireless communication terminal from the BSS Color field of the HE Operation element included in the received management frame. At this time, the management frame may be any one of a beacon frame, an association request frame, an association response frame, a reassociation request frame, a reassociation response frame, a probe request frame, and a probe response frame.

When the non-AP wireless communication terminal fails to receive information signaling the BSS color, the non-AP wireless communication terminal may use a predetermined value as a BSS color value when communicating with another wireless communication terminal. At this time, the predetermined value may be a reserved value which is not used in the BSS color when the BSS color is selected by the AP. For example, the predetermined value may be zero. Specifically, if the non-AP wireless communication terminal does not receive the information signaling the BSS color, the non-AP wireless communication terminal may set the BSS color value that the PPDU transmitted by the non-AP wireless communication terminal signals to a predetermined value. Also, when the non-AP wireless communication terminal fails to receive information signaling the BSS color, the non-AP wireless communication terminal may set the BSS color value which is signaled by the frame transmitted by the non-AP wireless communication terminal to a predetermined value. When the non-AP wireless communication terminal does not receive information signaling the BSS color, this is because there is no BSS color. Specifically, when the non-AP wireless communication terminal does not receive the information signaling the BSS color, the non-AP wireless communication terminal may not associate with any AP. In addition, a case where the non-AP wireless communication terminal does not receive the information signaling the BSS color may include a case where the non-AP wireless communication terminal may establish a tunneled direct link setup (TDLS) link, a

direct link setup (DLS) link, or an IBSS (Independent) membership. Also, a case where the non-AP wireless communication terminal does not receive information signaling the BSS color may include a case where the non-AP wireless communication terminal does not receive the information on the changed BSS color value after receiving the signaling information indicating that the operation based on the BSS color value is not allowed from the AP.

In a specific embodiment, when the non-AP wireless communication terminal fails to receive the HE Operation element, the non-AP wireless communication terminal may set the BSS color value included in the PPDU transmitted by the non-AP wireless communication terminal to a predetermined value. For example, the non-AP wireless communication terminal may use a predetermined value as a BSS color value when transmitting a probe request frame. Specifically, the non-AP wireless communication terminal may set the value of the BSS color field included in the HE Operation element to a predetermined value when transmitting a probe request frame. When transmitting the probe request frame, the non-AP wireless communication terminal may set the value of the BSS color field of the HE-SIG-A field of the PPDU including the probe request frame to a predetermined value.

In another specific embodiment, when transmitting a PPDU to a wireless communication terminal of an Inter-BSS, the wireless communication terminal may set a BSS color value indicated by the PPDU to a predetermined value. There is a high possibility that the wireless communication terminal may not know the BSS color of the Inter-BSS. In addition, this is because the wireless communication terminal of the Inter-BSS may ignore the PPDU indicating the BSS color of the BSS including the wireless communication terminal.

In addition, when the wireless communication terminal receives the PPDU indicating the predetermined value as the BSS color, the wireless communication terminal may not perform the operation based on the BSS color. Specifically, when the wireless communication terminal receives a PPDU indicating a predetermined value as a BSS color, the wireless communication terminal may not perform the SR operation on the corresponding PPDU. In a specific embodiment, when the wireless communication

terminal receives a PPDU indicating a predetermined value as a BSS color, the wireless communication terminal may treat the PPDU as an Intra-BSS PPDU. Accordingly, when the wireless communication terminal receives a PPDU indicating a predetermined value as a BSS color, the wireless communication terminal may not discard the corresponding PPDU.

The non-legacy PPDU includes a signaling field indicating a BSS color, e.g., a HE-SIG-A field, and the wireless communication terminal may perform various SR operations described above based on the signaling field indicating the BSS color. However, the legacy PPDU does not include a signaling field that indicates the BSS color. Therefore, the wireless communication terminal receiving the legacy PPDU must perform the SR operation based on the MAC frame included in the PPDU. However, there is a MAC frame including only a Receiver Address RA without including a Transmitter Address TA. When an operation based on BSS color may not be performed because a MAC frame including only a receiver address is transmitted via a legacy PPDU or a BSS color collision occurs, the SR operation for the MAC frame including only the receiver address may be a problem. An embodiment of the wireless communication terminal related thereto will be described with reference to FIG. 13 and FIG. 14.

FIG. 13 shows a MAC frame format of a Clear To Send (CTS) frame and an ACK frame according to an embodiment of the present invention. FIG. 14 shows an operation in which a wireless communication terminal according to an embodiment of the present invention sets a NAV based on an RTS frame and a CTS frame.

The MAC frame of the CTS frame and the ACK frame may include a Frame Control field including information on frame control. In addition, the MAC frame of the CTS frame and the ACK frame may include a duration field used for NAV setting. In addition, the MAC frame of the CTS frame and the ACK frame may include an RA field indicating a receiver address. In addition, the MAC frame of the CTS frame and the ACK frame may include an FCS field indicating whether the MAC frame includes an error.

The RA field of the CTS frame may be set based on the TA field of the RTS frame.

Specifically, the value of the TA field of the RA field RTS frame of the CTS frame may be a value that sets the Individual/Group bit to zero. Also, when the CTS frame is the first frame of the transmission sequence, the RA field may be set to the MAC address of the transmitter.

The RA field of the ACK frame may be set based on the Address 2 field of a data frame, a management frame, a BlockACKReq frame, a BlockACK frame, or a PS-Poll frame, which is transmitted to one wireless communication terminal. Specifically, the RA field of the ACK frame may set the Address 2 field value of a data frame, a management frame, a BlockACKReq frame, a BlockACK frame, or a PS-Poll frame, which is transmitted to one wireless communication terminal, to the non-bandwidth signaling TA value. Also, the RA field of the ACK frame may be set to the MAC address of the receipient.

When the wireless communication terminal may not determine whether the frame is an Intra-BSS frame or an Inter-BSS frame based on the CTS frame or the Address field of the ACK frame, the wireless communication terminal may set the Basic NAV based on the corresponding frame. Specifically, when the wireless communication terminal may not determine whether the frame is an Intra-BSS frame or an Inter-BSS frame based on a PPDU including a CTS frame or an ACK frame and may not determine whether the frame is an Intra-BSS frame or an Inter-BSS frame based on the CTS frame or the Address field of the ACK frame, the wireless communication terminal may set the Basic NAV based on the frame. Also, the case where the wireless communication terminal may not determine whether the frame is an Intra-BSS frame or an Inter-BSS frame based on the CTS frame or the Address field of the ACK frame may be a case where the address field of the CTS frame or the ACK frame is one, and the corresponding address field does not indicate the AP address or the BSSID. In a specific embodiment, the non-AP wireless communication terminal may receive a downlink (DL) CTS frame. At this time, the address field of the corresponding CTS frame may include the address of the non-AP wireless communication terminal and may not include the address or the BSSID of the wireless communication terminal that is the AP. Accordingly, the wireless communication terminal receiving the corresponding CTS frame may not determine whether the corresponding CTS frame is an

Inter-BSS frame or an Intra-BSS frame based on the Address field of the corresponding CTS frame. Also, when the wireless communication terminal may not determine whether the frame is an Intra-BSS frame or an Inter-BSS frame based on a PPDU including a CTS frame or an ACK frame, the corresponding PPDU may be a legacy PPDU. This is because the legacy PPDU may not include information indicating the BSS color. In addition, a case where the wireless communication terminal may not be able to determine whether the frame is an Intra-BSS frame or an Inter-BSS frame based on a PPDU including a CTS frame or an ACK frame may be a case where the wireless communication terminal may not be able to determine whether the frame is an Intra-BSS frame or an Inter-BSS frame based on the BSS color indicated by the signaling field of the corresponding PPDU as in the above-described embodiments.

In another specific embodiment, when the wireless communication terminal receives one frame, the wireless communication terminal may set the Basic NAV based on the frame regardless of the value of the address field of the frame. For example, when receiving a downlink (DL) CTS frame or an uplink (UL) CTS frame, the wireless communication terminal may set a Basic NAV based on the frame.

Also, when the wireless communication terminal maintains one NAV, the wireless communication terminal may regard that the NAV set by the corresponding frame is not set by the Intra-BSS frame, instead of setting the Basic NAV based on the corresponding frame in the above-described embodiments. Specifically, when the wireless communication terminal may not determine whether the frame is an Intra-BSS frame or an Inter-BSS frame based on the CTS frame or the Address field of the ACK frame, the wireless communication terminal may regard that the NAV set on the basis of the frame is not set by the Intra-BSS frame. In addition, when the wireless communication terminal receives one frame, the wireless communication terminal may regard that the NAV set based on the frame is not set by the Intra-BSS frame regardless of the value of the address field of the frame.

In the embodiment of FIG. 14, the first to third stations STA1 to STA3 are all included in the same BSS. The first station STA1 transmits the RTS frame and the second station STA2 transmits the CTS frame in response to the RTS frame. The third station

STA3 sets the Intra-BSS NAV based on the RTS frame. Since the address field of the CTS frame transmitted by the second station STA2 includes only the address of the first station STA1, the third station STA3 may not clearly determine whether the CTS frame transmitted by the second station STA2 is transmitted from the Intra-BSS frame. Therefore, the third station STA3 sets the basic NAV based on the CTS frame transmitted by the second station STA2 as in some embodiments described above.

At this time, when the third station STA3 receives the CF-End frame transmitted from the first station STA1 or the second station STA2, the third station STA3 identifies the received CF-End frame as an Intra-BSS frame. Therefore, even if the third station STA3 receives the CF-End frame transmitted from the first station STA1 or the second station STA2, the third station STA3 resets only the intra-NAV based on the received CF-End frame, and the basic NAV is maintained. When the third station STA3 does not receive the RTS frame but receives the CF-End frame from the Inter-BSS in a state where only the CTS frame is received, the third station STA3 may initiate transmission during the transmission procedure of the first station STA1 and the second station STA2 to cause interference.

To solve this problem, the wireless communication terminal may transmit a PPDU including only one address field in a format of a PPDU signaling a BSS color. However, when the PPDU signaling the BSS color is transmitted, the legacy wireless communication terminal may not decode the PPDU. Also, the wireless communication terminal may infer the BSS of the CTS frame and the ACK frame from the frame transmitted before the CTS frame or ACK frame. For this, there is a problem that a wireless communication terminal may be required to receive a previously transmitted frame and store information on the received frame. Therefore, the wireless communication terminal may transmit information identifying the BSS through the legacy PPDU. This will be described with reference to FIGS. 15 to 17.

FIG. 15 shows a format of an 802.11a PPDU according to an embodiment of the present invention.

The 802.11a PPDU includes a Short Training field including a relatively short

training signal, a Long Training field including a relatively long training signal, a Signal field including signaling information, and a Data field including data. The data field may include a Service field, a PSDU, and a tail bit. The data field may also include a Padding bit as needed. Specifically, the format of the 802.11a PPDU may be the same as that of FIG. 15.

At this time, the wireless communication terminal may transmit information identifying the BSS using the service field. Specifically, the wireless communication terminal may transmit information identifying the BSS using the reserved bits of the service field. Specifically, the bits from the first bit B0 to the seventh bit B6 of the service field may be scrambler initialization bits. The remaining nine bits except the scrambler initialization bit are reserved. Therefore, the wireless communication terminal may transmit information identifying the BSS using part or all of the nine reserved bits.

Further, the information identifying the BSS may be any one of a BSS color, a BSSID, and a partial BSS color. In addition, the information identifying the BSS may be a partial AID generated based on the BSS color. In addition, the information identifying the BSS may be part of the BSSID or information generated based on the BSSID. At this time, the information generated based on the BSSID may be a value obtained by calculating a partial value of the BSSID or a value obtained by calculating the BSSID.

The wireless communication terminal may also transmit information identifying a BSS through a field other than a service field according to another specific embodiment. Specifically, the wireless communication terminal may transmit information identifying the BSS through a signal field.

Further, the wireless communication terminal may transmit information identifying the BSS by combining a plurality of reserved fields.

In these embodiments, the wireless communication terminal receiving the PPDU may obtain information identifying the BSS based on the reserved field of the PPDU. In addition, the wireless communication terminal receiving the PPDU may determine whether the corresponding PPDU is the Inter-BSS PPDU or the Intra-BSS PPDU based on the obtained information identifying the BSS.

FIG. 16 shows a format of a service field of a PPDU according to an embodiment

of the present invention.

As described with reference to FIG. 15, the wireless communication terminal may transmit information identifying the BSS using the reserved bits of the service field. Specifically, the wireless communication terminal may transmit information identifying the BSS using the eighth bit B7 to the thirteenth bit B12 of the service field. Since the reserved bits are used in the embodiments described with reference to FIG. 15 to FIG. 16, a legacy wireless communication terminal that does not support the embodiment of the present invention may not decode information identifying the BSS, but may successfully receive a PPDU according to an embodiment of the present invention.

The wireless communication terminal may apply the embodiment described with reference to FIG. 15 to FIG. 16 when the address field of the MAC frame is one. However, the embodiment described with reference to FIGS. 15 to 16 is not limited thereto, and the wireless communication terminal may also apply the embodiments described with reference to FIGS. 15 to 16 even when the number of address fields of the MAC frame is two or more.

FIG. 17 shows an operation of setting a NAV according to an embodiment of FIG. 15 to FIG. 16 by a wireless communication terminal according to an embodiment of the present invention.

In the embodiment of FIG. 17, the first to third stations STA1 to STA3 are all included in the same BSS. The first station STA1 transmits the RTS frame and the second station STA2 transmits the CTS frame in response to the RTS frame. The third station STA3 sets the Intra-BSS NAV based on the RTS frame. The address field of the CTS frame transmitted by the second station STA2 includes only the address of the first station STA1, but as in the embodiments described with reference to FIGS. 15 to 16, the reserved field of the PPDU including the CTS frame transmitted by the second station STA2 includes information identifying the BSS. At this time, the reserved field may be the reserved bit in the service field. The third station STA3 obtains information identifying the BSS based on the reserved field. The third station STA3 may set the Intra-BSS NAV based on the information identifying the BSS. In the embodiment of FIG. 17, the third station STA3

does not set the value of Intra-BSS NAV because the value of the Intra-BSS NAV already set is equal to the value of NAV indicated by the duration field of the CTS frame.

Therefore, the third station STA3 may correctly set the intra-BSS NAV and the basic NAV even when the address field of the MAC frame is one. Thereafter, when the third station STA3 receives the CF-End frame from the Intra-BSS, the third station STA3 may reset the Intra-BSS NAV. In addition, when the third station STA3 receives the CF-End frame from the Inter-BSS, the third station STA3 may not reset the Intra-BSS NAV.

FIG. 18 shows a method of setting a partial AID and a Group ID field of VHT-SIG-A by a wireless communication terminal according to an embodiment of the present invention.

The VHT-SIG-A field may include a partial AID field and a Group ID field. The partial AID field may indicate information identifying the connection between the AP and the wireless communication terminal and information identifying the BSS. Specifically, the partial AID field of the PPDU transmitted to the AP may indicate the BSSID of the AP. Also, the partial AID field of the PPDU transmitted to the non-AP wireless communication terminal may be an identifier obtained by combining the AID of the non-AP wireless communication terminal and the BSSID of the AP associated with the non-AP wireless communication terminal. Also, when the PPDU is transmitted to the mesh station, the value of the partial AID field may be a value corresponding to the last 9 bits of the receiver address. In a specific embodiment, the partial AID field may be a 9-bit field.

The Group ID field may indicate whether the data in the data field is for multiple user (MU). Specifically, when the data of the data field is for a single user (SU), the value of the Group ID field may be 0 or 63. In a specific embodiment, if the PPDU is transmitted to the AP, the value of the Group ID field may be zero. Also, when the PPDU is transmitted to the non-AP wireless communication terminal, the value of the Group ID field may be 63. In addition, when the PPDU is transmitted to the mesh station, the value of the Group ID field may be zero. In a specific embodiment, the Group ID field may be a 6-bit field.

The wireless communication terminal may transmit information identifying the BSS through the Partial AID field and the Group ID field of VHT-SIG-A. Specifically, a

wireless communication terminal, which is an AP, may set a partial AID field value to a non-AP wireless communication terminal according to the following equation.

(dec(AID[0:8]) + dec(BSSID[44:47] XOR BSSID[40:43]) * 2^5) mod 2^9

XOR represents an exclusive OR operation of the bit operation, mod X represents the remaining value when divided by X, and dec (A [b: c]) represents the number of binary digits from b+1th bit to c+1th bit of A in decimal again.

At this time, the wireless communication terminal, which is an AP, may set the Group ID field to 63.

Also, the wireless communication terminal may set the partial AID field of the PPDU according to the above formula when the wireless communication terminal is a Direct Link Setup (DLS) station or a Tunneled Direct Link Setup (TDLS) station, and the wireless communication terminal transmits the PPDU in a direct path, and the receiver of the PPDU or PSDU is a DLS station or a TDLS station. At this time, the wireless communication terminal may set the Group ID field to 63.

FIGS. 19 to 20 show a method of determining whether a frame received by a wireless communication terminal is an Inter-BSS frame or an Intra-BSS frame according to an embodiment of the present invention.

FIG. 19 shows a method of determining whether a corresponding PPDU is an Inter-BSS PPDU or an Intra-BSS PPDU based on whether a PPDU received by a wireless communication terminal is a downlink PPDU according to an embodiment of the present invention.

As described above, the wireless communication terminal may perform identification based on the BSS color indicated by the signaling field of the PPDU. Also, the wireless communication terminal may identify whether the frame received based on the MAC header of the frame is an Inter-BSS frame or an Intra-BSS frame. Specifically, when the receiver address RA or the transmitter address TA of the MAC header of the frame received by the wireless communication terminal is a BSSID of a BSS including a wireless communication terminal or a bandwidth signaling variant of a BSSID, the wireless communication terminal may identify the received frame as an Intra-BSS frame.

The wireless communication terminal may identify whether the received PPDU is an Inter-BSS PPDU or an Intra-BSS PPDU based on information other than the BSS color value indicated by the MAC address and the signaling field of the PPDU. Specifically, the wireless communication terminal may identify whether the received PPDU is an Inter-BSS PPDU based on other parameter values of the RXVECTOR. In particular, when a BSS color collision occurs, the wireless communication terminal may identify whether the PPDU received is an Inter-BSS PPDU or an Intra-BSS PPDU based on information other than the BSS color value indicated by the signaling field of the PPDU. Specifically, when the frame received by the wireless communication terminal is a downlink frame, the wireless communication terminal may identify the frame as an inter-BSS frame. In a specific embodiment, even if the BSS color value indicated by the BSS color field of the signaling field of the PPDU or the BSS color indicated by the partial AID field is the same as the BSS color of the BSS including the wireless communication terminal, when the frame received by the wireless communication terminal, which is an AP, is a downlink frame, the wireless communication terminal may identify the frame as an Inter-BSS frame. For example, in the embodiment of FIG. 19, the AP receives a PPDU for downlink transmission and determines the PPDU as an Inter-BSS frame.

In addition, when the value of the Group ID field of the VHT-SIG-A field of the PPDU received by the wireless communication terminal is 63, the wireless communication terminal may identify the received PPDU as an Inter-BSS PPDU. This is because, as described with reference to FIG. 18, the Group ID field of the PPDU transmitted to the non-AP wireless communication terminal is set to 63. At this time, the wireless communication terminal, which is an AP, may identify the received PPDUs as Inter-BSS PPDUs only when the DLS protocol or the TDLS protocol is not used. As described above, this is because even when a DLS wireless communication terminal or a TDLS wireless communication terminal transmits a PPDU to a DLS wireless communication terminal or a TDLS wireless communication terminal through a direct path, the value of the Group ID field is set to 63.

Also, the wireless communication terminal, which is an AP, may identify whether the VHT PPDU is the Inter-BSS PPDU or the Intra-BSS PPDU based on the partial AID

field of the VHT PPDU. Specifically, the wireless communication terminal, which is an AP, may identify whether the VHT PPDU is an Inter-BSS PPDU or an Intra-BSS PPDU based on the partial AID field and the Group ID field of the VHT PPDU. In the specific embodiment, when the value of the partial AID field is a value that does not exist in the BSS operated by the wireless communication terminal, the AP may identify the corresponding PPDU as an Inter-PPDU.

In addition, when the wireless communication terminal, which is an AP, receives the VHT MU PPDU, the wireless communication terminal may identify the PPDU as an Inter-PPDU. This is because the VHT MU PPDU may only be used for downlink transmission. Specifically, the wireless communication terminal, which is an AP, may determine that the corresponding PPDU is a VHT MU PPDU through auto detection and the VHT-SIG-A field. In addition, If the group ID of the VHT-SIG-A is not 0 or 63, the wireless communication terminal, which is an AP, may identify the corresponding PPDU as the MU PPDU.

Also, when the wireless communication terminal, which is an AP, receives the HE PPDU and the UL/DL field of the HE-SIG-A field indicates downlink transmission, the wireless communication terminal, which is an AP, may identify the corresponding PPDU as the Inter-BSS PPDU. At this time, the value of the UL/DL field may be zero. At this time, the wireless communication terminal, which is an AP, may identify the received PPDUs as Inter-BSS PPDUs only when the DLS protocol or the TDLS protocol is not used.

When the wireless communication terminal of the AP receives the HE PPDU and the corresponding PPDU is not transmitted to the wireless communication terminal included in the IBSS and the UL_FLAG field of the HE-SIG-A field indicates the downlink transmission, the wireless communication terminal, which is an AP, may identify the PPDU as an Inter-BSS PPDU. At this time, the wireless communication terminal, which is an AP, may determine whether the DLS protocol or the TDLS protocol is used, and thus may determine whether the received PPDU is not transmitted to the wireless communication terminal included in the IBSS.

When a wireless communication terminal, which is an AP, receives a trigger-based

PPDU from a wireless communication terminal that is not triggered by the wireless communication terminal, which is an AP may identify the corresponding PPDU as an Inter-BSS PPDU. Specifically, when a wireless communication terminal, which is an AP, receives a trigger-based PPDU without transmitting a trigger frame, the wireless communication terminal, which is an AP, may identify the PPDU as an Inter-BSS PPDU.

FIG. 20 shows a method for identifying whether a MAC frame received is an Intra-BSS frame or an Inter-BSS frame based on SR-related information by a wireless communication terminal according to an embodiment of the present invention.

As described above, when a wireless communication terminal that is an AP receives a PPDU for downlink transmission, the wireless communication terminal that is an AP may identify the PPDU as an Inter-PPDU. This is because the PPDU that is the destination of the wireless communication terminal, which is an AP in the Intra-BSS, is the PPDU for the uplink transmission. In addition, the AP, which is an AP, may identify whether the corresponding PPDU is the Inter-BSS PPDU based on the SR-related information indicated by the PPDU. The SR-related information included in the PPDU may indicate that the PPDU includes a trigger frame. Also, the trigger frame is used only for downlink transmission. Therefore, the wireless communication terminal, which is an AP, may determine whether the corresponding PPDU is a PPDU for downlink transmission based on whether the PPDU includes a trigger frame. Therefore, the wireless communication terminal may identify whether the corresponding PPDU is an Inter-BSS PPDU based on the SR-related information.

