

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
 Stylesheet Version v1.2

EPAS ID: PAT6365160

SUBMISSION TYPE:	NEW ASSIGNMENT	
NATURE OF CONVEYANCE:	ASSIGNMENT	
CONVEYING PARTY DATA		
Name		Execution Date
KT CORPORATION		09/21/2020
RECEIVING PARTY DATA		
Name:	GOLDEN EYE TECHNOLOGIES LLC	
Street Address:	1000 HERITAGE CENTER CIRCLE, SUITE 508	
Internal Address:	SUITE 508	
City:	ROUND ROCK	
State/Country:	TEXAS	
Postal Code:	78664	
PROPERTY NUMBERS Total: 28		
Property Type	Number	
Patent Number:	9462609	
Patent Number:	9980221	
Patent Number:	10341951	
Patent Number:	9717037	
Patent Number:	10051556	
Patent Number:	9913162	
Patent Number:	10299156	
Patent Number:	9756554	
Patent Number:	10743244	
Patent Number:	9591566	
Patent Number:	10321480	
Patent Number:	8862154	
Patent Number:	8947299	
Patent Number:	9661600	
Patent Number:	9918297	
Patent Number:	9380472	
Patent Number:	8812022	
Patent Number:	8942737	
Patent Number:	9077548	

Property Type	Number
Patent Number:	8730830
Patent Number:	9055451
Patent Number:	9271243
Patent Number:	9253718
Patent Number:	9344978
Patent Number:	9918236
Patent Number:	10555186
Patent Number:	9635606
Patent Number:	10219213

CORRESPONDENCE DATA

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

Email: info@harfangip.com

Correspondent Name: HARFANG IP INVESTMENT CORP

Address Line 1: 1000 HERITAGE CENTER CIRCLE

Address Line 2: SUITE 508

Address Line 4: ROUND ROCK, TEXAS 78664

NAME OF SUBMITTER:	CHRISTIAN DUBUC
SIGNATURE:	/christian dubuc/
DATE SIGNED:	10/23/2020
	This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 9

source=KT W-Fi Assignment#page1.tif
source=KT W-Fi Assignment#page2.tif
source=KT W-Fi Assignment#page3.tif
source=KT W-Fi Assignment#page4.tif
source=KT W-Fi Assignment#page5.tif
source=KT W-Fi Assignment#page6.tif
source=KT W-Fi Assignment#page7.tif
source=KT W-Fi Assignment#page8.tif
source=KT W-Fi Assignment#page9.tif

Exhibit 2.5

PATENT ASSIGNMENT AGREEMENT

This Patent Assignment Agreement (the "Agreement") is made and entered into this 21st day of September 2020 (the "Effective Date") by and between **KT Corporation**, a Korean company, of 90 Buljeong-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, 13606, Korea (the "**Assignor**") and Golden Eye Technologies LLC, a Texas company, of 1000 Heritage Center Circle, Suite 508, Round Rock TX 78664, USA ("**Assignee**").

RECITALS

Assignor and Assignee have agreed by way of a purchase agreement (the "Purchase Agreement") dated September 21, 2020, by and between Assignor and Assignee, the terms of which are incorporated herein by reference, that Assignor shall sell, transfer, and assign and set over unto Assignee and Assignee shall accept, all rights, title and interest in and to the Patents listed in Appendix A attached hereto. In the event of any conflict between the terms of this Patent Assignment Agreement and the referenced Purchase Agreement, the terms of the Purchase Agreement shall prevail.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing premises, and the covenants and agreements in this Assignment, Assignor and Assignee agree as follows:

1. Assignor does hereby sell, transfer, convey, assign and deliver to Assignee all of Assignor's right, privilege, title and interest in, to and under the Patents and in the case of patent applications in and to any patents that may issue therefrom, including, in all instances, any counterparts of any of the foregoing in any jurisdiction throughout the world, and any and all divisions, continuations, reissues or reexaminations of any of the foregoing, and, further, all applications for industrial property protection, including without limitation, all applications for patents, utility models, copyright, and designs which may hereafter be filed for any inventions described in said Patents in any country or countries, together with the right to file such applications and the right to claim for the same the priority rights derived from the inventions and the Patents under the laws of the United States, the International Convention for the Protection of Industrial Property, or any other international agreement or the domestic laws of the country in which any such application is filed, as may be applicable, in each instance the same to be held by Assignee for Assignee's own use and enjoyment, and for the use and enjoyment of Assignee's successors, assigns and other legal representatives, as fully and entirely as the same would have been held and enjoyed by Assignor if this Assignment and sale had not been made; together with all claims for damages, information, rendering of accounts, destruction of infringing goods, payments, royalties, income or other remuneration (hereinafter "Damages") now or hereafter due or payable with respect thereto, and all causes of action (whether in law or equity) by reason of past, present and future infringements of the Patents or other rights being assigned hereunder, along with the right to sue for, counterclaim, recover and collect such Damages for the use and benefit of Assignee and its successors, assigns and other legal representatives. Assignee hereby accepts this assignment.

2. Insofar as this assignment concerns European patents and patent applications, Assignor hereby agrees that the assignment will be recorded in the register with the European Patent Office and/or national patent offices; and Assignee hereby declares that Assignee has agreed to the assignment of the aforementioned Patents to it and that Assignee will simultaneously apply for recording of the assignment in the register with the European Patent Office and/or national patent offices.

3. Assignor hereby authorizes and requests the Commissioner for Patents of the United States, and any officer of any country or countries foreign to the United States, whose duty it is to issue patents or other evidence or forms of intellectual property protection or applications as aforesaid, to issue the same to Assignee and its successors, assigns and other legal representatives in accordance with the terms of this instrument.

4. Assignor agrees that, whenever reasonably requested by Assignee, Assignor will execute all papers, take all rightful oaths, and do all acts which may be reasonably necessary for securing and maintaining the Patents in any country and for vesting title thereto in Assignee, its successors, assigns and legal representatives or nominees.

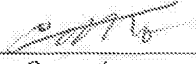
5. Assignor authorizes and empowers Assignee, its successors, assigns and legal representatives or nominees, to invoke and claim for any application for patent or other form of protection for the inventions, the benefit of the right of priority provided by the International Convention for the Protection of Industrial Property, as amended, or by any convention which may henceforth be substituted for it, or any other international agreement or the domestic laws of the country in which any such application is filed, as may be applicable, and to invoke and claim such right of priority without further written or oral authorization from Assignor.

6. Assignor hereby consents that a copy of this Agreement shall be deemed a full legal and formal equivalent of any assignment, consent to file or like document that may be required in any country for any purpose and more particularly in proof of the right of Assignee or nominee to claim the aforesaid benefit of the right of priority provided by the International Convention for the Protection of Industrial Property, as amended, or by any convention which may henceforth be substituted for it.

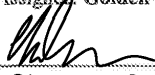
Signature Page Follows

IN WITNESS WHEREOF, the Parties have executed this Assignment on the Effective Date.

Assignor: KT Corporation

By: 
Name: Sang-Kyu Woo
Title: Team leader

Assignee: Golden Eye Technologies LLC

By: 
Name: Christian Dubac
Title: President

APPENDIX A

THE PATENTS

REF-NO	Country	Appl. No.	Filing Date	Patent No.	Title
P20120394US	U.S.A.	13/912,924	6/7/2013	US 9,462,609	Method For Connecting Wireless Channel And Apparatus For Performing The Method
P20130197	KR	1020130063604	6/3/2013		Method For Connecting Wireless Channel And Apparatus For Performing The Method
P20120394	KR	1020120061045	6/7/2012		Method For Connecting Wireless Channel And Apparatus For Performing The Method
P20120767	KR	1020120103397	9/18/2012		Method For Connecting Wireless Channel And Apparatus For Performing The Method
P20120416EP	E.P.O	13803889.8	6/11/2013	EP2862292B1	Method For Communicating Encoded Traffic Indication Map Information
P20120416EP DE	E.P.O	13803889.8	6/11/2013	EP2862292(D E) / 60 2013 035 827.3	Method For Communicating Encoded Traffic Indication Map Information
P20120416EP FR	E.P.O	13803889.8	6/11/2013	EP2862292(FR)	Method For Communicating Encoded Traffic Indication Map Information
P20120416EP GB	E.P.O	13803889.8	6/11/2013	EP2862292(G B)	Method For Communicating Encoded Traffic Indication Map Information