At this time, the SR related information may be the SR field of the signaling field of the PPDU. Specifically, the signaling field of the PPDU may indicate whether or not the SR operation is allowed while the corresponding PPDU is being transmitted, and may indicate an allowable condition. At this time, the signaling field may be the HE-SIG-A field. Specifically, the SR field may indicate an SR_Delay indicating that the SR operation is to be delayed. If the PPDU is a HE SU PPDU or a HE extended range SU PPDU, and the corresponding PPDU includes a trigger frame, the SR field indicates SR_Delay.

In addition, the SR field may indicate SR_Restricted, which indicates that SR

operation is restrictively allowed. Specifically, when the SR field of the PPDU has the SR_Restricted value, during the SR operation of the Inter-BSS wireless communication terminal, the TXOP duration of the transmission of the Inter-BSS wireless communication terminal may be restricted to the PPDU including the trigger frame. Also, when the PPDU is an HE MU PPDU and the corresponding PPDU includes a trigger frame, the SR field indicates SR_Restricted.

Also, the SR field may indicate SR_Disallowed indicating that the SR operation is not allowed. A wireless communication terminal transmitting a PPDU including a trigger frame indicates that the PPDU includes a trigger frame through the SR field of the PPDU and may protect the transmission sequence based on the trigger frame.

Therefore, when the SR field value of the PPDU received by the wireless communication terminal, which is an AP, is SR_Restricted or SR_Delay, the wireless communication terminal, which is an AP, may identify the PPDU as an Inter-BSS PPDU based on the type of the PPDU and the SR field. Specifically, when the PPDU received by the wireless communication terminal AP is a HE Single User (SU) PPDU or a HE extended range SU PPDU, and the SR field signaled by the corresponding PPDU indicates SR_Restricted, the wireless communication terminal, which is an AP, may identify the PPDU as an Inter-BSS PPDU. Also, when the PPDU received by the wireless communication terminal is an HE MU PPDU and the value of the SR field signaled by the PPDU indicates SR_Delayed, the wireless communication terminal, which is an AP, may identify the PPDU as an Inter-BSS PPDU. At this time, the HE SU PPDU indicates a PPDU for transmission to a single wireless communication terminal. Also, the HE extended range SU PPDU indicates a PPDU for transmission to a single wireless communication terminal. Also, the HE MU PPDU indicates a PPDU for a plurality of wireless communication terminals.

Also, in a specific embodiment, when the PPDU received by the non-AP wireless communication terminal is an Inter-BSS PPDU or an Intra-BSS PPDU, the non-AP wireless communication terminal may prioritize the determination based on the SR-related information indicated by the PPDU over the determination based on the BSS color value indicated by the PPDU signaling field.

In the embodiment of FIG. 20, the first AP AP1 transmits a trigger frame for triggering the transmission of the first station STA1 and the second station STA2. At this time, the second AP AP2 receives the PPDU including the trigger frame transmitted by the first AP AP1. The second AP AP2 may recognize that the corresponding PPDU is the PPDU including the trigger frame through the SR field value of the PPDU including the trigger frame transmitted by the first AP AP1. Accordingly, the second AP AP2 may identify the PPDU including the trigger frame transmitted by the first AP AP1 as the Inter-BSS PPDU. Particularly, even when the BSS color x of the BSS operated by the second AP AP2 is the same as the BSS color x of the BSS operated by the first AP AP1, the second AP AP2 may identify the PPDU including the trigger frame transmitted by the first AP AP1 as the Inter-BSS PPDU.

FIG. 21 shows a method for a wireless communication terminal to determine whether the corresponding PPDU is an Inter-BSS PPDU or an Intra-BSS PPDU when the PPDU received by the wireless communication terminal according to the embodiment of the present invention satisfies both the Inter-BSS PPDU condition and the Intra-BSS PPDU condition.

When the frame received by the wireless communication terminal satisfies both the Inter-BSS frame condition and the Intra-BSS frame condition, the wireless communication terminal may identify the frame as an Inter-BSS frame. Specifically, when the frame received by the wireless communication terminal satisfies both the Inter-BSS frame condition and the Intra-BSS frame condition and the wireless communication terminal is not able to identify whether the frame is an Inter-BSS frame or an Intra-BSS frame based on the MAC address, the wireless communication terminal may identify the frame as an Inter-BSS frame. In this case, a case where the wireless communication terminal is not able to identify the Inter-BSS frame or the Intra-BSS frame based on the MAC address may include a case where the wireless communication terminal is not able to decode the MAC header of the corresponding frame.

In addition, the Inter-BSS frame condition and the Intra-BSS frame condition may include all conditions for identifying whether the wireless communication terminal is an

Inter-BSS frame or an Intra-BSS frame in the above-described embodiments. For example, the wireless communication terminal may identify whether the frame is an Inter-BSS frame or an Intra-BSS frame based on the BSS color value indicated by the BSS color field of the signaling field of the PPDU including the MAC frame. As described above, the BSS color that the PPDU signals may be the BSS color that the BSS color field of the PPDU signals. Specifically, the BSS color that the PPDU signals may be the BSS color that the BSS color field of the HE-SIG-A of the PPDU signals.

Also, the wireless communication terminal may identify whether the frame is an Inter-BSS frame or an Intra-BSS frame based on the value of the partial AID field of the signaling field of the PPDU including the frame. Also, the wireless communication terminal may identify whether the frame is an Inter-BSS frame or an Intra-BSS frame based on the Address field of the frame. In addition, when the wireless communication terminal is an AP and the wireless communication terminal receives a downlink transmission PPDU, the wireless communication terminal may identify a frame included in the corresponding PPDU as an Inter-BSS frame.

If the PPDU includes a BSS color field, the partial AID field is less likely to include information on the BSS color. Therefore, a case where the Intra-BSS frame condition and Inter-BSS color condition are satisfied at the same time may include a case where when the wireless communication terminal performs determination based on the BSS color field or the partial AID field, the corresponding PPDU is identified as an Intra-BSS PPDU, and when the wireless communication terminal performs determination based on the address field of the frame, the corresponding PPDU may be identified as an Inter-BSS PPDU. Or, when the wireless communication terminal performs determination based on the BSS color field or the partial AID field, the corresponding MAC frame is identified as an Intra-BSS frame, and when the wireless communication terminal performs determination based on whether the PPDU including the MAC frame is an uplink transmission format, the corresponding PPDU is identified as an Inter-BSS PPDU. Since the number of bits representing the BSS color is limited, a BSS color collision may occur as described above. Therefore, when the frame received by the wireless communication terminal satisfies both the Inter-BSS frame condition and the Intra-BSS frame condition,

the wireless communication terminal may identify whether the frame received based on a condition other than the BSS color indicated by the PPDU is an Inter-BSS frame or an Intra-BSS frame. Specifically, when the frame received by the wireless communication terminal satisfies both the Inter-BSS frame condition and the Intra-BSS frame condition, the wireless communication terminal may identify whether the received frame is an Inter-BSS frame or an Intra-BSS frame based on a condition other than the BSS color field or the partial AID field of the PPDU. At this time, other conditions may be identified based on the Address field of the MAC header described above. Further, another condition may be that the PPDU including the frame is a PPDU for downlink transmission.

In the embodiment of FIG. 21, the first AP AP1 transmits an HE MU PPDU including a trigger frame to the first station STA1 and the second station STA2. At this time, the second AP AP2 receives the HE MU PPDU including the trigger frame transmitted by the first AP AP1. The BSS color of the BSS operated by the first AP AP1 and the second AP is equal to x. Therefore, the BSS color indicated by the HE-SIG-A field of the HE MU PPDU transmitted by the first AP AP1 satisfies the Intra-BSS color condition. However, when the HE MU PPDU transmitted by the first AP AP1 is the PPDU for downlink transmission including the trigger frame and as in the above-described embodiment, since the determination based on whether or not the PPDU for downlink transmission is prior to the determination based on the BSS color when the wireless communication terminal determine that the frame received by the wireless communication terminal is an Inter-BSS frame or an Intra-BSS frame, the second AP AP2 identifies the HE MU PPDU transmitted by the first AP AP1 as an Inter-BSS PPDU.

The wireless communication terminal may identify the received frame as an Intra-BSS frame according to any one condition, and then, identify the received frame as an Inter-BSS frame according to the determination priority order described above. At this time, the wireless communication terminal may use the enhanced CCA level. Specifically, the wireless communication terminal may use the CCA level corresponding to the inter-BSS frame. In a specific embodiment, the CCA level corresponding to the Inter-BSS frame may be referred to as the OBSS PD level.

As described above, the wireless communication terminal may enter the power save state based on the MAC header. At this time, the specific operation of the wireless communication terminal will now be described in detail with reference to FIGS. 22 to 23.

FIG. 22 shows a case where a wireless communication terminal according to an embodiment of the present invention enters a power save state based on a MAC header of a frame received by the wireless communication terminal. Also, FIG. 23 shows a case where, when a wireless communication terminal according to an embodiment of the present invention is included in a BSS corresponding to a multiple BSSID set, the wireless communication terminal enters a power save state based on a MAC header of a frame received by the wireless communication terminal.

When a Transmitter Address TA or a Receiver Address RA indicated by a MAC header of a received frame corresponds to another BSSID of a multiple BSSID set that includes a BSSID of a BSS including a wireless communication terminal, the wireless communication terminal may determine the received frame as an Intra-BSS frame. When the frame received by the wireless communication terminal is an Intra-BSS frame and the wireless communication terminal is not the recipient of a received frame, the wireless communication terminal may enter the power save state. At this time, the wireless communication terminal may maintain the power save state until the end of the duration of the PPDU including the received frame.

In the embodiment of FIG. 22, the first station STA1 and the second station STA2 are associated with the same access point AP. When the access point AP transmits the PPDU to the first station STA1, the second station STA2 may receive the PPDU. At this time, the second station STA2 determines whether the received PPDU is an intra-BSS frame. When the received PPDU is an Intra-BSS frame, the second station STA2 determines whether the recipient of the received PPDU is the second station STA2. Specifically, the second station STA2 may determine whether the receiver of the PPDU received based on the MAC header is the second station STA2. At this time, when the second station STA2 is not the receiver of the received PPDU, the second station STA2 may enter the power save state.

When entering the power save state, the wireless communication terminal may

determine whether the Receiver Address RA of the frame indicates a plurality of wireless communication terminals including the corresponding wireless communication terminal. Specifically, when the received frame is an Intra-BSS frame, the Receiver Address RA of the received frame is not the MAC address of the wireless communication terminal, and the Receiver Address RA of the received frame does not correspond to the broadcast address, the wireless communication terminal may enter the power save state. At this time, when the Receiver Address RA of the received frame does not correspond to the multicast address that the wireless communication terminal is required to receive and the Receiver Address RA of the received frame does not correspond to the group address that the wireless communication terminal is required to receive, the wireless communication terminal may enter the power save state.

In a specific embodiment, even when the Receiver Address RA of the trigger frame or the Receiver Address RA of a multi-station block ACK (Multi-STA BlockACK) frame does not match the MAC address of the wireless communication terminal, the wireless communication terminal may be required to receive a trigger frame or a multi-station block ACK frame. Specifically, when the receiver of the trigger frame is a plurality of wireless communication terminals, the Receiver Address RA of the trigger frame may be a broadcast address. At this time, the number of User Info fields of the trigger frame may be two or more. Also, when the receiver of the multi-station block ACK frame is a plurality of wireless communication terminals, the Receiver Address RA of the multi-station block ACK may be a broadcast address. At this time, the number of AID fields in the Per STA Info subfield of the multi-station block ACK may be two or more. At this time, the broadcast address may indicate a plurality of wireless communication terminals or one wireless communication terminal.

Accordingly, when the received frame is an Intra-BSS frame, the Receiver Address RA of the received frame is not the MAC address of the wireless communication terminal, the received frame is a trigger frame, and the Receiver Address RA of the received frame does not correspond to the broadcast address, the wireless communication terminal may enter the power save state. In addition, when the received frame is an Intra-BSS frame, the Receiver Address RA of the received frame is not the MAC address of the wireless

communication terminal, the received frame is a trigger frame, and the Receiver Address RA of the multi-station block ACK frame does not correspond to the broadcast address, the wireless communication terminal may enter the power save state.

Specifically, when the receiver of the trigger frame or the multi-station block ACK frame is a plurality of wireless communication terminals, the Receiver Address RA may be a multicast address or a group address. Therefore, when the wireless communication terminal receives the trigger frame or the multi-station block ACK frame and the Receiver Address RA of the received frame is not a multicast address and a group address including the wireless communication terminal, the wireless communication terminal may enter the power save state.

When any one of the BSSIDs included in the multiple BSSID set is set to the Receiver Address RA of the frame or the Transmitter Address TA of the frame, only the wireless communication terminal included in the BSS identified by the corresponding BSSID may be a recipient or a transmitter of the corresponding frame. Specifically, for a frame transmitted to a plurality of wireless communication terminals included in each of two or more BSSs corresponding to a multiple BSSID set, a modified value may be set based on the BSSID in the Transmitter Address of the frame. At this time, the wireless communication terminal may not separately determine whether the Receiver Address RA and the Transmitter Address TA are the broadcast address or the multicast address including the address of the wireless communication terminal. For convenience of explanation, the BSSID of the BSS including the wireless communication terminal is referred to as a first BSSID, and the first BSSID and a different BSSID are referred to as a second BSSID. Specifically, when the second BSSID is included in the multiple BSSID set including the first BSSID and the Receiver Address RA or the Transmitter Address TA of the frame received by the wireless communication terminal matches the second BSSID, the wireless communication terminal may enter the power save state.

In the embodiment of FIG. 23, the multiple BSSID set includes a first BSSID BSSID(1) and a second BSSID BSSID(2). The first station STA1 is included in the BSS identified by the second BSSID BSSID(2) and the second station STA2 is included in the BSS identified by the first BSSID BSSID(1). At this time, the virtual access point having

the second BSSID BSSID(2) transmits the PPDU to the first station STA1. The second station STA2 receives the corresponding PPDU. The second station STA2 determines whether the received PPDU is an intra-BSS frame. Specifically, the second station STA2 may determine whether the MAC address signaled by the MAC header of the received PPDU is the BSSID of the multiple BSSID set including the first BSSID. Since the Transmitter Address TA of the received PPDU is the second BSSID BSSID(2), the second station STA2 determines the received PPDU as an intra-BSS frame. Also, since the receiver of the received PPDU is a wireless communication terminal included in the BSS identified by the second BSSID BSSID(2), the second station STA2 enters the power save state.

When the received PPDU is an Inter-BSS frame, the second station STA2 determines whether the recipient of the received PPDU is the second station STA2. Specifically, the second station STA2 may determine whether the recipient of the PPDU received based on the MAC header is the second station STA2. At this time, when the second station STA2 is not the receiver of the received PPDU, the second station STA2 may enter the power save state.

In another specific embodiment, if the reference BSSID is set to the Transmitter Address TA of the frame, it may indicate that the Transmitter Address TA is transmitted to a plurality of wireless communication terminals included in two or more BSSs corresponding to the multiple BSSID set. When the second BSSID is included in the multiple BSSID set including the first BSSID, the second BSSID is not the reference BSSID, and the Receiver Address RA or the Transmitter Address TA of the frame received by the wireless communication terminal is transmitted from the second BSSID, the wireless communication terminal may enter the power save state.

As described above, the wireless communication terminal may signal various information through the signaling field of the PPDU. The format of the signaling field will be described with reference to FIG. 24.

FIG. 24 shows the format of the HE-SIG-B field according to an embodiment of the present invention.

The HE MU PPDU may include a HE-SIG-B field that signals information necessary for multi-user transmission. Specifically, the HE-SIG-B field may be classified into a common field for signaling information commonly applied to wireless communication terminals participating in multi-user transmission and a user-specific field for signaling information for each of a plurality of wireless communication terminals participating in multi-user transmission. Both the common field and the user-specific field may be encoded based on 20 MHz. Specifically, the common field may include information on resource allocation such as a resource unit RU allocated to a plurality of wireless communication terminals participating in multi-user transmission and a number of users in the MU-MIMO. Further, in the user-specific field, information on each of the plurality of wireless communication terminals may be arranged in the order listed in the RU allocation field in the common field.

Specifically, the user-specific field includes information on a station identifier (STAID), a number of spatial streams, a transmit beamforming (TxBF), a modulation and coding scheme (MCS), a dual sub-carrier modulation (DCM), and Coding. In addition, the user-specific field may include information on Spatial Configuration Fields, MCS, DCM, and Coding when a plurality of wireless communication terminals are allocated to one RU. At this time, information on coding may indicate whether LDPC is used or not. The common field may include one Binary Block Code (BCC) block. The user-specific field includes information on the two wireless communication terminals in one BCC block. At this time, the last BCC block may include information on one wireless communication terminal. Also, the information on the individual wireless communication terminals may be referred to as Per-user content. One BCC block may include CRC and Tail bits. In addition, the HE-SIG-B field may also include padding to align the OFDM symbol boundaries. The format of the specific HE-SIG-B field may be as shown in FIG. 24(a).

When a wireless communication terminal transmits a PPDU over a frequency bandwidth of 40 MHz or more, the wireless communication terminal may repeatedly transmit two HE-SIG-B fields each having a frequency bandwidth of 20 MHz every 40 MHz by the entire frequency bandwidth. At this time, the two HE-SIG-B fields may include different information. In addition, each of the two HE-SIG-B fields may include

information on an RU included in the frequency bandwidth in which the corresponding HE-SIG-B field is transmitted. The wireless communication terminal receiving the PPDU may recognize the configuration of the entire MU PPDU by decoding two HE-SIG-B fields. Specifically, the wireless communication terminal may transmit the HE-SIG-B field in the form as shown in FIG. 24(b).

In a specific embodiment, the wireless communication terminal may indicate a wireless communication terminal corresponding to per-user content through an identifier of the wireless communication terminal in a user-specific field of the HE-SIG-B field. At this time, the identifier of the wireless communication terminal may be an association identifier (AID). If multiple BSSID sets are used, the wireless communication terminal uses the assigned AID according to the group addressed AID assignment method in the multiple BSSID TIM Operation so that it is possible to broadcast a PPDU to wireless communication terminals included in any one of a plurality of BSSs corresponding to multiple BSSIDs. For example, there are N BSSs corresponding to a set of multiple BSSIDs, and each of the N BSSs may have one of the values from 0 to N-1 as an AID. At this time, the wireless communication terminal may broadcast the PPDU to the wireless communication terminal of the BSS corresponding to the AID of 0 by designating the wireless communication terminal identifier as 0 in the per-user content of the user-specific field. When multiple BSSID sets are used, the wireless communication terminal may broadcast PPDUs to wireless communication terminals included in all BSSs corresponding to multiple BSSID sets using a specific AID. At this time, the specific AID may be an unassigned value in a multiple BSSID TIM operation. In a specific embodiment, the specific AID may be 2047.

A frame to be transmitted to a plurality of wireless communication terminals and a frame to be transmitted to any one wireless communication terminal may be included in one MU PPDU. At this time, a plurality of RUs to which the PPDUs are transmitted may be divided into RUs used for a plurality of wireless communication terminals and RUs used for transmission to any one wireless communication terminal. When the wireless communication terminal receives the MU PPDU, the wireless communication terminal may determine whether the per-user content indicates information corresponding to the

wireless communication terminal or based on the wireless communication identifier included in the per-user content. At this time, the wireless communication terminal may determine whether the wireless communication terminal identifier indicates the wireless communication terminal based on the range of the wireless communication terminal indicated by the wireless communication terminal identifier. Specifically, the wireless communication terminal may be identified from a wireless communication terminal identifier indicating a small range of wireless communication terminals. For example, the HE-SIG-B field may include N wireless communication terminal identifiers from a wireless communication terminal identifier indicating the first group to a wireless communication terminal identifier indicating the Nth group. At this time, the first group includes a smaller number of wireless communication terminals than the second group, and the second group includes a smaller number of wireless communication terminals than the third group. In this case, the wireless communication terminal may confirm the wireless communication terminal identifier indicating the (N-1)th group from the wireless communication terminal identifier indicating the (N)th group.

When multiple BSSID sets are used, the wireless communication terminal may determine the wireless communication terminal identifier included in the HE-SIG-B field in the following order. When a wireless communication terminal identifier indicating only the wireless communication terminal is included in the per-user content, the wireless communication terminal may receive the payload of the PPDU transmitted through the RU indicated by the per-user content. When the wireless communication terminal identifier indicating only the wireless communication terminal is not included in the per-user content and the wireless communication identifier indicating a broadcast to the wireless communication terminals of the BSS with which the wireless communication terminal is associated is included in the per-user content, the wireless communication terminal may receive the payload of the PPDU transmitted through the RU indicated by the per-user content. The wireless communication terminal identifier indicating only the wireless communication terminal is not included in the per-user content, the wireless communication identifier indicating the broadcast to the wireless communication terminals of the BSS with which the wireless communication terminal is associated is not included in

the per-user content, and the wireless communication terminal identifier indicating a broadcast to wireless communication terminals included in all BSSs may be included in the per-user content. At this time, the wireless communication terminal may receive the payload of the PPDU transmitted through the RU indicated by the per-user content including the wireless communication terminal identifier indicating the broadcast to the wireless communication terminals included in all the BSSs. If all of the above cases are not satisfied, the wireless communication terminal may stop decoding the corresponding PPDU. This is because the payload of the PPDU to be decoded by the wireless communication terminal is not included in the PPDU. For convenience of explanation, the wireless communication terminal identifiers are described in three ranges but depending on the number or inclusion relationship of the wireless communication terminals, there may be more range types. In such a case, as described above, the wireless communication terminal may determine the wireless communication terminal identifier according to the size of the range indicated by the wireless communication terminal identifier.

When multiple BSSID sets are not used, the wireless communication terminal may confirm the wireless communication terminal identifier included in the HE-SIG-B field in the following order. When a wireless communication terminal identifier indicating only the wireless communication terminal is included in the per-user content, the wireless communication terminal may receive the payload of the PPDU transmitted through the RU indicated by the per-user content. When the wireless communication terminal identifier indicating only the wireless communication terminal is not included in the per-user content, and a wireless communication identifier indicating at least one of broadcast, group cast, and multicast for a group including a wireless communication terminal is included in the per-user content, the wireless communication terminal may receive the payload of the PPDU transmitted through the RU indicated by the per-user content. The wireless communication terminal identifier indicating only the wireless communication terminal is not included in the per-user content, the wireless communication identifier indicating at least one of broadcast, group cast, and multicast for a group including a wireless communication terminal is not included in the per-user content, and the wireless communication terminal identifier indicating a broadcast to the wireless communication

terminals included in the BSS may be included in the per-user content. At this time, the wireless communication terminal may receive the payload of the PPDU transmitted through the RU indicated by the per-user content including the wireless communication terminal identifier indicating the broadcast to the wireless communication terminals included in the BSS. If all of the above cases are not satisfied, the wireless communication terminal may stop decoding the corresponding PPDU. This is because the payload of the PPDU to be decoded by the wireless communication terminal is not included in the PPDU. For convenience of explanation, the wireless communication terminal identifiers are described in three ranges but depending on the number or inclusion relationship of the wireless communication terminals, there may be more range types. In such a case, as described above, the wireless communication terminal may determine the wireless communication terminal identifier according to the size of the range indicated by the wireless communication terminal identifier.

In order for the wireless communication terminal receiving the MAC frame to effectively control the MAC frame, the wireless communication terminal may transmit information on the MAC frame control through the MAC frame header. At this time, there is a need for a method for efficiently transmitting information on MAC frame control. This will be described with reference to FIGS. 25 and 33.

FIG. 25 is a view illustrating a MAC frame format according to an embodiment of the present invention.

The MAC frame may include a Frame Control field indicating information on frame control. Also, the MAC frame may indicate a duration used for NAV setting according to the frame type, or may include a Duration/ID field indicating the AID of the wireless communication terminal transmitting the frame. In addition, the MAC frame may include four Address fields indicating information related to the address. Further, the MAC frame may include a Sequence Control field indicating information on sequence control. In addition, the MAC frame may include a QoS Control field indicating information on Quality of Service (QoS) control. In addition, the MAC frame may include a Frame Body field indicating a payload of the MAC frame. In addition, the MAC frame may include an

FCS field indicating whether the MAC frame includes an error. The MAC frame may not include the fields described above depending on the frame type or subtype. Also, the MAC frame may include a Frame Control field, a Duration/ID field, an Address 1 field, and an FCS field regardless of a frame type and a subtype.

FIG. 26 is a view illustrating a variant of an HT Control field according to an embodiment of the present invention.

The wireless communication terminal may transmit and modify various HT Control fields. Specifically, the wireless communication terminal may transmit the HT Control field in the format of an HT variant, a VHT variant, or an HE variant. Also, the HT Control field may be a 32-bit field. At this time, the first bit B0 and the second bit B1 of the HT Control field may indicate the type of the HT Control field. When the first bit B0 of the HT Control field is 0, the HT Control field may be an HT variant. At this time, the bits below the second bit B1 of the HT Control field may include the HT Control Middle, the AC Constraint, and the RDG/More PPDU subfields as shown in FIG. 26. Also, when the first bit B0 of the HT Control field is 1 and the second bit B1 is 0, the HT Control field may be a VHT variant. At this time, the bits below the second bit B1 of the HT Control field may include the VHT Control Middle, the AC Constraint, and the RDG/More PPDU subfields as shown in FIG. 26. When the first bit B0 of the HT Control field is 1 and the second bit B1 is 1, the HT Control field may be an HE variant. At this time, the bits below the second bit B1 of the HT Control field may include an aggregated control (A-Control) subfield as shown in FIG. 26. The A-Control subfield may include Control information. The control information included in the A-Control and the format of the A-Control subfield will be described with reference to FIGS. 27 to 33.

FIG. 27 shows the format of the A-Control subfield according to an embodiment of the present invention.

The wireless communication terminal according to the embodiment of the present invention may insert one or a plurality of control subfields into the A-Control subfield to transmit the same. At this time, the number of Control subfields included in the A-Control

subfield may be differently applied depending on at least one of the type and the subtype of the MAC frame. At this time, the A-Contorl sub-field may include a padding bit to match the length of the sub-field. In a specific embodiment, the A-Control subfield may be a 30-bit field. Also, the HE variant may be a 32-bit field. The A-Control subfield may include zeros as padding bits. The A-Control subfield may include control subfields consecutively.

In addition, the Control sub-field may include a Control ID sub-field indicating the type of information included in the Control sub-field. In addition, the Control sub-field may include a Control Information sub-field indicating Control information. In a specific embodiment, the Control ID field may be a 4-bit field. The contents and length of the Control Information subfield may be determined according to the Control ID subfield. Specifically, the A-Control subfield may be in the format shown in FIG. 27(a). In addition, the Control sub-field included in the A-Control sub-field may have a format as shown in FIG. 27(b).

The Control subfield may include information related to at least one of UL MU response scheduling, Receive operation mode indication, HE link adaptation, UL PPDU triggering, BlockACK request, and Buffer Status Report Requests. When a bit corresponding to the length of the A-Control sub-field is decoded, the wireless communication terminal that decodes the Control subfield may determine that there is no additional Control information to be decoded. However, when the number of Control subfields included in the A-Control subfield is variable and the length of the A-Control sub-field remains, the wireless communication terminal that decodes the A-Control subfield may not determine whether the current decoding bit is a padding bit or a control subfield. Therefore, there is a need for a method of a wireless communication terminal that decodes the A-Control subfield to determine whether the currently decoded bit is a padding bit.

The wireless communication terminal may insert the Control subfields of the A-Control subfield into the A-Control subfield in the order in which they are arranged according to the Control ID. Specifically, the wireless communication terminal may insert the control subfields of the A-control subfield into the A-control subfields in ascending order of the Control ID. In another specific embodiment, the wireless communication

terminal may insert control sub-fields of the A-Control sub-field into the A-Control sub-field in a descending order of the Control ID. When the Control subfields are inserted into the A-Control subfield in the order in which they were sorted according to the Control ID, the wireless communication terminal decoding the A-Control sub-field may determine the corresponding bit as a padding bit when the value of the Control ID field in the A-Control sub-field is continuously 0. In a specific embodiment, after the Control ID subfield with 0 is decoded, when 0 is decoded again at the position corresponding to the Control ID subfield, the wireless communication terminal that decodes the A-Control sub-field may determine that there is no additional Control information to be decoded. Also, when 0 is decoded at the position corresponding to the Control ID subfield contrary to the Control ID sort order, the wireless communication terminal that decodes the Control subfield may determine that there is no Control information to be decoded further.

In another specific embodiment, the wireless communication terminal may indicate that there is no Control sub-field after the corresponding field via a specific Control ID sub-field value. At this time, when the Control ID subfield having the specific Control ID subfield value is decoded, the wireless communication terminal that decodes the A-Control sub-field may determine that there is no additional Control information to be decoded.

FIG. 28 shows the format of an A-Control sub-field of a control sub-field according to another embodiment of the present invention.

The Control sub-field included in the A-Control sub-field may include information indicating whether the corresponding Control field is the last Control sub-field included in the A-Control sub-field. Specifically, the information indicating whether the corresponding Control field is the last Control sub-field included in the A-Control sub-field may be a 1-bit field. Also, the information indicating whether the corresponding Control field is the last Control sub-field included in the A-Control sub-field may be referred to as an End of Control field. In this embodiment, the wireless communication terminal that decodes the A-Control sub-field may stop decoding the A-Control sub-field based on the End of Control field. Specifically, when the End of Control field indicates that the corresponding

Control sub-field is the last Control sub-field of the A-Control sub-field, the wireless communication terminal decoding the A-Control sub-field may determine that there is no Control information to be additionally decoded after the field of the corresponding Control sub-field. Specifically, the format of the control subfield may be as shown in FIG. 28.

The length of the HE variant transmitted by the wireless communication terminal according to the embodiment of the present invention may be variable. This is because when the field of the HE variant is fixed, the wireless communication terminal may not be able to insert all the necessary Control information into the HE variant field. This will be described with reference to FIGS. 29 to 32.

FIG. 29 shows a frame format and an HE variant format of an HT Control field according to another embodiment of the present invention.

Specifically, the wireless communication terminal may insert a plurality of HE variants into the HT Control field to transmit the HT Control field. At this time, the wireless communication terminal may insert a field indicating that there are more HE variants to be decoded in the HE variant. A field indicating that there is more HE variant may be referred to as a More A-Control subfield. For example, when the value of the More A-Control subfield is 1, the wireless communication terminal that decodes the HT Control field may decode the following bits into an HE variant after the corresponding HE variant. The More A-Control subfield may be placed in the last bit of the HE variant. Also, the More A-Control sub-field may be placed in the first bit of the A-Control sub-field. Further, the More A-Control sub-field may be placed immediately after two bits indicating the variant included in the A-Control sub-field. In addition, the More A-Control subfield may be placed in front of the extended HE variant.

In a specific embodiment, the length of the A-Control subfield may be extended in units of 32 bits. Also, even if the A-Control subfield is extended, the first bit B0 and the second bit B1 of the A-Control subfield indicating the variant included in the HT Control field may not be repeated. Also, in a specific embodiment, the length of the HE variant added after the first HE variant may be 30 bits. The specific format of the HT Control field and the concrete form of the HE Variant may be as shown in FIG. 29.

FIG. 30 shows a frame format and an HE variant format of an HT Control field according to another embodiment of the present invention.

When the HE Control subfield is an HE variant, the wireless communication terminal may insert a specific Control ID value indicating the end of the HE variant. At this time, the wireless communication terminal that decodes the HE Control subfield may determine the end of the HE Control subfield by decoding a specific Control ID value indicating the end of the HE variant. The format of the specific HE Control subfield may be as shown in FIG. 30.

FIG. 31 shows a frame format and an HE variant format of an HT Control field according to another embodiment of the present invention.

When the length of the HE variant transmitted by the wireless communication terminal is variable, the wireless communication terminal may transmit the HE variant by inserting the End of Control field described above into the Control subfield. The wireless communication terminal that decodes the HT Control field may determine the end of the HT Control field based on the End of Control field. The format of the specific HE Control subfield may be as shown in FIG. 31.

FIG. 32 shows a frame format and an HE variant format of an HT Control field according to another embodiment of the present invention.

When the length of the HE variant transmitted by the wireless communication terminal is variable, the wireless communication terminal may insert a Length subfield indicating the length of the A-control field into the HE variant and transmit the HE subfield. Specifically, the Length sub-field may indicate – 1, which is the number of Control sub-fields following the Length sub-field. At this time, the Length subfield may have the same number of bits as the Control ID. In another specific embodiment, the Length subfield may indicate the number of unit lengths with which the A-Control subfield extends. For example, when the A-Control subfield is extended in units of bytes, the Length subfield may indicate the total number of bytes of the A-Control subfield or the number of bytes of the extended A-Control subfield. In another specific embodiment, when the A-Control sub-field is extended in units of 32 bits or 30 bits, the Length subfield may indicate a value obtained by dividing the length of the extended A-Control subfield by 32

bits or 30 bits, or may indicate a value obtained by dividing the total length of the A-Control subfield by 32 bits or 30 bits.

FIG. 33 shows a frame format and an HE variant format of an HT Control field according to another embodiment of the present invention.

The wireless communication terminal may transmit the control information through the body of the frame. Specifically, the wireless communication terminal may transmit Control information that is included in the A-Control field through the body of the frame. The total length of the MAC header or the length of the HT Control field may be limited, and in this case, this is because there is Control information required for a wireless communication terminal receiving a frame without being included in the HT Control. In a specific embodiment, the wireless communication terminal transmits the Control ID field through the HT Control field and transmits the Control Information field corresponding to the Control ID field through the body of the frame. Specifically, the wireless communication terminal transmits the Control ID field corresponding to the specific value through the HT Control field and transmits the Control Information field corresponding to the Control ID field through the body of the frame. In another specific embodiment, when the length of the Control Information field is greater than or equal to the reference value, the wireless communication terminal transmits the Control ID field through the HT Control field and transmits the Control Information field corresponding to the Control ID field through the body of the frame. For example, when the length of the Control Information field is long, such as information on BlockAck or information on BlockAck Request, the wireless communication terminal may transmit the Control Information field through the frame Body. At this time, when a plurality of Control ID fields are transmitted through the HT Control field and a plurality of Control Information fields corresponding to the plurality of Control ID fields are transmitted through the frame Body, the wireless communication terminal may insert a Control Information field corresponding to the Control ID field into the body of the frame according to the sort order of the Control ID field. In the embodiment of FIG. 33, there are Control ID m and Control ID m+1 in the HT Control field, and the wireless communication terminal inserts them into the HT Control field in the order of Control ID m and Control ID m+1. Since the Control Information

length corresponding to a plurality of Control IDs is long, the wireless communication terminal inserts the Control Information corresponding to the Control ID into the frame Body. At this time, the wireless communication terminal inserts Control Information into the frame Body in the order of Control Information corresponding to Control ID m and Control Information corresponding to Control ID m+1.

In another specific embodiment, if the HT Control field is of limited length, the wireless communication terminal transmits the Control ID field through the HT Control field and transmits the Control Information field corresponding to the Control ID field through the body of the frame. In addition, the length of the HT Control field may be fixed to 32 bits (4 bytes). In addition, the wireless communication terminal may transmit information indicating that a Control Information field corresponding to the Control ID field is included in the body of the frame. In addition, the wireless communication terminal may transmit information indicating that a Control Information field corresponding to the Control ID field is included in the body of the frame. In another specific embodiment, the wireless communication terminal may transmit information indicating the end of the Control subfield. At this time, the information indicating the end of the Control subfield may be a 1-bit field. At this time, the wireless communication terminal may transmit information indicating the end of the Control subfield as in the embodiment described with reference to FIG. 28 to FIG. 32.

In these embodiments, the wireless communication terminal receiving the frame may obtain the Control ID field in the HT Control field and obtain the Control Information field corresponding to the Control ID field from the Body of the frame.

Any one of the wireless communication terminals may transmit a trigger frame for triggering the transmission of the plurality of wireless communication terminals to the plurality of wireless communication terminals. At this time, the plurality of wireless communication terminals may transmit a response frame to the trigger frame to the wireless communication terminal that transmits the trigger frame based on the trigger frame. Through this operation, a plurality of wireless communication terminals may simultaneously transmit frames to one wireless communication terminal. Operations based

on the trigger frame of the wireless communication terminal will be described with reference to FIGS. 34 to 44.

FIG. 34 shows a format of a trigger frame according to an embodiment of the present invention.

The trigger frame may include a Frame Control field indicating information on frame control. Further, the trigger frame may include a Duration/ID field indicating a duration used for NAV setting. In addition, the trigger frame may include an RA field indicating a receiver address and a TA field indicating a transmitter address. When the trigger frame triggers a plurality of wireless communication terminals, the RA field may be a multicast address or a broadcast address indicating a plurality of wireless communication terminals. When the trigger frame triggers one wireless communication terminal, the RA field may indicate the MAC address of the corresponding wireless communication terminal. Further, the trigger frame may include an FCS field indicating whether or not the trigger frame includes an error.

In addition, the trigger frame may include a Common Info field and one or more Per User Info fields. The Common Info field may indicate information that is commonly applied to a plurality of wireless communication terminals triggered by the trigger frame. The Per User Info field may indicate information applied to each of a plurality of wireless communication terminals triggered by the trigger frame. At this time, the number of Per User Info fields may be determined according to the number of the plurality of wireless communication terminals triggered by the trigger frame. The trigger frame may include a Padding field. At this time, the Padding field may allow time for the wireless communication terminal receiving the trigger frame to process the trigger frame. The format of the specific trigger frame may be as shown in FIG. 34.

FIG. 35 shows the format of a Common Info field and a Per User Info field of a trigger frame according to the embodiment of the present invention.

The Common Info field may include a length of the trigger-based PPDU or a Length field indicating the L-SIG Length field of the trigger-based PPDU. At this time, the Length field may be a 12-bit field. In addition, the Common Info field may include a

Cascade Indication field indicating that there is a subsequent trigger frame after the trigger frame. The Common Info field may include a CS Required field indicating whether channel sensing is required when transmitting a trigger-based PPDU. At this time, the channel sensing may include virtual channel sensing and energy detection (ED) for determining whether NAV is set or not. In addition, the trigger frame may include a HE-SIG-A Info field indicating information to be inserted in the HE-SIG-A field of the trigger-based PPDU. At this time, the information that the wireless communication terminal receiving the trigger frame may recognize by itself may be omitted in the trigger frame. In addition, the trigger frame may include a CP and LTF Type field indicating a combination of LTF and Cyclic Prefix (CP) of the trigger-based PPDU. In addition, the trigger frame may include a Trigger Type field indicating the type of the trigger frame. At this time, the type of the trigger frame may indicate any one of a basic trigger, a beamforming report, a poll trigger, an MU-BAR, and an MU-RTS. In addition, the trigger frame may include a Trigger Dependent Common Info field whose format is determined according to the trigger type. A specific form of the Common Info field may be the same as that shown in FIG. 35(a).

The Per User Info field may include a User Identifier field indicating a wireless communication terminal corresponding to Per User Info. At this time, the User Identifier field may indicate the AID of the wireless communication terminal corresponding to Per User Info. Also, the Per User Info field may include an RU Allocation field indicating information on an RU allocated to a wireless communication terminal corresponding to the User Identifier field. Also, the Per User Info field may include a Coding Type field to be used by the corresponding wireless communication terminal when the wireless communication terminal corresponding to the User Identifier field transmits the trigger-based PPDU. Specifically, the Coding Type field may indicate either BCC or LDPC. Also, when the wireless communication terminal corresponding to the User Identifier field transmits the trigger-based PPDU, the Per User Info field may include a DCM field indicating whether the corresponding wireless communication terminal uses Dual Carrier Modulation (DCM). In addition, the Per User Info field may include an SS Allocation field indicating a spatial stream to be used by the wireless communication terminal when the

wireless communication terminal corresponding to the User Identifier field transmits the trigger-based PPDU. Also, the Per User Info field may include a Trigger Dependent Per User Info field which format is determined according to the type of the trigger frame. Specifically, the format of the Per User Info field may be the same as that shown in FIG. 35(b).

FIG. 36 shows a Common Info field and a Per User Info field of a trigger frame according to another embodiment of the present invention.

When a wireless communication terminal triggered by a trigger frame transmits a trigger-based PPDU, the Common Info field may include a Spatial Reuse field indicating a value of a Spatial Reuse field to be inserted in the HE-SIG-A field of the PPDU by the corresponding wireless communication terminal. Also, when a wireless communication terminal triggered by a trigger frame transmits a trigger-based PPDU, the Common Info field may include a BW field indicating a value to be inserted in the BW field of the HE-SIG-A by the corresponding wireless communication terminal. Also, when a wireless communication terminal triggered by a trigger frame transmits a trigger-based PPDU, the Common Info field may include an MU MIMO LTF Mode field indicating an MU MIMO LTF mode to be used by the corresponding wireless communication terminal. Also, when a wireless communication terminal triggered by a trigger frame transmits a trigger-based PPDU, the Common Info field may include a Number of LTFs field indicating the number of LTFs to be used by the corresponding wireless communication terminal. Also, when a wireless communication terminal triggered by a trigger frame transmits a trigger-based PPDU, the Common Info field may include an STBC field indicating whether the wireless communication terminal uses the STBC. Also, when a wireless communication terminal triggered by a trigger frame transmits a trigger-based PPDU, the Common Info field may include an LDPC Extra Symbol field indicating whether or not the LDPC additional symbol is present when the corresponding wireless communication terminal is used. Also, when a wireless communication terminal triggered by a trigger frame transmits a trigger-based PPDU, the Common Info field may include an AP TX Power field indicating the transmission power to be used by the wireless communication terminal. Also, when a

wireless communication terminal triggered by a trigger frame transmits a trigger-based PPDU, the Common Info field may include a Packet Extension field indicating information on a packet extension of a PPDU transmitted by the corresponding wireless communication terminal. Other fields included in the Common Info field may be the same as the embodiment described with reference to FIG. 35(a). Specifically, the Common Info field may be the same as the embodiment of FIG. 35(a).

When a wireless communication terminal corresponding to the User Identifier field transmits a trigger-based PPDU, the Per User Info field or the Target RSSI field may include an RSSI field indicating an RSSI value to be targeted by the wireless communication terminal.

FIG. 37 shows a Trigger Dependent Common Info field and a Trigger Dependent Per User Info field of an MU-BAR type trigger frame according to an embodiment of the present invention.

The wireless communication terminal, which is an AP, may transmit a data frame to a plurality of wireless communication terminals and request transmission of an ACK frame for the corresponding data frame. Specifically, a wireless communication terminal, which is an AP, may trigger ACK frame transmission of a plurality of wireless communication terminals through a trigger frame. At this time, the trigger frame type may be MU-BAR type.

Also, when a wireless communication terminal, which is an AP, transmits a group cast frame to a plurality of wireless communication terminals and one of the non-AP wireless communication terminals fails to receive a group cast frame, Group Cast Retries (GCR) BlockACK may be transmitted. At this time, the wireless communication terminal, which is an AP, may trigger GCR BlockACK transmission of a plurality of wireless communication terminals through a trigger frame. For this, the Common Info field of the trigger frame may include information related to the GCR. At this time, the trigger frame type may be MU-BAR type or MU-BAR type for GCR. Specifically, when the type of the trigger frame is MU-BAR type or MU-BAR type for GCR, the Common Info field of the trigger frame may include a GCR Indication field indicating whether the trigger frame is an

MU-BAR for GCR. In addition, the Common Info field of the trigger frame may include a GCR Address field indicating the address of the GCR group triggered by the trigger frame. Specifically, the Common Info field included in the trigger frame of the MU-BAR type may be the same as the embodiment of FIG. 37(a).

In addition, the Trigger Dependent Per User Info field of the trigger frame may include a BAR control field including information about the BAR frame control. In addition, the Trigger Dependent Per User Info field of the trigger frame may include a BAR Information field including information on the BAR frame. In the specific embodiment, the BAR Control field and the BAR Information field may be the same as the format of the trigger frame of the BlockAckReq type. In another specific embodiment, the BAR Control field and the BAR Information field may be a structure in which one or more fields are omitted from the field format of the Trigger of the BlockAckReq type. For example, the wireless communication terminal may use the MU-BAR type or the MU-BAR type trigger frame for the GCR by omitting the information included in the Trigger Dependent Common Info of the Trigger Frame of the BlockAckReq type. Specifically, the wireless communication terminal inserts a GCR Indication field in Trigger Dependent Common Info of a Trigger Frame of BlockAckReq type and omits the GCR Indication field in the BAR Control field. In another specific embodiment, the wireless communication terminal may insert a GCR Address field in the Trigger Dependent Common Info field and omit the GCR Address field in the BAR Information field. In another specific embodiment, even when the wireless communication terminal requests the GCR BlockAck, the wireless communication terminal inserts the GCR Address field in the Trigger Dependent Common Info field and omits the GCR Address field in the BAR Information field.

FIG. 38 shows the format of the Trigger Dependent Common Info field of the MU-BAR type trigger frame according to an embodiment of the present invention.

In a specific embodiment of the present invention, when the type of trigger frame is MU-BAR type or MU-BAR type for GCR, the Trigger Dependent Common Info field of the trigger frame may include only the GCR Address field. At this time, the wireless

communication terminal may set the value of the GCR Address field to a predetermined value and indicate that it is not a MU-BAR type trigger frame for GCR. Specifically, the predetermined value may be zero. The wireless communication terminal receiving the trigger frame may determine whether the corresponding trigger frame is the MU-BAR type trigger frame for GCR based on the value of the GCR Address field. Specifically, the wireless communication terminal receiving the trigger frame may determine whether the corresponding trigger frame is a MU-BAR type trigger frame for GCR, according to whether the value of the GCR Address field is a predetermined value.

In another specific embodiment, the wireless communication terminal may indicate that the MU-BAR trigger frame is a MU-BAR type trigger frame for the GCR through a Starting Sequence Control value or a TID value requested by the MU-BAR. At this time, the wireless communication terminal receiving the trigger frame may determine whether the trigger frame is a trigger frame of MU-BAR type for GCR through the Starting Sequence Control value or the TID value requested by the MU-BAR.

Also, even if the wireless communication terminal receiving the trigger frame corresponds to the address indicated by the GCR Address field, when the STA Identifier field in the Per User Info field does not indicate the wireless communication terminal receiving the trigger frame, the wireless communication terminal receiving the trigger frame may determine that the transmission is not triggered by the GCR BlockACK.

The format of the Trigger Dependent Common Info field of the specific MU-BAR type trigger frame may be the same as the embodiment of FIG. 38.

FIG. 39 shows a format of an MU-BAR type trigger frame for GCR according to an embodiment of the present invention.

The wireless communication terminal may set the RA field of the MU-BAR type trigger frame for GCR to the GCR address. Specifically, the wireless communication terminal may set the RA field of the trigger frame to the GCR address and indicate that the type of the trigger frame is the MU-BAR type for GCR. Therefore, the wireless communication terminal may omit the GCR Address field in the Common Info field. In another specific embodiment, the wireless communication terminal may not set a value in

the GCR Address field in the Common Info field. Also, when the wireless communication terminal sets the RA field of the MU-BAR type trigger frame for GCR to the GCR address, the wireless communication terminal may insert only the information related to the wireless communication terminal corresponding to the GCR address in the Per User Info field of the trigger frame. The specific trigger frame format may be the same as the embodiment of FIG. 39.

FIG. 40 shows a format of an MU-BAR type trigger frame for GCR according to an embodiment of the present invention.

The wireless communication terminal may set the RA field of the MU-BAR type trigger frame for GCR to the broadcast address. At this time, the wireless communication terminal may set the GCR Address field to the GCR address in the Common Info field. In addition, when the wireless communication terminal sets the RA field of the MU-BAR type trigger frame for GCR to the broadcast address, the wireless communication terminal may request an ACK frame other than GCR BlockACK with the GCR BlockACK via the corresponding trigger frame. Therefore, when the wireless communication terminal sets the RA field of the MU-BAR type trigger frame for GCR to the broadcast address,

the wireless communication terminal may insert information on the wireless communication terminal corresponding to the GCR address and information on the wireless communication terminal not corresponding to the GCR address in the Per User Info field of the trigger frame. The specific trigger frame format may be the same as the embodiment of FIG. 40.

FIG. 41 shows the format of the BAR Control field and the encoding value of the BlockACKReq variant according to an embodiment of the present invention.

As described above, when the trigger frame is the MU-BAR type, the Trigger Dependent Per User Info field of the trigger frame may include a BAR Control field. At this time, a plurality of bits included in the Trigger Dependent Per User Info field may indicate a Variant of BlcokACKReq. Specifically, the Multi-TID subfield, the Compressed Bitmap subfield, and the GCR subfield included in the Trigger Dependent Per User Info

field may indicate Variants of BlcokACKReq. For example, the type of the trigger frame may be GCR BlockACKReq, when the value of the Multi-TID subfield is 0, the value of the Compressed Bitmap subfield is 1, and the value of the GCR subfield is 1.

As described above, when a trigger frame of MU-BAR type requests GCR BlockAck, the trigger frame of MU-BAR type may request a GCR BlockAck frame and another ACK frame together. Specifically, the wireless communication terminal may request an ACK for a plurality of TIDs from the wireless communication terminal receiving the trigger frame through the MU-BAR type trigger frame. In a specific embodiment, the wireless communication terminal may request an ACK for a plurality of TIDs including a GCR BlockACK frame from a wireless communication terminal receiving a trigger frame through a trigger frame of an MU-BAR type. For example, the wireless communication terminal may set the Multi-TID Saab field to 1, set the GCR sub-field to 1, request a GCR BlockAck, and request an ACK of another TID together. At this time, the value of the Compressed Bitmap subfield may be 0 or 1. In a specific embodiment, the format of the BAR Control field may be the same as in FIG. 41(a). Also, the encoding value of the BlockACKReq variant may be as shown in FIG. 41(b).

When the trigger frame requests a GCR BlockAck frame and another ACK frame together, the wireless communication terminal may transmit a Multi-TID BlockACK frame in response to the trigger frame. Also, when the trigger frame requests a GCR BlockAck frame and another ACK frame together, the wireless communication terminal may transmit BlockACK frames for a plurality of TIDs together with other MPDUs. Specifically, the wireless communication terminal may transmit a BlockACK frame for a plurality of TIDs and another MPDU through the A-MDPU. At this time, the BlockACK frame may be a Compressed BlockACK frame.

FIG. 42 shows the format of the BAR Information field according to an embodiment of the present invention.

As described above, when the type of the trigger frame is the MU-BAR type, the Trigger Dependent User Info field may include a BAR Information field. At this time, the BAR information field includes a Block ACK Starting Sequence Control field and may not

include a GCR Address field. In particular, even when the type of the trigger frame is the MU-BAR type for GCR, the BAR Information field includes the Block ACK Starting Sequence Control field and may not include the GCR Address field. Also, when the type of the trigger frame is the MU-BAR type, the Common Info field may include a GCR Address field. Specifically, when the type of the trigger frame is the MU-BAR type, the Trigger Dependent Common Info field may include a GCR Address field. This is because the GCR Address field is information commonly applied to a plurality of wireless communication terminals through which GCR BlockACK transmission is triggered via the MU-BAR. Specifically, the format of the BAR Information field may be the same as the embodiment of FIG. 42.

FIG. 43 shows a BAR Information field according to another embodiment of the present invention.

When the type of the trigger frame is the MU-BAR type and the wireless communication terminal requests an ACK for a plurality of TIDs, the wireless communication terminal may generate and transmit a BAR Information field classified by TID. Specifically, when the type of the trigger frame is the MU-BAR type for GCR and the wireless communication terminal requests an ACK for a plurality of TIDs, the wireless communication terminal may generate and transmit a BAR information field for each TID. At this time, the BAR information field may include a Per TID Info field and a Block ACK Starting Sequence field by TID. At this time, the Per TID Info field may include a TID subfield indicating the TID. For example, the concrete format of the BAR Information field may be the same as the embodiment of FIG. 43. The length of the BAR Information field may vary depending on the number of TIDs requesting an ACK. Specifically, the length of the Trigger Dependent Per User Info field may vary depending on the number of TIDs requesting ACK. Therefore, the length of the Per User Info field may vary depending on the number of TIDs requesting ACK. The wireless communication terminal transmitting the trigger frame may signal the number of TIDs through the TID_INFO field of the BAR Control field of the trigger frame. The wireless communication terminal receiving the trigger frame may determine the length of the Per User Info field based on the TID_INFO

field of the BAR Control field of the trigger frame.

FIG. 44 shows a trigger frame structure according to another embodiment of the present invention.

The trigger frame may have a format as described in FIG. 34. At this time, the format of the Common Info field and the Per User Info field may be the same as any of the embodiments described with reference to FIGS. 35 to 36. In addition, the format of the Trigger Dependent Per User Info field may be the same as the embodiment described with reference to FIG. 37. Also, the format of the Trigger Dependent Common Info field may be the same as the embodiment described with reference to FIG. 37 and FIG. 38. In addition, the format of the BAR Information field may be the same as the embodiment described with reference to FIG.43.

FIG. 45 shows the operation of a wireless communication terminal according to an embodiment of the present invention.

The wireless communication terminal receives the PPDU (S4501).

The wireless communication terminal identifies whether the PPDU is an Inter-BSS PPDU or an Intra-BSS PPDU (S4503). In addition, when the PPDU received by the wireless communication terminal is not identified as Inter-BSS PPDU or Intra-BSS PPDU, this may be a case where the received PPDU lacks information for determining a BSS from which the received PPDU is transmitted. As described above, the wireless communication terminal may identify whether the received PPDU is an Inter-BSS PPDU or an Intra-BSS PPDU based on the MAC header of the MAC frame included in the PPDU. When a wireless communication terminal, which is an AP, receives a trigger-based PPDU from a wireless communication terminal that is not triggered by the wireless communication terminal, which is an AP, the wireless communication terminal, which is an AP, may identify the corresponding PPDU as an Inter-BSS PPDU. In a specific embodiment, when the wireless communication terminal, which is an AP, does not transmit the trigger frame but receives the trigger-based PPDU, the wireless communication terminal, which is an AP, may identify the PPDU as an Inter-BSS PPDU. Also, based on whether the received PPDU

includes a trigger frame, the wireless communication terminal, which is an AP, may determine whether the corresponding PPDU is a PPDU for downlink transmission. Specifically, the wireless communication terminal, which is an AP, may identify whether the corresponding PPDU is an Inter-BSS PPDU based on the SR-related information. At this time, the SR-related information may be an SR field signaled by the PPDU described above. The wireless communication terminal may identify whether the PPDU received through at least one of the above conditions is an Inter-BSS PPDU or an Intra-BSS PPDU.

Also, when the PPDU received by the wireless communication terminal satisfies both the Inter-BSS PPDU condition and the Intra-BSS PPDU condition, the wireless communication terminal may identify whether the corresponding PPDU is an Inter-BSS PPDU or an Intra-BSS PPDU based on conditions other than BSS color. As described above, this is because the BSS color value may have a BSS color collision due to the limitation of the value. In a specific embodiment, the wireless communication terminal may identify whether the received PPDU is an Inter-BSS PPDU or an Intra-BSS PPDU according to the embodiments described with reference to FIGS. 6 to 23. Specifically, whenthe PPDU received by the wireless communication terminal satisfies both the Inter-BSS PPDU condition and the Intra-BSS PPDU condition, the wireless communication terminal may identify the corresponding PPDU as an Inter-BSS PPDU.

The wireless communication terminal may perform an operation related to channel access according to whether the received PPDU is an Inter-BSS PPDU or an Intra-BSS PPDU. In addition, the wireless communication terminal may enter a power save mode depending on whether the received PPDU is an Inter-BSS PPDU or an Intra-BSS PPDU (S4505). At this time, the operation related to the channel access may include at least one of the operation for setting the CCA threshold value and the operation for setting/resetting the NAV.

In addition, when the PPDU received by the wireless communication terminal may not identify the Inter-BSS PPDU or the Intra-BSS PPDU, the following operation may be performed. When the PPDU received by the wireless communication terminal is not identified as Inter-BSS PPDU or Intra-BSS PPDU, the wireless communication terminal may regard the PPDU as an Inter-BSS PPDU. Specifically, when the PPDU received by

the wireless communication terminal is not identified as Inter-BSS PPDU or Intra-BSS PPDU, the wireless communication terminal may set Basic NAV based on the received PPDU. For example, when the PPDU received by the wireless communication terminal may not be identified as Inter-BSS PPDU or Intra-BSS PPDU, the wireless communication terminal may set the Basic NAV based on the TXOP Duration field indicated by the HE-SIG-A field of the corresponding PPDU.

When the PPDU received by the wireless communication terminal may not be identified as Inter-BSS PPDU or Intra-BSS PPDU, the wireless communication terminal may not enter the power save mode based on the BSS color signaled by the PPDU.

The wireless communication terminal may reset the currently set NAV when the BSS from which the PPDU setting the currently set NAV is transmitted and the BSS from which the CF-End frame is transmitted are the same. Additionally, the wireless communication terminal may not reset the NAV when the BSS from which the PPDU setting the currently set NAV is transmitted and the BSS from which the CF-End frame is transmitted are different.

Also, when the NAV is set by the PPDU that is not able to identify whether the PPDU is the Intra-BSS PPDU or the Inter-BSS PPDU based on the BSS color value indicated by the signaling field of the PPDU, the wireless communication terminal may not reset the NAV based on the CF-End frame transmitted from the Intra-BSS or the CF-End frame transmitted from the BSS corresponding to the multiple-BSSID set including the BSSID corresponding to the BSS of the wireless communication terminal.

A case where the PPDU received by the wireless communication terminal may not be identified as Inter-BSS PPDU or Intra-BSS PPDU may be a case where it may be impossible to identify whether the PPDU received by the wireless communication terminal based on the BSS color is an Inter-BSS PPDU or an Intra-BSS PPDU, due to the BSS color collision. If the wireless communication terminal is not able to identify whether the PPDU received based on the BSS color is the Inter-BSS PPDU or the Intra-BSS PPDU, the wireless communication terminal may not operate on the basis of the BSS color that the received PPDU signals. Specifically, if the wireless communication terminal is not able to

identify whether the PPDU received based on the BSS color is the Inter-BSS PPDU or the Intra-BSS PPDU, the wireless communication terminal may not set the Intra-BSS NAV based on the BSS color and the TXOP Duration field that the HE-SIG-A field of the received PPDU signals. Specifically, when the wireless communication terminal recognizes the BSS color collision, the wireless communication terminal may not set the intra-BSS NAV based on the TXOP Duration field indicated by the HE-SIG-A field. When the wireless communication terminal receives the signaling information indicating that the operation based on the BSS color is not allowed, the wireless communication terminal may not set the Intra-BSS NAV based on the BSS color and the TXOP Duration field of the HE-SIG-A field of the PPDU.

In addition, when the wireless communication terminal is not be able to identify whether the PPDU received is the Inter-BSS PPDU or the Intra-BSS PPDU based on the BSS color, the wireless communication terminal may set the Basic NAV based on the BSS color and the TXOP Duration field that the HE-SIG-A field of the received PPDU signals. Specifically, when the wireless communication terminal recognizes the BSS color collision, the wireless communication terminal may set the Basic NAV based on the TXOP Duration field indicated by the HE-SIG-A field. When the wireless communication terminal receives the signaling information indicating that the operation based on the BSS color is not allowed, the wireless communication terminal may set the Basic NAV based on the BSS color and the TXOP Duration field of the HE-SIG-A field of the PPDU.

Specifically, if the wireless communication terminal is not able to identify whether the PPDU received based on the BSS color is the Inter-BSS PPDU or the Intra-BSS PPDU, the wireless communication terminal may not enter the power save mode based on the BSS color that the HE-SIG-A field of the received PPDU signals.

In addition, when the PPDU received by the wireless communication terminal may not be identified as Inter-BSS PPDU or Intra-BSS PPDU, this may be a case where the received PPDU lacks information for determining the transmitted BSS. Specifically, when the PPDU received by the wireless communication terminal is not identified as Inter-BSS PPDU or Intra-BSS PPDU, the wireless communication terminal may not decode the MAC header of the MAC frame included in the PPDU. Also, a case where the PPDU received by

the wireless communication terminal is not identified as Inter-BSS PPDU or Intra-BSS PPDU may be a case where it may be impossible to identify whether the received PPDU is an Inter-BSS PPDU or an Intra-BSS PPDU according to various methods described above.

In addition, the wireless communication terminal may transmit the PPDU by including signaling information indicating that the operation based on the BSS color is not allowed in the signaling field of the PPDU. At this time, the wireless communication terminal receiving the PPDU including the corresponding signaling information may not perform the operation based on the BSS color. In a specific embodiment, the wireless communication terminal may transmit the BSS color value indicated by the signaling field of the PPDU by setting it to a predetermined value. At this time, the predetermined value may be a reserved value which is not used in the BSS color when the BSS color is selected by the AP. For example, the predetermined value may be zero. In addition, when the wireless communication terminal receives the PPDU indicating the predetermined value as the BSS color, the wireless communication terminal may not perform the operation based on the BSS color. Specifically, when the wireless communication terminal receives a PPDU indicating a predetermined value in a BSS color, the wireless communication terminal may not perform the SR operation on the corresponding PPDU. In a specific embodiment, when the wireless communication terminal receives a PPDU indicating a predetermined value in a BSS color, the wireless communication terminal may treat the PPDU as an Intra-BSS PPDU. Accordingly, when the wireless communication terminal receives a PPDU indicating a predetermined value in a BSS color, the wireless communication terminal may not discard the corresponding PPDU.

As described above, the wireless communication terminal may transmit the BSS color indicating the BSS including the wireless communication terminal when communicating with another wireless communication terminal. At this time, when the wireless communication terminal does not receive the information signaling the BSS color, the wireless communication terminal may transmit the predetermined value as the BSS color. At this time, the predetermined value may be a reserved value which is not used in the BSS color when the BSS color is selected by the AP. For example, the predetermined value may be zero. Specifically, when the wireless communication terminal does not

receive the information signaling the BSS color, the non-AP wireless communication terminal may transmit a predetermined value as the BSS color when communicating with other wireless communication terminals. In a specific embodiment, if the wireless communication terminal does not receive the information signaling the BSS color, the wireless communication terminal may set the BSS color value that the PPDU transmitted by the wireless communication terminal signals, to a predetermined value. Also, when the wireless communication terminal does not receive information signaling the BSS color, the wireless communication terminal may set the BSS color value that the frame transmitted by the wireless communication terminal signals, to a predetermined value. When the wireless communication terminal does not receive the information that signals the BSS color, there is no BSS color. Specifically, when the wireless communication terminal does not receive the information signaling for the BSS color, the wireless communication terminal may not associate with any AP. Also, a case where the wireless communication terminal does not receive the information signaling the BSS color may include a case where the wireless communication terminal fails to establish a Tunneled Direct Link Setup (TDLS) link, a Direct Link Setup (DLS) link, or an IBSS (Independent) membership. Also, a case where the wireless communication terminal does not receive the information signaling the BSS color may include a case where the wireless communication terminal may not receive information on the changed BSS color value after receiving the information indicating that the operation based on the BSS color value is not allowed. Also, the PPDU signaling the predetermined value as the BSS color may not be identified as the Inter-BSS PPDU or the Intra-BSS PPDU based on the predetermined value of the BSS color.

In a specific embodiment, when the wireless communication terminal does not receive the HE Operation element, the wireless communication terminal may set the BSS color value included in the PPDU transmitted by the wireless communication terminal to a predetermined value. For example, the wireless communication terminal may use a predetermined value as a BSS color value when transmitting a probe request frame. Specifically, when the wireless communication terminal transmits a probe request frame, the wireless communication terminal may set the value of the BSS color field included in

the HE Operation element to a predetermined value. Also, when the wireless communication terminal transmits a probe request frame, the value of the BSS color field of the HE-SIG-A field of the PPDU including the probe request frame may be set to a predetermined value.

At this time, when the wireless communication terminal receives the PPDU indicating the predetermined value as the BSS color, the wireless communication terminal may not perform the operation based on the BSS color. Specifically, when the wireless communication terminal receives a PPDU indicating a predetermined value as a BSS color, the wireless communication terminal may not perform the SR operation on the corresponding PPDU. In a specific embodiment, when the wireless communication terminal receives a PPDU indicating a predetermined value as a BSS color, the wireless communication terminal may treat the PPDU as an Intra-BSS PPDU. Accordingly, when the wireless communication terminal receives a PPDU indicating a predetermined value as a BSS color, the wireless communication terminal may not discard the corresponding PPDU.

When the wireless communication terminal accesses the channel or enters the power save mode, the specific operation of the wireless communication terminal may be the same as the embodiments through the embodiments described with reference to FIG. 6 to FIG. 23.

Although the present invention is described by using wireless LAN communication as an example, it is not limited thereto and may be applied to other communication systems such as cellular communication. Additionally, while the method, device, and system of the present invention are described in relation to specific embodiments thereof, some or all of the components or operations of the present invention may be implemented using a computer system having a general purpose hardware architecture.

The features, structures, and effects described in the above embodiments are included in at least one embodiment of the present invention and are not necessary limited to one embodiment. Furthermore, features, structures, and effects shown in each

embodiment may be combined or modified in other embodiments by those skilled in the art. Therefore, it should be interpreted that contents relating to such combination and modification are included in the range of the present invention.

While the present invention is described mainly based on the above embodiments but is not limited thereto, it will be understood by those skilled in the art that various changes and modifications are made without departing from the spirit and scope of the present invention. For example, each component specifically shown in the embodiments may be modified and implemented. It should be interpreted that differences relating to such modifications and application are included in the scope of the present invention defined in the appended claims.

[Claims]

1. A wireless communication terminal communicating wirelessly, the terminal comprising:

a transceiver; and

a processor,

wherein the processor is configured to transmit a BSS color indicating a BSS including the wireless communication terminal when communicating with another wireless communication terminal by using the transceiver, and

when the wireless communication terminal fails to receive information signaling the BSS color, the processor is configured to transmit a predetermined value as the BSS color.

2. The wireless communication terminal of claim 1, wherein when the wireless communication terminal fails to make any association with a wireless communication terminal, which is an AP, the processor is configured to transmit a predetermined value as the BSS color.

3. The wireless communication terminal of claim 1, wherein when receiving signaling information indicating that an operation based on the BSS color is not allowed, the processor is configured to transmit a predetermined value as the BSS color.

4. The wireless communication terminal of claim 1, wherein the predetermined value is 0.

5. The wireless communication terminal of claim 1, wherein a PLCP Protocol Data Unit (PPDU) signaling the predetermined value as the BSS color is not identified as an Inter-BSS PPDU or an Intra-BSS PPDU based on the BSS color, which is the predetermined value,

wherein the Intra-BSS PPDU indicates a PPDU transmitted from the same BSS as the BSS including the wireless communication terminal, and

wherein the Inter-BSS PPDU indicates a PPDU transmitted from a BSS other than the BSS including the wireless communication terminal.

6. A wireless communication terminal communicating wirelessly, the wireless communication terminal comprising:

a transceiver; and

a processor,

wherein the processor is configured to receive a PLCP Protocol Data Unit (PPDU) through the transceiver and access a channel based on whether the PPDU is an Inter-BSS PPDU or an Intra-BSS PPDU,

the Intra-BSS PPDU indicates a PPDU transmitted from the same BSS as the BSS including the wireless communication terminal, and

the Inter-BSS PPDU indicates a PPDU transmitted from a BSS other than the BSS including the wireless communication terminal.

7. The wireless communication terminal of claim 6, wherein if the PPDU satisfies both an Inter-BSS PPDU condition and an Intra-BSS PPDU condition, the PPDU is identified as an Inter-BSS PPDU.

8. The wireless communication terminal of claim 6, wherein when the PPDU is not identified as the Inter-BSS PPDU or the Intra-BSS PPDU, the processor is configured to set a Basic NAV instead of an Intra-BSS Network Allocation Vector (NAV) based on the PPDU,

the Intra-BSS NAV is set based on the PPDU transmitted from the same BSS as the wireless communication terminal, and

the Basic NAV is set based on the PPDU transmitted from the BSS other than that of the wireless communication terminal

9. The wireless communication terminal of claim 6, wherein when the wireless communication terminal is not able to identify whether the PPDU is the Intra-BSS PPDU or the Inter-BSS PPDU based on the BSS color, the processor is configured not to set an Intra-BSS Network Allocation Vector (NAV) based on the BSS color and a TXOP Duration field of an HE-SIG-A field of the PPDU,

wherein the Intra-BSS NAV is set based on the PPDU transmitted from the same BSS as that of the wireless communication terminal.

10. The wireless communication terminal of claim 9, wherein when receiving signaling information indicating that an operation based on the BSS color is not allowed, the processor is configured not to set the Intra-BSS NAV based on the BSS color and the TXOP Duration field of the HE-SIG-A field of the PPDU.

11. The wireless communication terminal of claim 10, wherein when the wireless

communication terminal recognize that the BSS color of the BSS including the wireless communication terminal is the same as the BSS color of another BSS, an Intra-BSS NAV is not set based on the BSS color and the TXOP Duration field of the HE-SIG-A field of the PPDU.

12. The wireless communication terminal of claim 6, wherein when the wireless communication terminal is not able to identify whether the PPDU is the Intra-BSS PPDU or the Inter-BSS PPDU based on the BSS color, the processor is configured not to enter a power save mode based on the BSS color and the PPDU.

13. The wireless communication terminal of claim 6, wherein when the wireless communication terminal is an AP and the PPDU is a trigger-based PPDU transmitted from a wireless communication terminal that is not triggered by the wireless communication terminal, the processor is configured to determine that the PPDU is an Inter-BSS PPDU.

14. The wireless communication terminal of claim 6, wherein when the wireless communication terminal is an AP and the PPDU is a PPDU including a trigger frame, the processor is configured to determine that the PPDU is an Inter-BSS PPDU.

15. The wireless communication terminal of claim 14, wherein the processor is configured to determine whether the PPDU includes the trigger frame based on information related to a Spatial Reuse (SR) operation included in the PPDU.

16. The wireless communication terminal of claim 15, wherein based on that

information related to the SR operation included in the PPDU indicates whether the SR operation is restrictively allowed or the SR operation is delayed while the PPDU is being transmitted, the processor is configured to determine whether the PPDU comprises the trigger frame.

17. A wireless communication terminal communicating wirelessly, the wireless communication terminal comprising:

a transceiver; and

a processor,

wherein the processor is configured to receive a PLCP Processing Data Unit (PPDU) through the transceiver, and not to perform an operation based on the BSS color when the BSS color indicated by the PPDU is a predetermined value.

18. The wireless communication terminal of claim 17, wherein when the BSS color indicated by the PPDU is a predetermined value, the processor is configured not to perform the SR operation for the PPDU.

19. The wireless communication terminal of claim 18, wherein when the BSS color indicated by the PPDU is a predetermined value, the processor is configured to regard the PPDU as an Intra-BSS PPDU.

20. The wireless communication terminal of claim 17, wherein the predetermined value is a reserved value that is not used in the BSS color when an AP selects the BSS color.

[ABSTRACT]

Provided is a wireless communication terminal that communicates wirelessly. The terminal includes: a transceiver; and a processor. The processor is configured to receive a frame through the transceiver, determine whether the frame is classified into an Intra-Basic Service Set (BSS) frame or an Inter-BSS frame according to a BSS from which the frame is transmitted, and access a channel according to whether the frame is an Intra-BSS frame or an Inter-BSS frame.

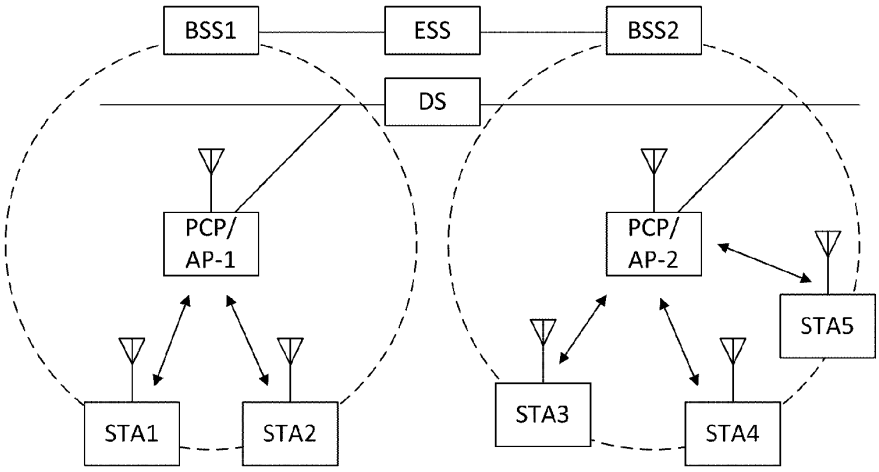

BSS1
ESS
BSS2
DS
PCP/
AP-1
PCP/
AP-2
STA5
STA1
STA2
STA3
STA4

FIG. 1

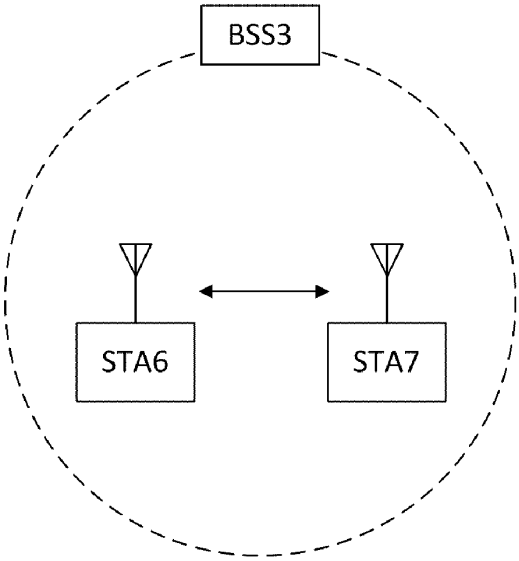

BSS3
STA6
STA7

FIG. 2

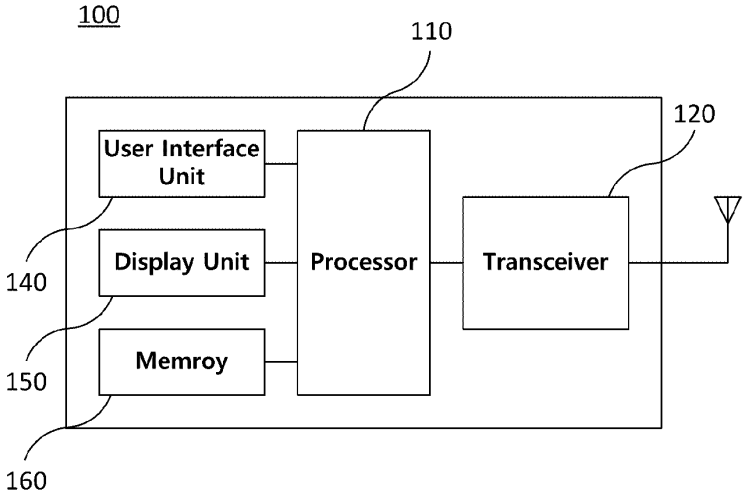

100
110
120
User Interface Unit
Display Unit
Memroy
Processor
Transceiver
140
150
160

FIG. 3

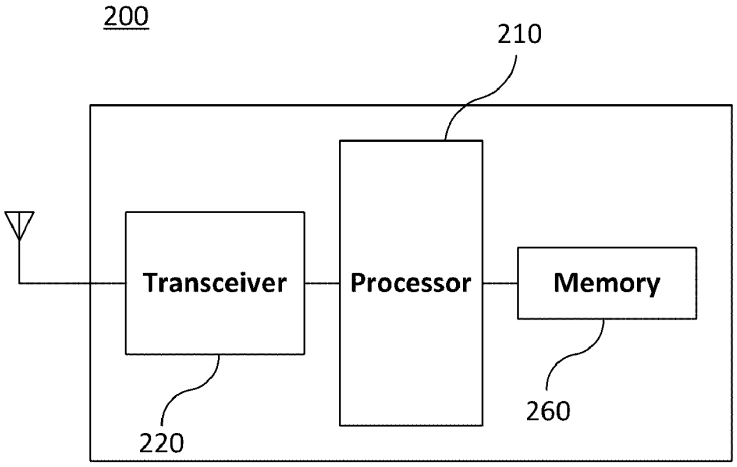

200
210
Transceiver
Processor
Memory
220
260

FIG. 4

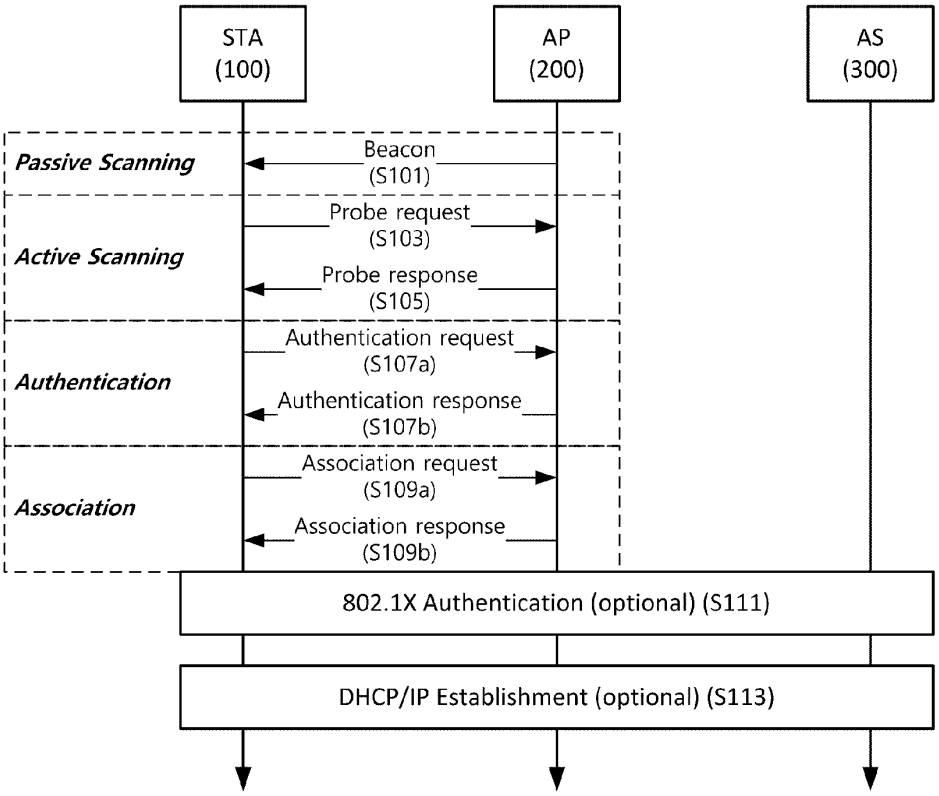

STA
(100)
AP
(200)
AS
(300)
Passive Scanning
Beacon
(S101)
Active Scanning
Probe request
(S103)
Probe response
(S105)
Authentication
Authentication request
(S107a)
Authentication response
(S107b)
Association
Association request
(S109a)
Association response
(S109b)
802.1X Authentication (optional) (S111)
DHCP/IP Establishment (optional) (S113)

FIG. 5

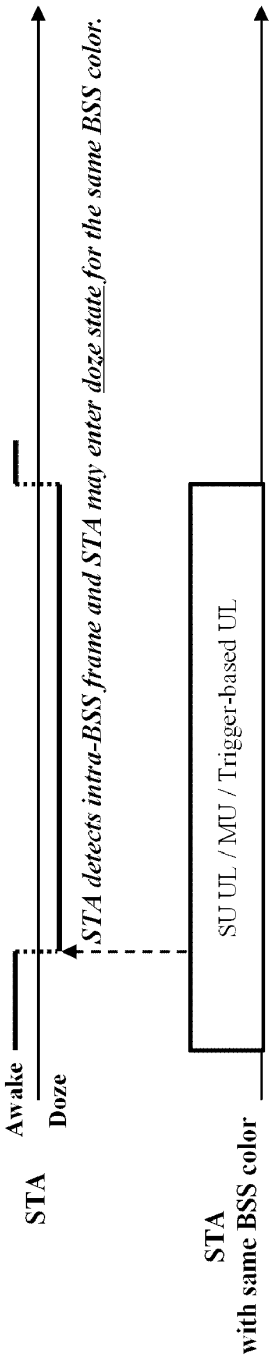

STA
Awake
Doze
STA detects intra-BSS frame and STA may enter doze state for the same BSS color.
STA
with same BSS color
SU UL / MU / Trigger-based UL

FIG. 6

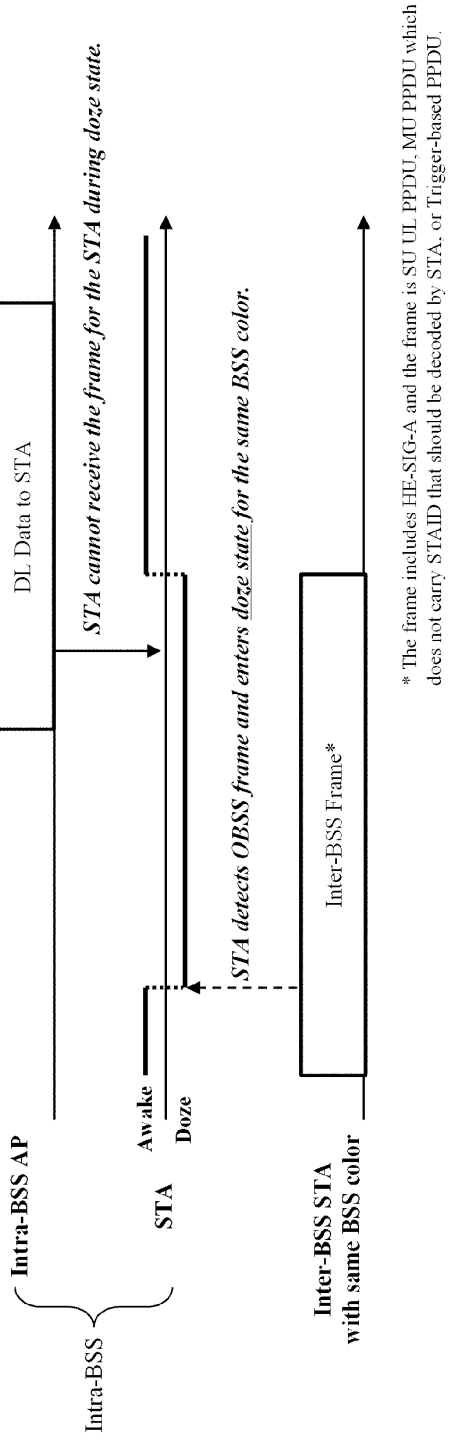

Intra-BSS
Intra-BSS AP
STA
Awake
Doze
Inter-BSS STA
with same BSS color
DL Data to STA
STA cannot receive the frame for the STA during doze state.
STA detects OBSS frame and enters doze state for the same BSS color.
Inter-BSS Frame*
* The frame includes HE-SIG-A and the frame is SU UL PPDU, MU PPDU which does not carry STAID that should be decoded by STA, or Trigger-based PPDU.

FIG. 7

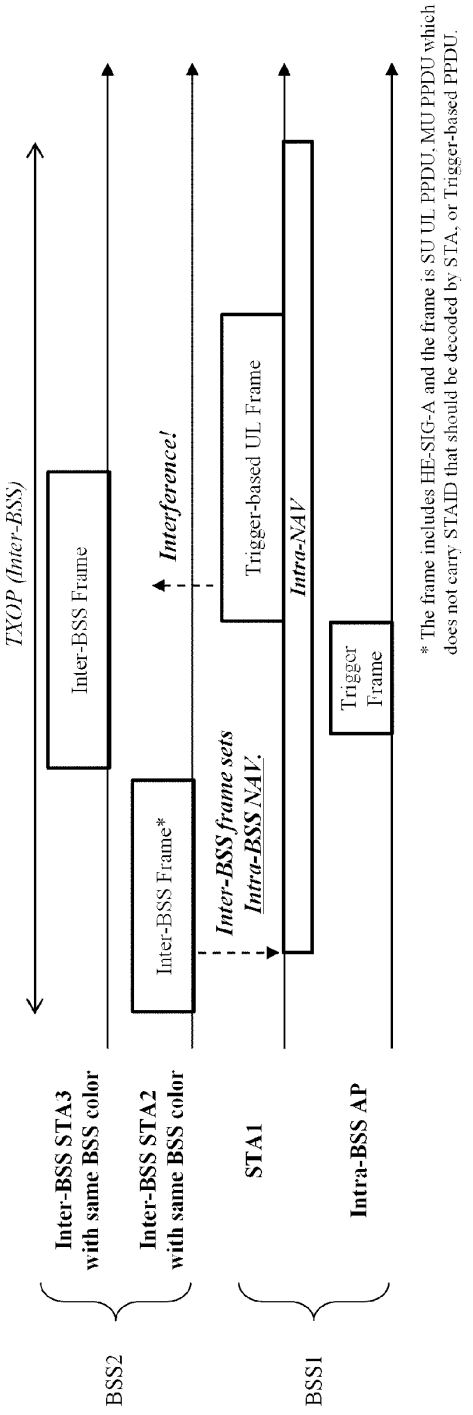

TXOP (Inter-BSS)
Inter-BSS Frame
Interference!
Inter-BSS Frame*
Inter-BSS frame sets Intra-BSS NAV.
Trigger-based UL Frame
Intra-NAV
Trigger Frame
Inter-BSS STA3 with same BSS color
Inter-BSS STA2 with same BSS color
STA1
Intra-BSS AP
BSS2
BSS1
* The frame includes HE-SIG-A and the frame is SU UL PPDU, MU PPDU which does not carry STAID that should be decoded by STA, or Trigger-based PPDU.

FIG. 8

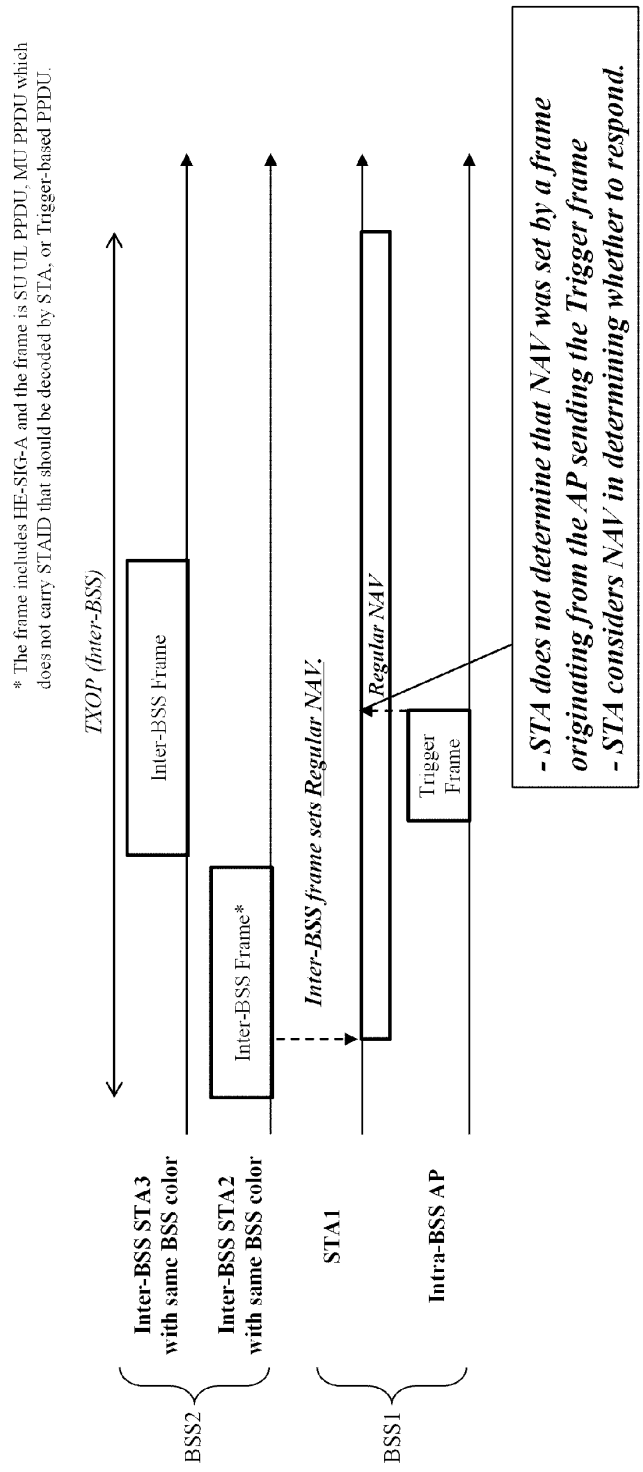

* The frame includes HE-SIG-A and the frame is SU UL PPDU, MU PPDU which does not carry STAID that should be decoded by STA, or Trigger-based PPDU.
TXOP (Inter-BSS)
Inter-BSS Frame
Inter-BSS Frame*
Inter-BSS frame sets Regular NAV.
Regular NAV
Trigger Frame
- STA does not determine that NAV was set by a frame originating from the AP sending the Trigger frame
- STA considers NAV in determining whether to respond.
Inter-BSS STA3 with same BSS color
Inter-BSS STA2 with same BSS color
STA1
Intra-BSS AP
BSS2
BSS1

FIG. 9

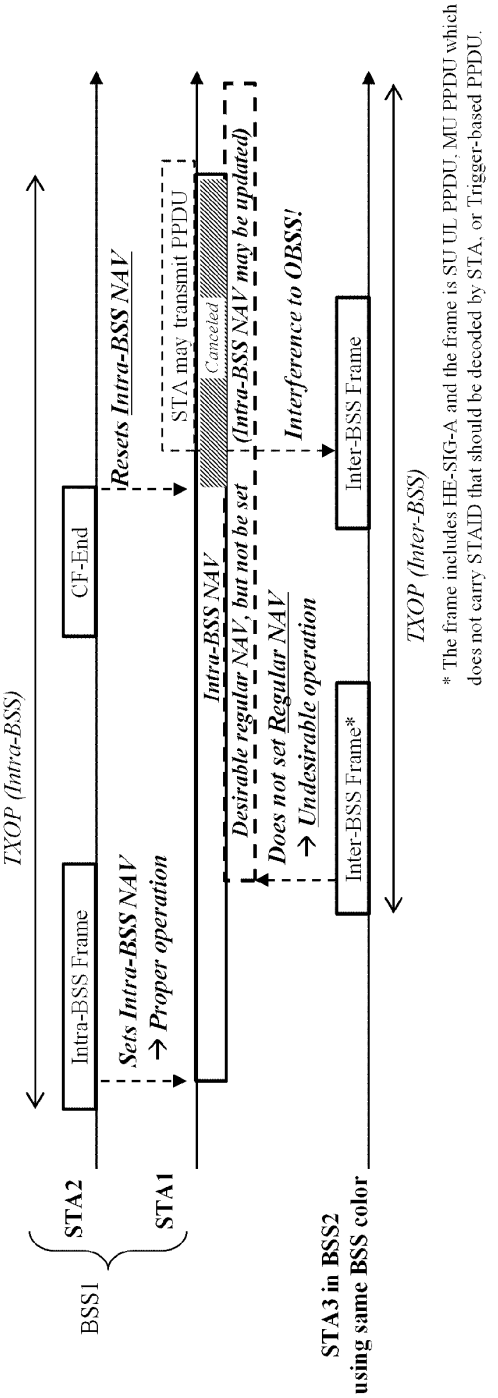

TXOP (Intra-BSS)
BSS1
STA2
STA1
Intra-BSS Frame
CF-End
Sets Intra-BSS NAV
→ Proper operation
Resets Intra-BSS NAV
STA may transmit PPDU
Canceled
Intra-BSS NAV
Desirable regular NAV, but not be set
Does not set Regular NAV
→ Undesirable operation
(Intra-BSS NAV may be updated)
Interference to OBSS!
STA3 in BSS2
using same BSS color
Inter-BSS Frame*
Inter-BSS Frame
TXOP (Inter-BSS)
* The frame includes HE-SIG-A and the frame is SU UL PPDU, MU PPDU which does not carry STAID that should be decoded by STA, or Trigger-based PPDU.

FIG. 10

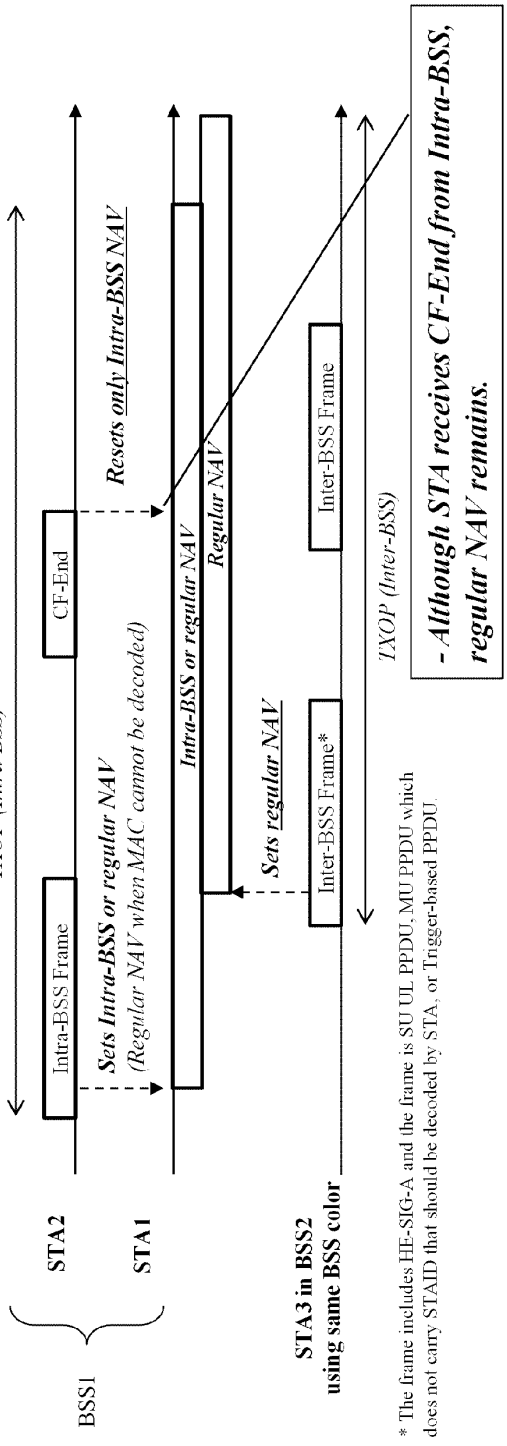
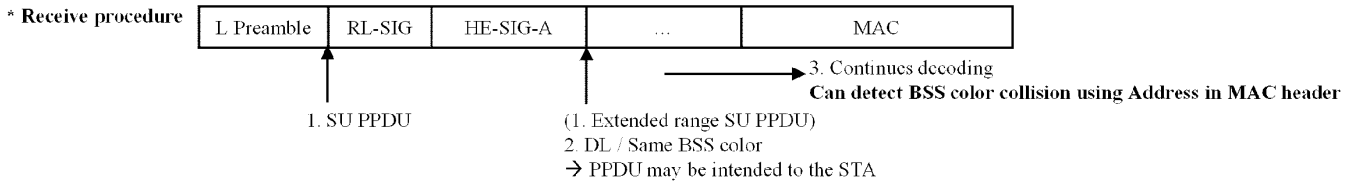

TXOP (Intra-BSS)
Intra-BSS Frame
CF-End
Sets Intra-BSS or regular NAV
(Regular NAV when MAC cannot be decoded)
Resets only Intra-BSS NAV
Intra-BSS or regular NAV
Regular NAV
Sets regular NAV
Inter-BSS Frame*
Inter-BSS Frame
TXOP (Inter-BSS)
- Although STA receives CF-End from Intra-BSS, regular NAV remains.
STA2
STA1
BSS1
STA3 in BSS2
using same BSS color
* The frame includes HE-SIG-A and the frame is SU UL PPDU, MU PPDU which does not carry STAID that should be decoded by STA, or Trigger-based PPDU

FIG. 11

HE SU (Extended Range) DL PPDU



HE MU PPDU

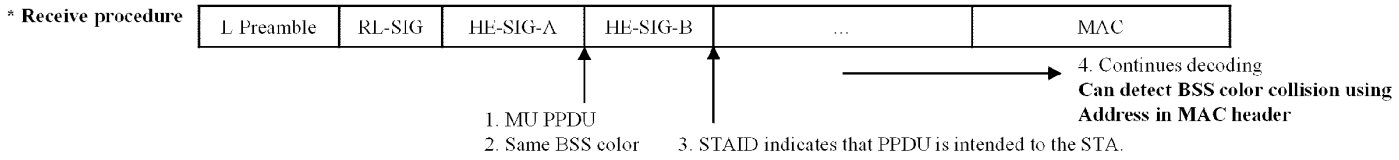


FIG. 12

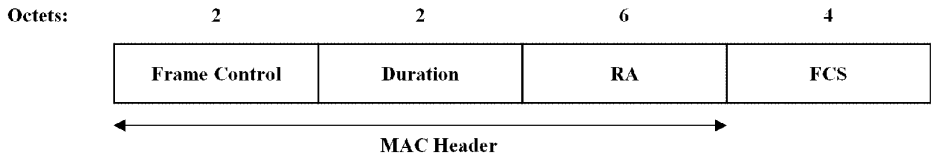

Octets:
2
2
6
4
Frame Control
Duration
RA
FCS
MAC Header

FIG. 13

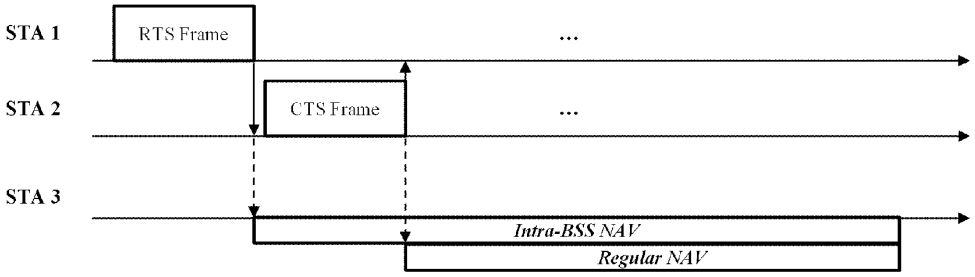
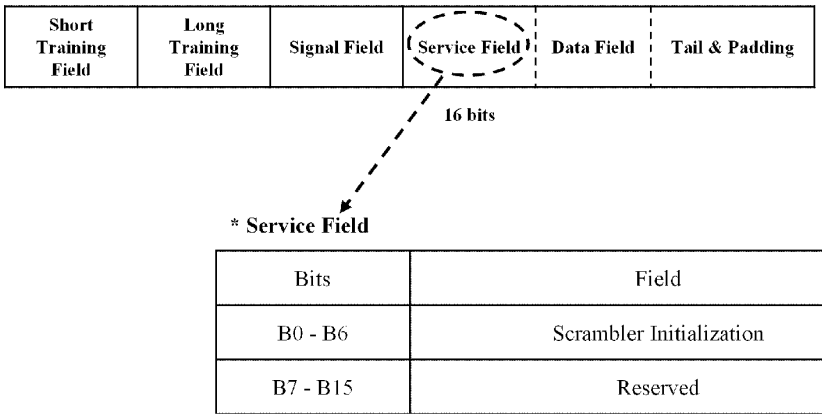

STA 1
RTS Frame
...
STA 2
CTS Frame
...
STA 3
Intra-BSS NAV
Regular NAV

FIG. 14



Bits	Field
B0 - B6	Scrambler Initialization
B7 - B15	Reserved

FIG. 15

Bits	Field
B0 - B6	Scrambler Initialization
B7 - B12	BSS Color
B13 - B15	Reserved

FIG. 16

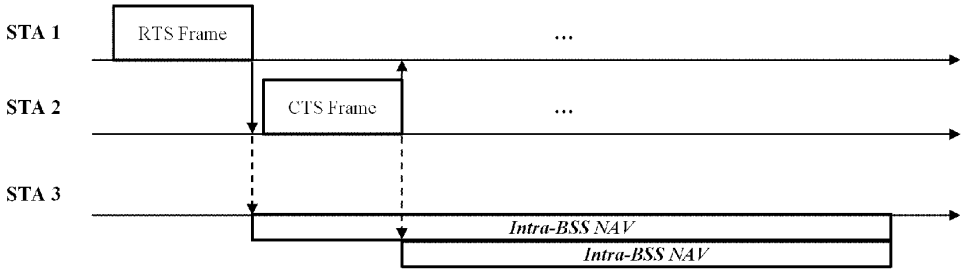


FIG. 17

Condition	Group ID	Partial AID
Addressed to AP	0	BSSID[39:47]
Addressed to Mesh STA	0	RA[39:47]
Sent by an AP and addressed to a STA associated with that AP or sent by a DLS or TDLS STA in a direct path to a DLS or TDLS peer STA	63	(dec(AID[0:8]) + dec(BSSID[44:47] XOR BSSID[40:43]) * 2^5) mod 2^9 where XOR is a bitwise exclusive OR operation mod X indicates the X-modulo operation dec(A|b:c|) is the cast to decimal operator where b is scaled by 2^0 and c by 2^(c-b)
Otherwise	63	0

FIG. 18

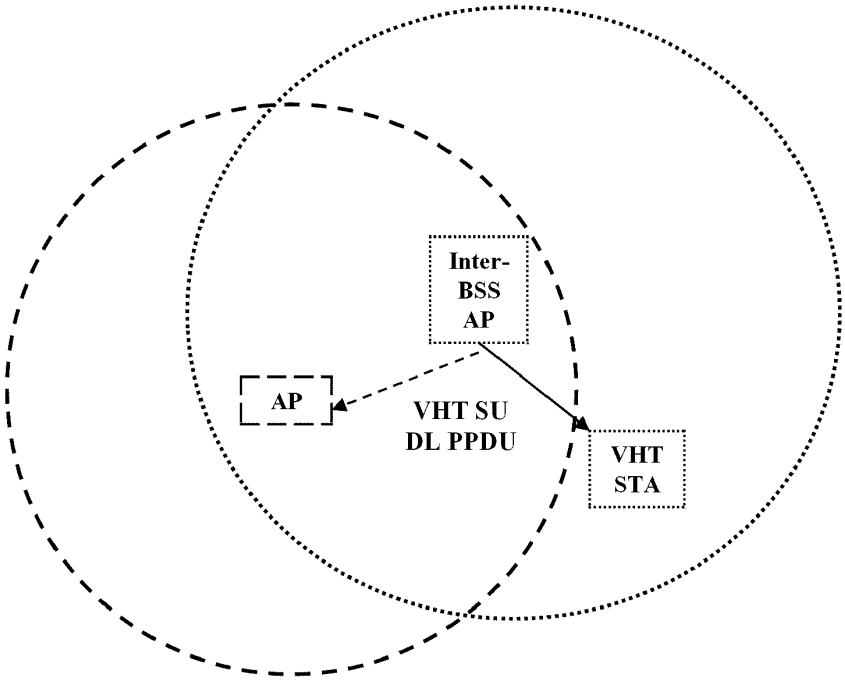


FIG. 19

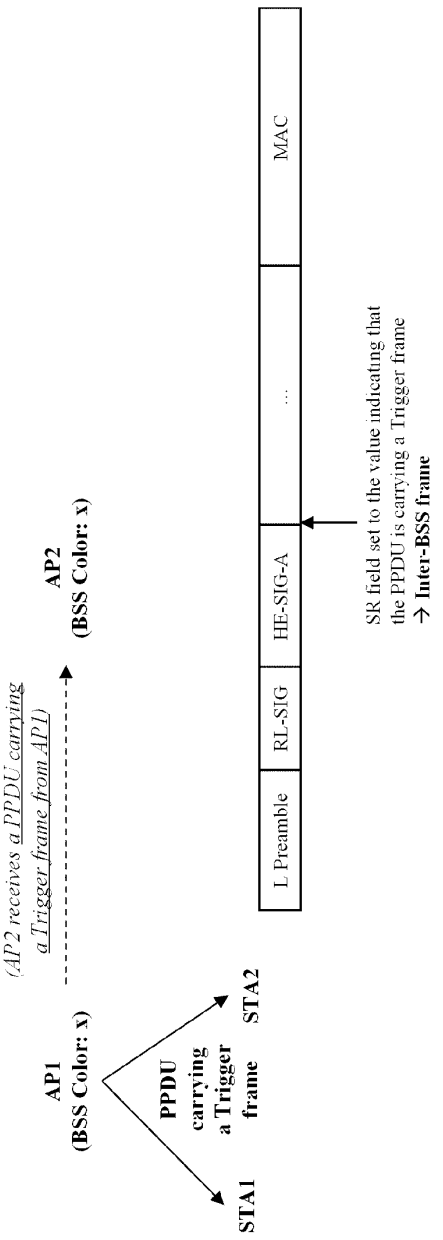

AP1
(BSS Color: x)
(AP2 receives a PPDU carrying a Trigger frame from AP1)
AP2
(BSS Color: x)
PPDU carrying a Trigger frame
STA1
STA2
L Preamble
RL-SIG
HE-SIG-A
...
MAC
SR field set to the value indicating that the PPDU is carrying a Trigger frame
→ Inter-BSS frame

FIG. 20

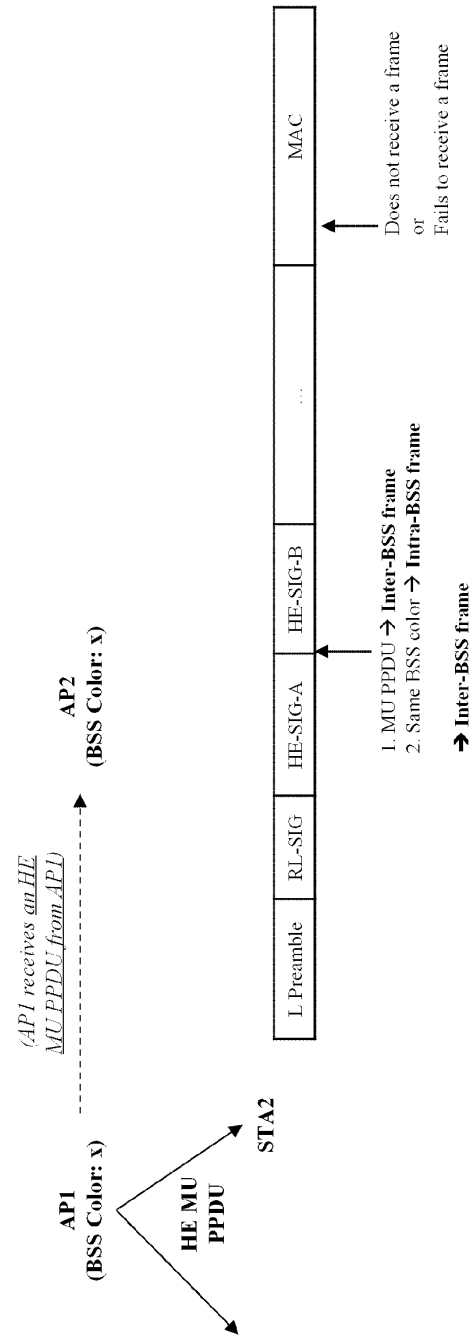

AP1
(BSS Color: x)
HE MU
PPDU
STA2
(AP1 receives an HE
MU PPDU from AP1)
AP2
(BSS Color: x)
L Preamble
RL-SIG
HE-SIG-A
HE-SIG-B
...
MAC
1. MU PPDU → Inter-BSS frame
2. Same BSS color → Intra-BSS frame
→ Inter-BSS frame
Does not receive a frame
or
Fails to receive a frame

FIG. 21

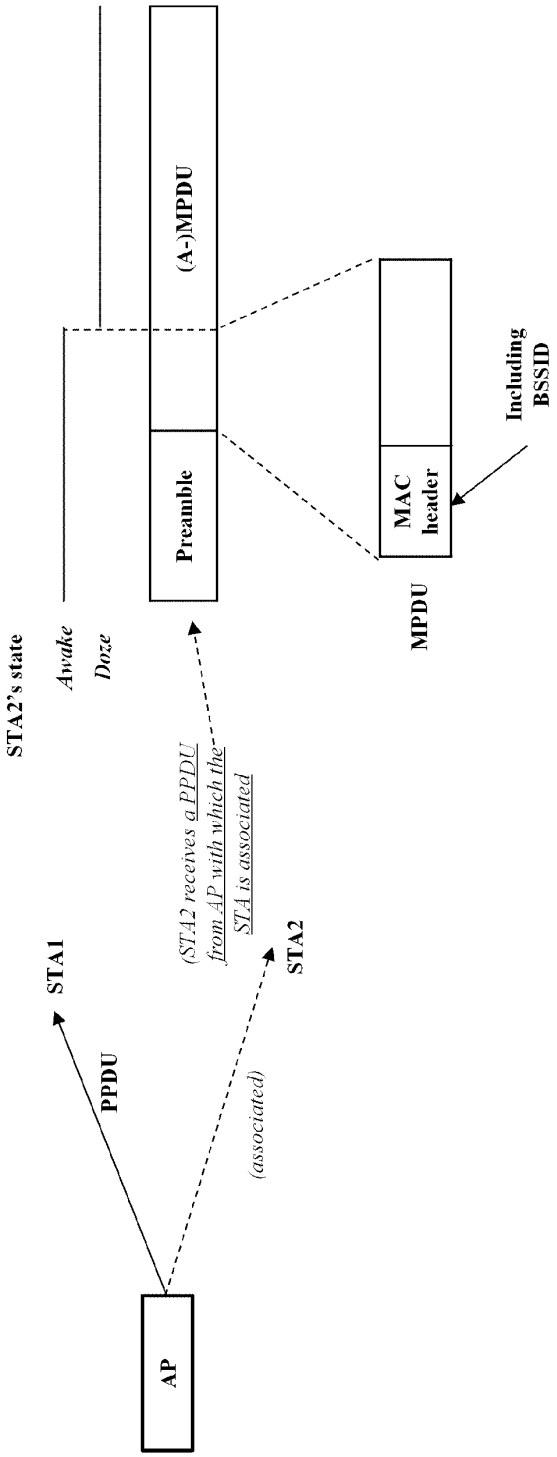

AP
STA1
PPDU
(associated)
STA2
(STA2 receives a PPDU from AP with which the STA is associated
STA2's state
Awake
Doze
Preamble
(A-)MPDU
MPDU
MAC header
Including BSSID

FIG. 22

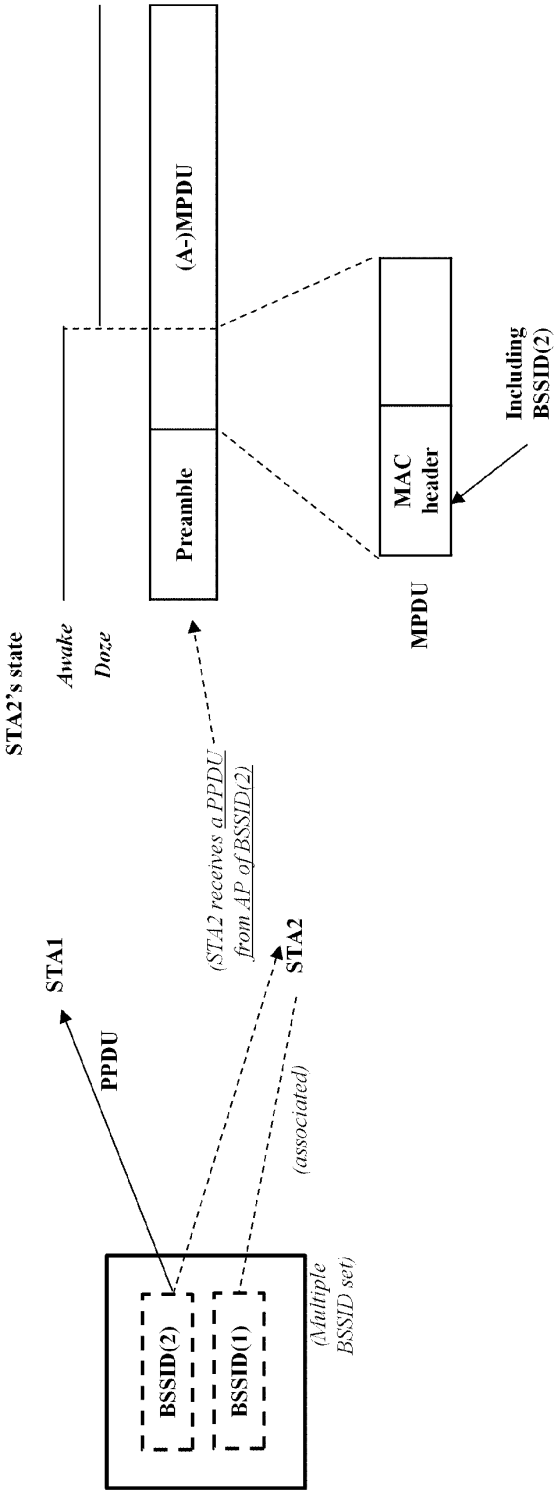

STA2's state
Awake
Doze
(A-)MPDU
Preamble
MAC header
Including BSSID(2)
MPDU
(STA2 receives a PPDU from AP of BSSID(2))
STA1
PPDU
STA2
(associated)
BSSID(2)
BSSID(1)
(A multiple BSSID set)

FIG. 23

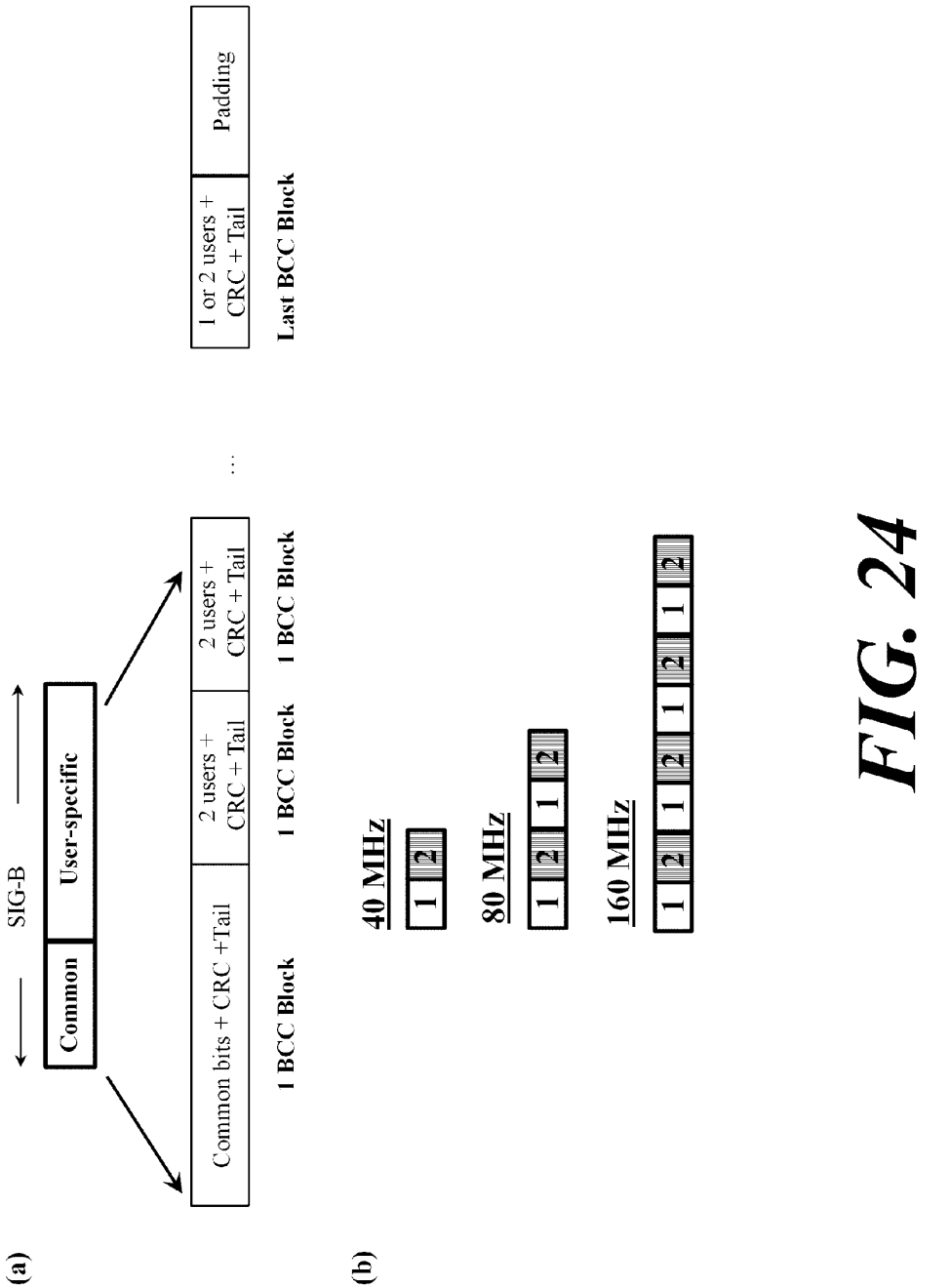

(a)
SIG-B
Common
User-specific
Common bits + CRC +Tail
2 users + CRC + Tail
2 users + CRC + Tail
1 or 2 users + CRC + Tail
Padding
1 BCC Block
1 BCC Block
1 BCC Block
Last BCC Block
(b)
40 MHz
1 2
80 MHz
1 2 1 2
160 MHz
1 2 1 2 1 2 1 2

FIG. 24

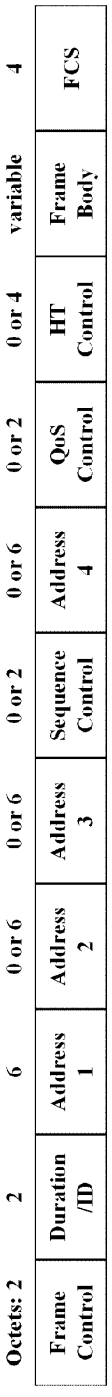

Octets: 2
2
6
0 or 6
0 or 6
0 or 2
0 or 6
0 or 2
0 or 4
variable
4
Frame Control
Duration /ID
Address 1
Address 2
Address 3
Sequence Control
Address 4
QoS Control
HT Control
Frame Body
FCS
MAC Header

FIG. 25

Variant	B0 (value)	B1 (value)	B2 - B29	B30	B31
HT variant	VHT (0)	HT Control Middle		AC Constraint	RDG/More PPDU
VHT variant	VHT (1)	HE (0)	VHT Control Middle	AC Constraint	RDG/More PPDU
HE variant	VHT (1)	HE (1)	Aggregated Control		

FIG. 26

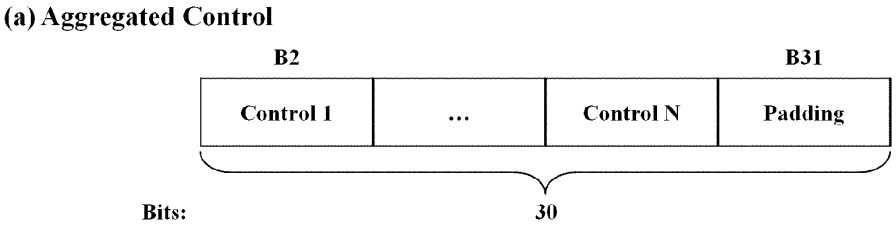

(a) Aggregated Control
B2
B31
Control 1
...
Control N
Padding
Bits:
30
(b) Control
B0
B3
Control ID
Control Information
Bits:
4
variable

FIG. 27

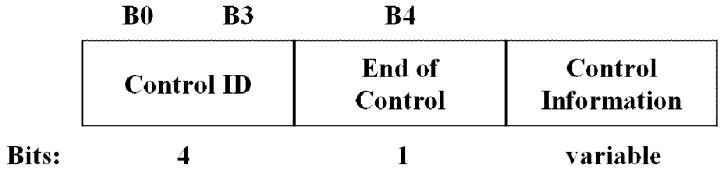

B0
B3
B4
Control ID
End of Control
Control Information
Bits:
4
1
variable

FIG. 28

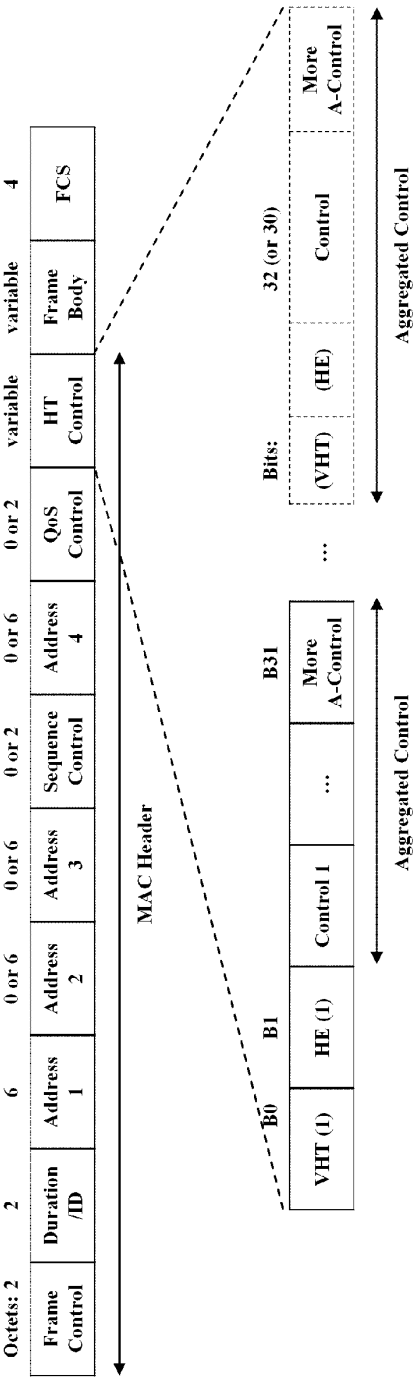

Octets: 2
2
6
0 or 6
0 or 6
0 or 2
0 or 6
0 or 2
variable
variable
4
Frame Control
Duration /ID
Address 1
Address 2
Address 3
Sequence Control
Address 4
QoS Control
HT Control
Frame Body
FCS
MAC Header
B0
B1
B31
VHT (1)
HE (1)
Control 1
...
More A-Control
Aggregated Control
...
Bits:
32 (or 30)
(VHT)
(HE)
Control
More A-Control
Aggregated Control

FIG. 29

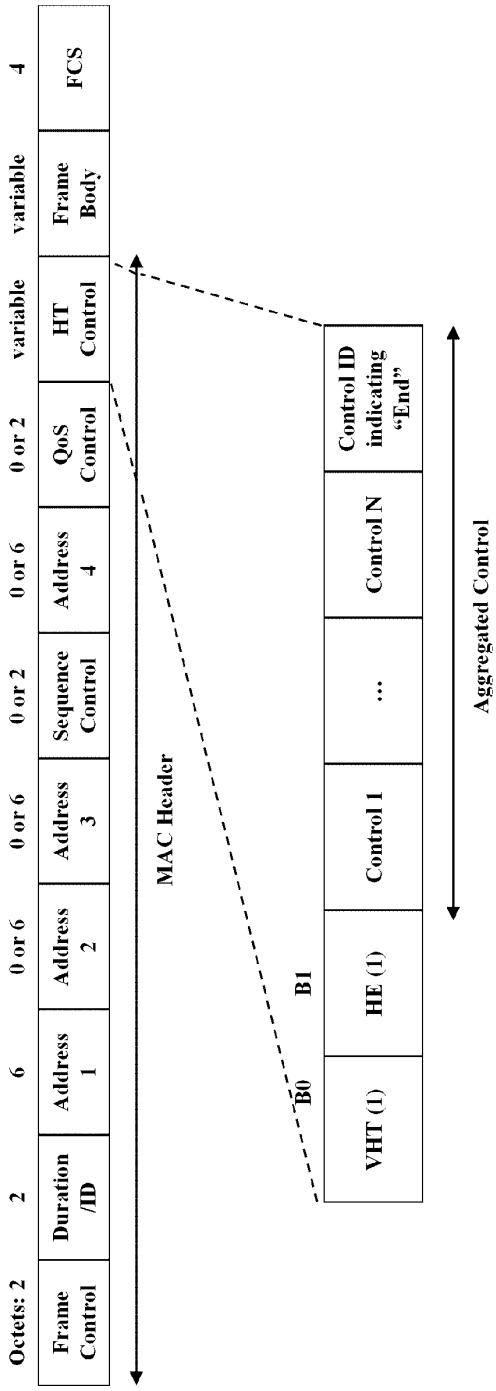

Octets: 2
2
6
6
0 or 6
0 or 6
0 or 2
0 or 6
0 or 2
variable
4
Frame Control
Duration /ID
Address 1
Address 2
Address 3
Sequence Control
Address 4
QoS Control
HT Control
Frame Body
FCS
MAC Header
B0
B1
VHT (1)
HE (1)
Control 1
...
Control N
Control ID indicating "End"
Aggregated Control

FIG. 30

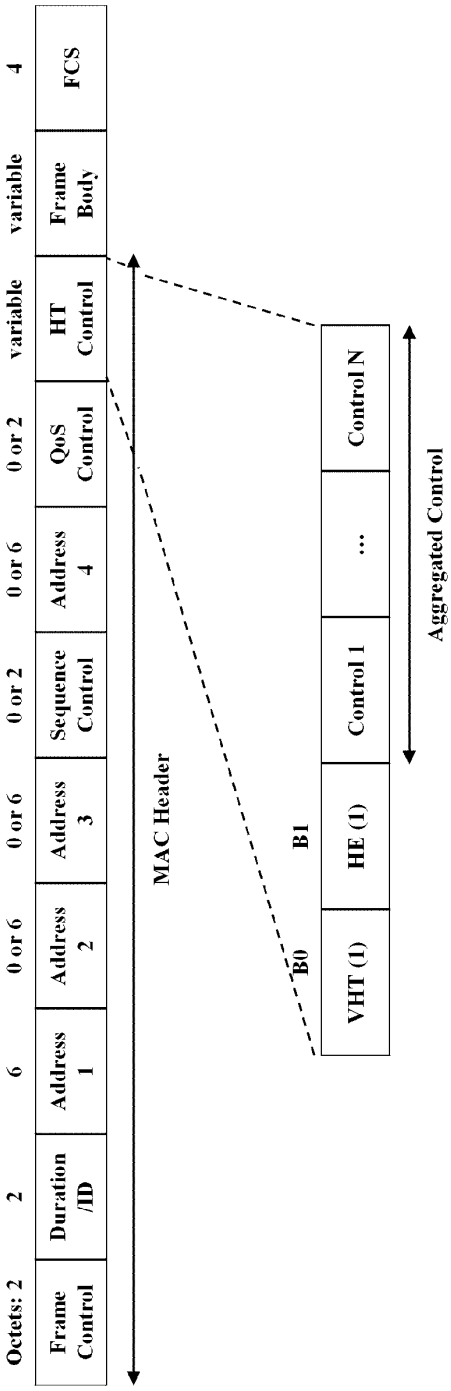

Octets: 2
2
6
0 or 6
0 or 6
0 or 2
0 or 6
0 or 2
variable
variable
4
Frame Control
Duration /ID
Address 1
Address 2
Address 3
Sequence Control
Address 4
QoS Control
HT Control
Frame Body
FCS
MAC Header
B0
B1
VHT (1)
HE (1)
Control 1
...
Control N
Aggregated Control

FIG. 31

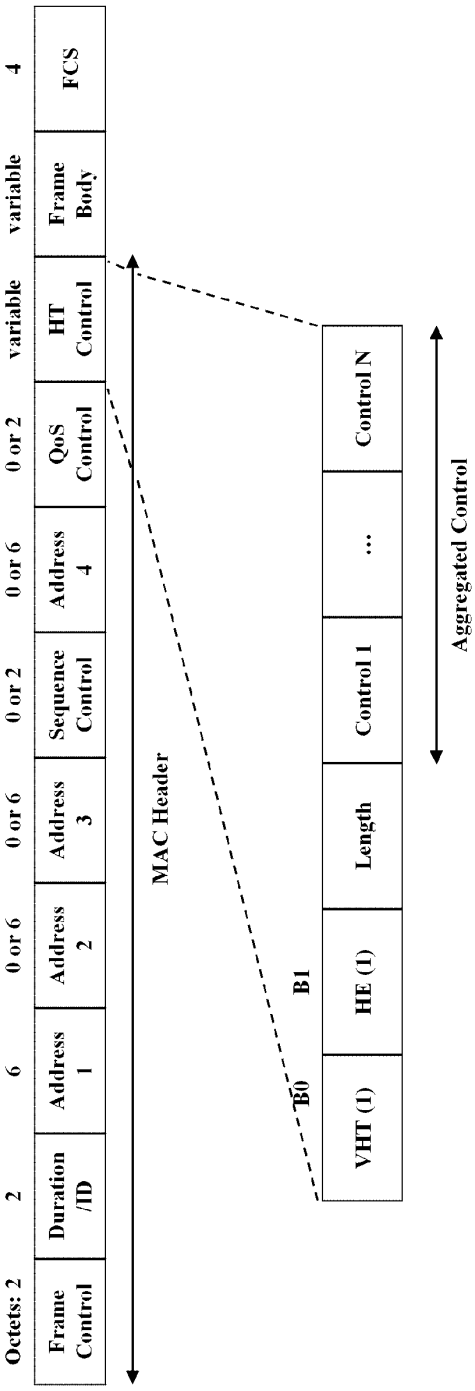

Octets: 2
2
6
6
0 or 6
0 or 6
0 or 2
0 or 6
0 or 2
variable
variable
4
Frame Control
Duration /ID
Address 1
Address 2
Address 3
Sequence Control
Address 4
QoS Control
HT Control
Frame Body
FCS
MAC Header
B0
B1
VHT (1)
HE (1)
Length
Control 1
...
Control N
Aggregated Control

FIG. 32

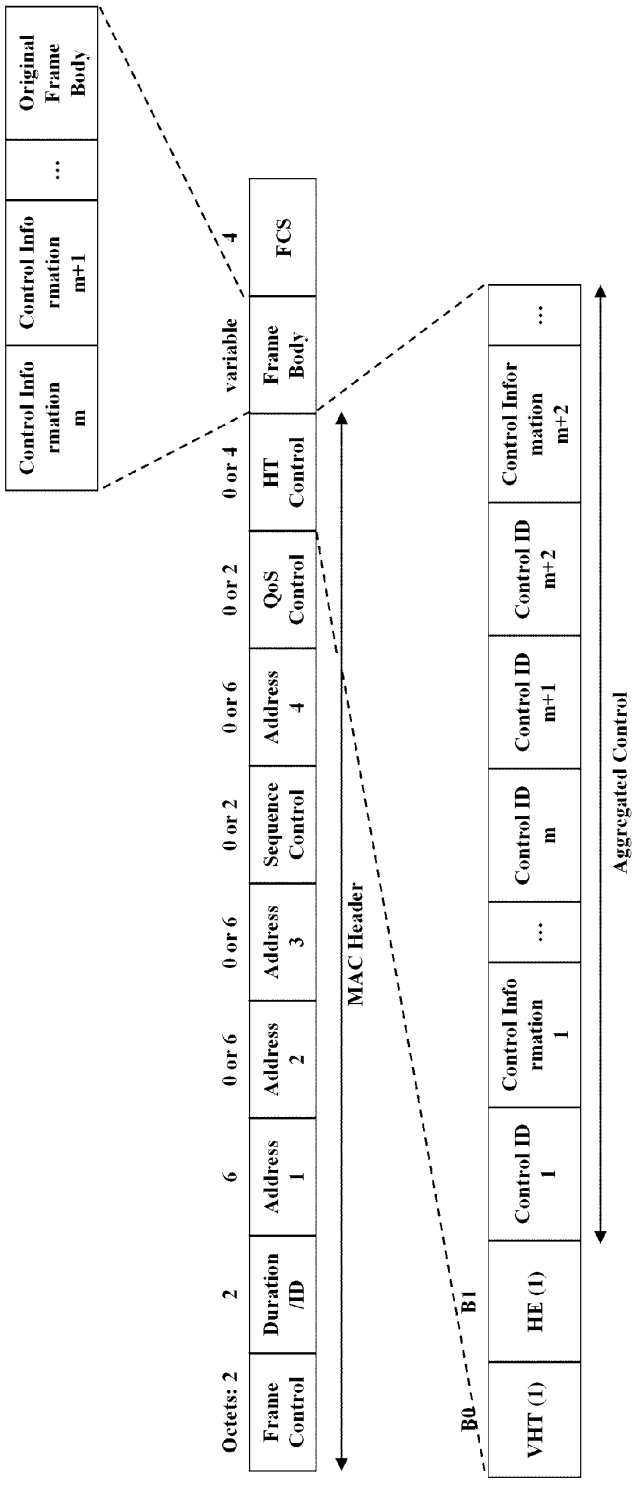

Octets: 2
2
6
6
0 or 6
0 or 6
0 or 2
0 or 6
0 or 2
0 or 4
variable
4
Frame Control
Duration /ID
Address 1
Address 2
Address 3
Sequence Control
Address 4
QoS Control
HT Control
Frame Body
FCS
MAC Header
B0
B1
VHT (1)
HE (1)
Control ID 1
Control Information 1
...
Control ID m
Control ID m+1
Control ID m+2
Control Information m+2
...
Aggregated Control
Control Information m
Control Information m+1
...
Original Frame Body

FIG. 33

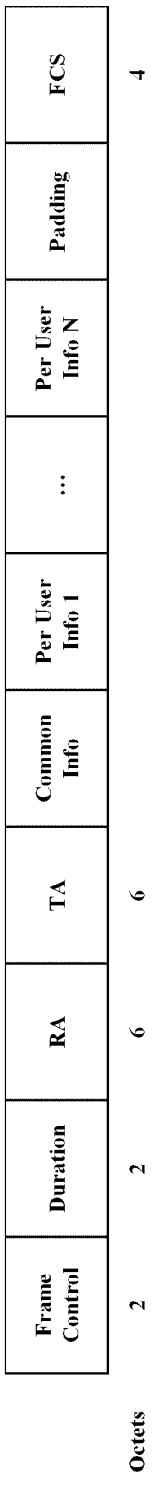

Frame Control
Duration
RA
TA
Common Info
Per User Info 1
...
Per User Info N
Padding
FCS
Octets
2
2
6
6
6
4

FIG. 34

(a) Common Info field

Length	Cascade Indication	CS Required	HE-SIG-A Info	CP and LTF Type	Trigger Type	Trigger Dependent Common Info
12	1	1				variable

Bits

(b) Per User Info field

User Identifier	RU Allocation	Coding Type	MCS	DCM	SS Allocation	Trigger Dependent Per User Info
12						variable

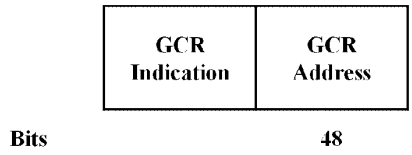
Bits

FIG. 35

(a) Common Info field
Length
Cascade Indication
CS Required
Spatial Reuse
BW
CP and LTF Type
MU MIMO LTF Mode
Number of LTFs
STBC
LDPC Extra Symbol
AP TX Power
Packet Extension
Trigger Type
Trigger Dependent Common Info
Bits
12
1
1
>=2
1
3
1
1
>=3
4
variable
(b) Per User Info field
User Identifier
RU Allocation
Coding Type
MCS
DCM
SS Allocation
Target RSSI
Trigger Dependent Per User Info
Bits
12
8
1
4
1
variable

FIG. 36

(a) Trigger Dependent Common Info field



(b) Trigger Dependent Per User Info field

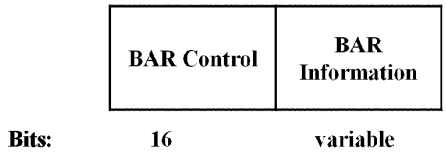


FIG. 37

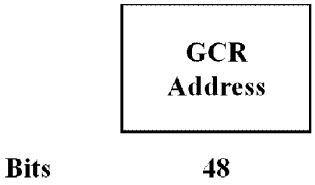


FIG. 38

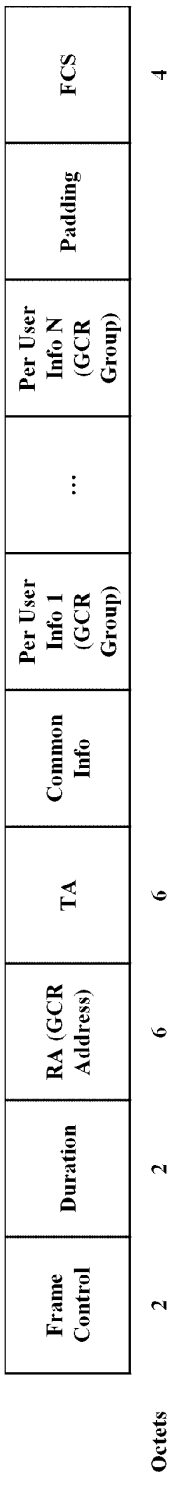

Frame Control
Duration
RA (GCR Address)
TA
Common Info
Per User Info 1 (GCR Group)
...
Per User Info N (GCR Group)
Padding
FCS
Octets
2
2
6
6
4

FIG. 39

121

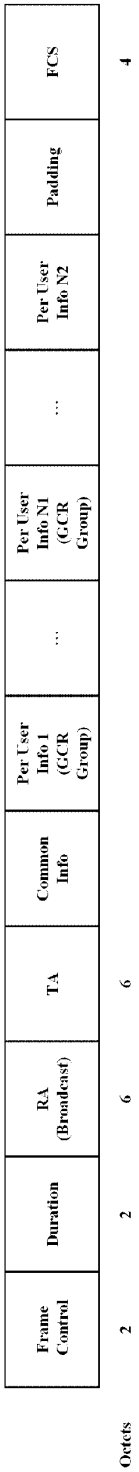

Frame Control
Duration
RA (Broadcast)
TA
Common Info
Per User Info 1 (GCR Group)
...
Per User Info N1 (GCR Group)
...
Per User Info N2
Padding
FCS
Octets
2
2
6
6
4

FIG. 40

122

(a) BAR Control field

B0	B1	B2	B3	B4	B11	B12	B15
BAR ACK Policy	Multi-TID	Compressed Bitmap	GCR	Reserved		TID_INFO	
Bits 1	1	1	1	8		4	

(b) BlockACKReq variant encoding

Multi-TID subfield value	Compressed Bitmap subfield value	GCR subfield value	BlockACKReq variant
0	0	0	Basic BlockACKReq
0	1	0	Compressed BlockACKReq
1	0	0	Extended Compressed BlockACKReq
1	1	0	Multi-TID BlockACKReq
0	0	1	Reserved
0	1	1	GCR BlockACKReq
1	0	1	*Reserved*
1	1	1	*Reserved*

FIG. 41

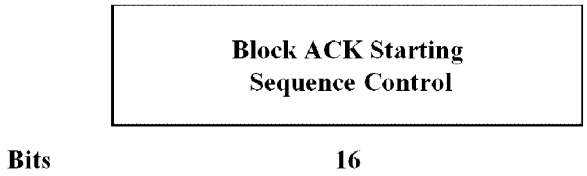

Block ACK Starting Sequence Control
Bits
16

FIG. 42

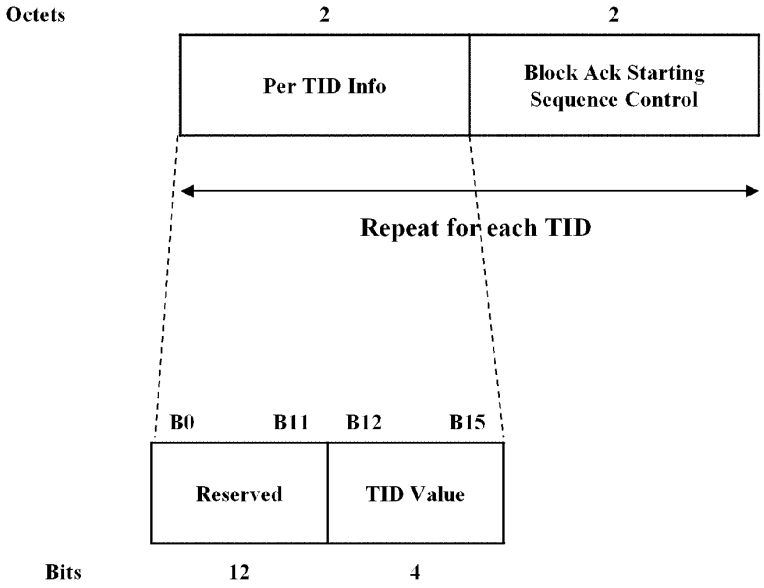

Octets
2
2
Per TID Info
Block Ack Starting Sequence Control
Repeat for each TID
B0
B11
B12
B15
Reserved
TID Value
Bits
12
4

FIG. 43

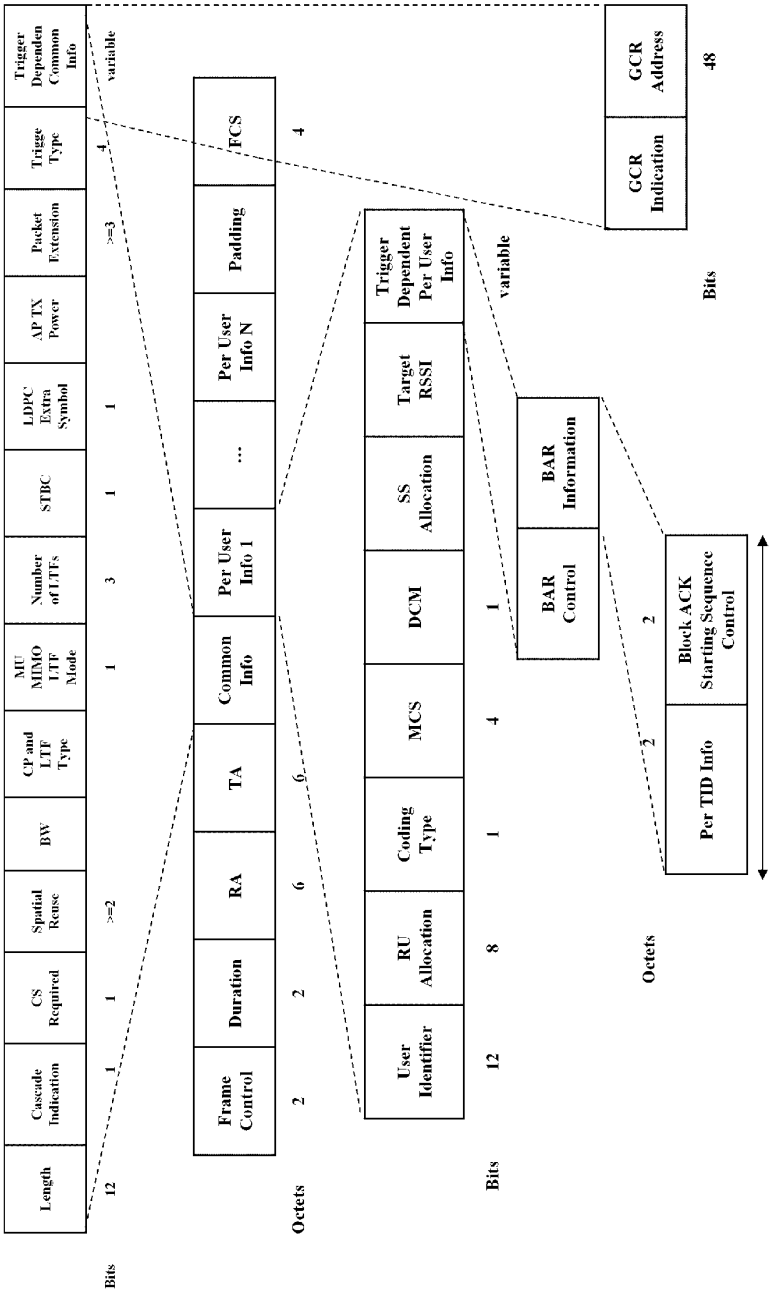

Length
Cascade Indication
CS Required
Spatial Reuse
BW
CP and LTF Type
MU MIMO LTF Mode
Number of LTFs
STBC
LDPC Extra Symbol
AP TX Power
Packet Extension
Trigge Type
Trigger Dependen Common Info
Bits
12
1
1
>=2
variable
Frame Control
Duration
RA
TA
Common Info
Per User Info 1
...
Per User Info N
Padding
FCS
Octets
2
2
6
6
4
User Identifier
RU Allocation
Coding Type
MCS
DCM
SS Allocation
Target RSSI
Trigger Dependent Per User Info
Bits
12
8
1
4
1
variable
BAR Control
BAR Information
Octets
2
2
Per TID Info
Block ACK Starting Sequence Control
GCR Indication
GCR Address
Bits
48

FIG. 44

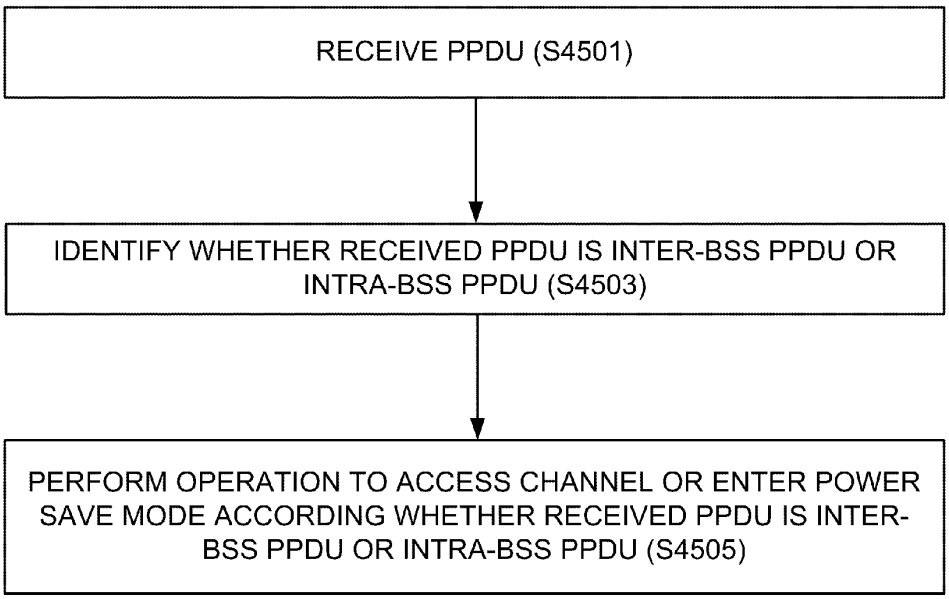

RECEIVE PPDU (S4501)
IDENTIFY WHETHER RECEIVED PPDU IS INTER-BSS PPDU OR INTRA-BSS PPDU (S4503)
PERFORM OPERATION TO ACCESS CHANNEL OR ENTER POWER SAVE MODE ACCORDING WHETHER RECEIVED PPDU IS INTER-BSS PPDU OR INTRA-BSS PPDU (S4505)

FIG. 45

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET
First Named Inventor/Applicant Name:	Geonjung KO
Filer:	Young Seok Koo
Attorney Docket Number:	B-9587CON 631613-2

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	300	300
UTILITY SEARCH FEE	1111	1	660	660
UTILITY EXAMINATION FEE	1311	1	760	760
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

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

Electronic Acknowledgement Receipt	
EFS ID:	33624525
Application Number:	16121546
International Application Number:	
Confirmation Number:	9775
Title of Invention:	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET
First Named Inventor/Applicant Name:	Geonjung KO
Customer Number:	36716
Filer:	Young Seok Koo
Filer Authorized By:	
Attorney Docket Number:	B-9587CON 631613-2
Receipt Date:	04-SEP-2018
Filing Date:	
Time Stamp:	21:15:34
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1720
RAM confirmation Number	090518INTEFSW21163200
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	Application Data Sheet	631613_ADS.pdf	1256676 b8874fdd9a0c0f70d75a2f6c63fff607a4cf73c6	no	10
Warnings:					
Information:					
2	Oath or Declaration filed	631613_Declaration_Signed.pdf	57153 d2a1c689d1676e09585a4e5c59ba345351fa6838	no	2
Warnings:					
Information:					
3	Power of Attorney	631613_POA_SKTelecom_Signed.pdf	180564 7a468a446bfedf0d8efe875412bcea021c75e8f5	no	2
Warnings:					
Information:					
4	Power of Attorney	631613_POA_Wilus_Signed.pdf	102338 c4321d1e55aa0c4ea8756b8a74732fb0c0a263ef	no	2
Warnings:					
Information:					
5	Assignee showing of ownership per 37 CFR 3.73	631613_Statement373c.pdf	439486 f69fce10ac5ec4cbb33284fe751a0c36458c6adb	no	9
Warnings:					
Information:					
6		631613_PreliminaryAmendment.pdf	94867 fb870d0929ac9de420dafa8d795d14a3e3924b3c	yes	4
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	

	Preliminary Amendment		1	1	
	Specification		2	2	
	Applicant Arguments/Remarks Made in an Amendment		3	4	
Warnings:					
Information:					
7		631613_IDS.pdf	170099 743478754ea520f800f9b19f6e8a6b0005d0112f	yes	4
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Transmittal Letter		1	3	
	Information Disclosure Statement (IDS) Form (SB08)		4	4	
Warnings:					
Information:					
8	Foreign Reference	Ref_WO2015-112780.pdf	1515227 558fd14323e6e135b2bb1712f91f3682c290d32d	no	38
Warnings:					
Information:					
9	Foreign Reference	Ref_WO2016-021792.pdf	4770178 aa6366011031b8e5ff2d8cd081a05853f9487b70	no	80
Warnings:					
Information:					
10	Foreign Reference	Ref_WO2015-120488.pdf	1061323 4e55ba47abd0c7a5bb7aac43418e0930e60eeae8	no	15
Warnings:					
Information:					
11	Foreign Reference	Ref_WO2017-150954.pdf	10865698 b1319d85af41e6d1fb0e65f36ed3cbfbf8806191	no	185
Warnings:					

Information:					
12	Other Reference-Patent/App/Search documents	Ref_PCTKR2017002407_ISR.pdf	402956 0b9c714eac00fc03f8e028aa5f34f073f57db9df	no	5
Warnings:					
Information:					
13	Other Reference-Patent/App/Search documents	Ref_PCTKR2017002407_WROP.pdf	1180870 2a654d477c3ae7b6690c9e5c6a164a1d866ed445	no	15
Warnings:					
Information:					
14	Non Patent Literature	Ref_WILUS_BSS-Color-Settings_NPL.pdf	561879 028cbcae84bb037324c39c87e8ddfa672db12a1f	no	13
Warnings:					
The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing					
Information:					
15		Application.pdf	1526819 279ce3decd3865da862b566d0ba30f292c2dc0ca	yes	126

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Specification	1	83
	Claims	84	88
	Abstract	89	89
	Drawings-other than black and white line drawings	90	126

Warnings:					
Information:					
16	Fee Worksheet (SB06)	fee-info.pdf	35149 c6c79e715eba5b0c0b2f4e8b2e121fc55aadadbe	no	2
Warnings:					
Information:					

Total Files Size (in bytes):	24221282

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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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	B-9587CON 631613-2
	Application Number	
Title of Invention	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

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

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Geonjung		KO	

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	301-606, 36 Dongtanwoncheon-ro 915beon-gil
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City	Gyeonggi-do
State/Province	
Postal Code	16547
Country [i]	KR

Inventor 2 Remove

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

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Mailing Address of Inventor:

Address 1	308-1402, 7 Naesonsunhwan-ro Uiwang-si
Address 2	
City	Gyeonggi-do
State/Province	
Postal Code	16024
Country [i]	KR

Inventor 3 Remove

Legal Name

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	B-9587CON 631613-2
	Application Number	
Title of Invention	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET	

Prefix	Given Name	Middle Name	Family Name	Suffix
	Woojin		AHN	

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:

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Address 2	Anyang-si

City	Gyeonggi-do	State/Province	
Postal Code	14038	**Country** [i]	KR

Inventor 4 Remove

Legal Name

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

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	36716		
Email Address	LA_MAIL@LA.LADAS.COM	Add Email	Remove Email

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	B-9587CON 631613-2
	Application Number	
Title of Invention	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET	

Application Information:

Title of the Invention	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET		
Attorney Docket Number	B-9587CON 631613-2	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	37	**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	36716		

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	B-9587CON 631613-2
	Application Number	
Title of Invention	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET	

Domestic Benefit/National Stage Information:

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

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	PCT/KR2017/002407	2017-03-06

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

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

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
10-2016-0026684	KR	2016-03-04	

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
10-2016-0029975	KR	2016-03-12	

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
10-2016-0044465	KR	2016-04-11	

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
10-2016-0057597	KR	2016-05-11	

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
10-2016-0114821	KR	2016-09-07	

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

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	B-9587CON 631613-2
	Application Number	
Title of Invention	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET	

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

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

PTO/AIA/14 (02-18)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	B-9587CON 631613-2
	Application Number	
Title of Invention	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET	

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.

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	B-9587CON 631613-2
	Application Number	
Title of Invention	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET	

Applicant Information:

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

Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

● Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC.		
Mailing Address Information For Applicant:			
Address 1	5F, 216 Hwangsaeul-ro Bundang-gu, Seongnam-si		
Address 2			
City	Gyeonggi-do	**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. Add

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	B-9587CON 631613-2
	Application Number	
Title of Invention	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET	

Applicant 2 Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

◉ Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	SK TELECOM CO., LTD.		
Mailing Address Information For Applicant:			
Address 1	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. Add

Assignee Information including Non-Applicant Assignee Information:

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

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☒

PTO/AIA/14 (02-18)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	B-9587CON 631613-2
	Application Number	
Title of Invention	WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET	

Organization Name			
Mailing Address Information For Assignee including Non-Applicant Assignee:			
Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

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

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

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

Signature	/Young Seok Koo 76255/			Date (YYYY-MM-DD)	2018-09-04
First Name	Young Seok	Last Name	Koo	Registration Number	76,255

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

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

Privacy Act Statement

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

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

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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 METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET

As the below named inventor, I hereby declare that:

This declaration is directed to:

☒ The attached application, or

☐ United States application or PCT international application number _____ filed on _____.

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

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

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

WARNING:

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

LEGAL NAME OF INVENTOR (1)

Inventor: Geonjung KO Date (Optional): Aug 28 2018

Signature: [signature]

LEGAL NAME OF INVENTOR (2)

Inventor: Juhyung SON Date (Optional): 28. Aug. 2018

Signature: [signature]

LEGAL NAME OF INVENTOR (3)

Inventor: Woojin AHN Date (Optional): 28. Aug. 2018

Signature:

LEGAL NAME OF INVENTOR (4)

Inventor: Jinsam KWAK Date (Optional): Aug. 28. 2018

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.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE *Patent*

Applicant: WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. & SK TELECOM CO., LTD.	)	***Re.: Preliminary Amendment***
USSN: Not yet assigned	)	Group: Not yet assigned
Filing Date: Concurrently herewith	)	Examiner: Not yet assigned
For: "WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET"	)	Our Ref.: B-9587CON 631613-2
	)	Date: September 4, 2018

PRELIMINARY AMENDMENT

Sir:

Prior to examination of the above-identified U.S. patent application, please enter the following amendments and remarks into the prosecution history of the above-identified U.S. patent application without prejudice or disclaimer.

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

Remarks begin on page 3 of this paper.

AMENDMENTS TO THE SPECIFICATION

Please insert the following paragraph and section entitled "CROSS-REFERENCE TO RELATED APPLICATIONS" on page 1, immediately after the title section entitled "WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET" and before the section entitled "Technical Field", to read as follows:

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of International Patent Application No. PCT/KR2017/002407 filed on March 6, 2017, which claims the priority to Korean Patent Application No. 10-2016-0026684 filed in the Korean Intellectual Property Office on March 4, 2016, Korean Patent Application No. 10-2016-0029975 filed in the Korean Intellectual Property Office on March 12, 2016, Korean Patent Application No. 10-2016-0044465 filed in the Korean Intellectual Property Office on April 11, 2016, Korean Patent Application No. 10-2016-0057597 filed in the Korean Intellectual Property Office on May 11, 2016, and Korean Patent Application No. 10-2016-0114821 filed in the Korean Intellectual Property Office on September 7, 2016, the entire contents of which are incorporated herein by reference.

* * *

REMARKS

In this Preliminary Amendment, the section of the "CROSS-REFERENCE TO RELATED APPLICATIONS" is inserted to include reference to the earlier applications. This amendment is to comply with 37 C.F.R. §1.77. A substitute specification should not be required as this amendment only adds a benefit or priority claim.

Amendment of the subject application is respectfully requested.

* * *

No Disclaimers or Disavowals

Although the present communication may include alterations to the application or claims, or may contain characterizations of claim scope or referenced art, the Applicant is not conceding that any previously pending claims are unpatentable in view of the cited reference(s). Rather, any alterations or characterizations are being made to facilitate expeditious prosecution of this application. The Applicant reserves the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution. Accordingly, reviewers of this or any parent child or related prosecution history shall not reasonably infer that the Applicant has made any disclaimers or disavowals of any subject matter supported by the present application.

Very truly yours,

/Young Seok Koo 76,255/

Young Seok Koo
Attorney for the Applicant
Registration No. 76,255
LADAS & PARRY LLP
5670 Wilshire Blvd. Suite 2100
Los Angeles, CA 90036
(323) 934-2300 voice
(323) 934-0202 facsimile

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: WILUS INSTITUTE OF STANDARDS AND TECHNOLOGY INC. and SK TELECOM CO., LTD.	Examiner: Not Yet Assigned
Serial No.: Not Yet Assigned	Art Unit: N/A
Filing or 371 (c) Date: Concurrently Herewith	Conf. No.: N/A
For: "WIRELESS COMMUNICATION METHOD AND WIRELESS COMMUNICATION TERMINAL IN BASIC SERVICE SET OVERLAPPING WITH ANOTHER BASIC SERVICE SET"	Our Ref: B-9587CON 631613-2
Date: September 4, 2018	Re: ***Information Disclosure Statement***

INFORMATION DISCLOSURE STATEMENT

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

Dear Sir/Madam:

This information disclosure statement is filed in accordance with 37 C.F.R. §§ 1.56, 1.97 and 1.98 to disclose information that may be relevant to the above-identified patent application. The Applicant requests the Examiner consider the documents listed on the enclosed form PTO-1449 (modified) in the examination of this application.

The filing of this Information Disclosure Statement (IDS) shall not be construed as a representation that a search has been made (37 C.F.R. 1.97(g)), an admission that the information cited is, or is considered to be, material to patentability, or that no other material information exists.

The filing of this Information Disclosure Statement shall not be construed as an admission against interest in any manner (37 C.F.R § 1.97(h)).

If any additional fee is required for this filing, the Applicant requests the Examiner contact a practitioner associated with the Customer Number listed below for authorization.

This information disclosure statement also includes the statements marked below. Failure to mark a statement should not be construed as a negative assertion.

Timing and Fees

This IDS is being filed:

[x] Concurrently with the application, and no fee is due.

[ ] Within three months of the filing of the national application, other than a continued prosecution application under § 1.53(d), and no fee is due.

[ ] Within three months of the date of entry of the national stage as set forth in § 1.491 in an international application, and no fee is due.

[ ] Before the mailing of a first Office Action on the merits, and no fee is due.

[ ] Before the mailing of a first Office Action after the filing of a request for continued examination under§ 1.114, and no fee is due.

[ ] After the periods described above, and before a final Office Action under § 1.113, a Notice of Allowance under § 1.311, or an action that otherwise closes prosecution in the application, and is

  [ ] accompanied by the fee set forth in § 1.17(p), or

  [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(1): That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement; or

  [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(2): That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

[ ] After the periods described above, and is accompanied by the fee set forth in § 1.17(p), and is

  [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(1), that each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement; or

  [ ] filed with the statement set forth in 37 C.F.R. 1.97(e)(2), that no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

[ ] Concurrently with a Request for Continued Examination, and no additional fee is due for this IDS.

Items Disclosed

At least one item listed on the enclosed form PTO-1449 (modified) was

[ ] Cited in an Office Action for a related application, the application number of the related application and the issue date of the Office Action are provided below and the Office Action is enclosed.

---

[x] Cited in an International Search Report (ISR) or an International Preliminary Report on Patentability (IPRP) or a Written Opinion (WO) of the International Searching Authority (ISA) for the related PCT Application, the PCT application number and the issue date of the ISR/IPRP/WO are provided below and the ISR/IPRP/WO is enclosed.

International Search Report for PCT/KR2017/002407 mailed on July 13, 2017

Written Opinion of the International Searching Authority for PCT/KR2017/002407 mailed on July 13, 2017

Additional Information

[x] Translations of the foreign-language documents are also enclosed as machine-translations, human-translations, or counterpart applications as noted. Machine translations were provided by the Japanese Patent Office, ESPACENET, Google Documents, Patent Fetcher® /ESPACENET, Google Translate or Google Translator Toolkit as noted and with OCR by Adobe Acrobat 9 or ABBYY PDF Transformer 3 if needed.

[x] English-language abstracts of foreign-language documents are provided.

[x] Documents listed on the enclosed ISR/IPRP/WO or the Office Action have relevance at least as described therein.

[ ] The documents with the following reference numbers were described in the specification of the present application; omission of a reference from this list does not indicate that it was not discussed in the specification of the present application.

[ ] At least one of the references cited in the Office Action listed on the attached PTO-1449 (modified) were previously submitted in an IDS or cited by the Examiner for the present application on _____ and therefore are not submitted in this IDS.

[ ] Other:

Respectfully submitted,

/ Young Seok Koo 76255 /

Young Seok Koo
Attorney for Applicant
Registration No. 76,255
LADAS & PARRY LLP
Customer 36716
5670 Wilshire Blvd., Suite 2100
Los Angeles, CA 90036
(323) 934-2300 voice

DocCode – SCORE

SCORE Placeholder Sheet for IFW Content

Application Number: 16121546 Document Date: 09/04/2018

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

- Drawing

At the time of document entry (noted above):

- USPTO employees may access SCORE content via eDAN using the Supplemental Content tab, or via the SCORE web page.
- External customers may access SCORE content via PAIR using the Supplemental Content tab.

Form Revision Date: August 26, 2013