REF-NO	Country	Appl. No.	Filing Date	Patent No.	Title
P20120416EP IT	E.P.O	13803889.8	6/11/2013	EP2862292(IT)	Method For Communicating Encoded Traffic Indication Map Information
P20120416EP D1DE	E.P.O	18159297.3	6/11/2013	EP3355487(D E) / 60 2013 061 139.4	Method For Communicating Encoded Traffic Indication Map Information
P20120416EP D1FR	E.P.O	18159297.3	6/11/2013	EP3355487(FR)	Method For Communicating Encoded Traffic Indication Map Information
P20120416EP D1GB	E.P.O	18159297.3	6/11/2013	EP3355487(G B)	Method For Communicating Encoded Traffic Indication Map Information
P20120416EP D1IT	E.P.O	18159297.3	6/11/2013	EP3355487(IT)	Method For Communicating Encoded Traffic Indication Map Information
P20120416JP	JAPAN	2015-517175	6/11/2013	5925963	Method For Communicating Encoded Traffic Indication Map Information
P20120416JP D1	JAPAN	2016-081790	4/15/2016	6400624B2	Method For Communicating Encoded Traffic Indication Map Information
P20120416US	U.S.A.	14/406,576	12/9/2014	9980221	Method For Communicating Encoded Traffic Indication Map Information
P20120416US C1	U.S.A.	15/959,639	4/23/2018	10341951B2	Method For Communicating Encoded Traffic Indication Map Information
P20120969P1	KR	1020140121105	9/12/2014	101932112B1	Method For Communicating Of Information Of Traffic Indication Map Encoded
P20120969	KR	1020130025959	3/12/2013	101561114B1	Method For Communicating Of Information Of Traffic Indication Map Encoded
P20120416	KR	1020120063372	6/13/2012		Method For Communicating Of Information Of Traffic Indication Map Encoded
P20120416PC	WO	WOKR13005104	6/11/2013		Method For Communicating Encoded Traffic Indication Map Information
P20120454US	U.S.A.	14/411,278	12/24/2014	9,717,037	Method For Scanning For Access Point In Wireless Lan System
P20120454US C1	U.S.A.	15/618,443	6/8/2017	10,051,556	Method For Scanning For Access Point In Wireless Lan System
P20130200	KR	1020130063860	6/4/2013	102055865B1	Method for Scanning Access Point in Wireless Local Area Network
P20120454	KR	1020120070043	6/28/2012		Method For Scanning Access Point in Wireless Local Area Network System

REF-NO	Country	Appl. No.	Filing Date	Patent No.	Title
P20120454PC	WO	WOKR13005733	6/27/2013		Method For Scanning For Access Point in Wireless LAN System
P20120482CN	CHINA	201380034845.6	6/28/2013	1044126318	Aid Reassignment Method, And Apparatus For Performing Said Aid Reassignment Method
P20120482CN D1	CHINA	201810790395	6/28/2013		Aid Reassignment Method, And Apparatus For Performing Said Aid Reassignment Method
P20120482JP	JAPAN	2015-520045	6/28/2013	5982571	Aid Reassignment Method, And Apparatus For Performing Said Aid Reassignment Method
P20120482JP D1	JAPAN	2016-149338	7/29/2016	6215411	Aid Reassignment Method, And Apparatus For Performing Said Aid Reassignment Method
P20120482JP D2	JAPAN	2017-179842	9/20/2017	6386644	Aid Reassignment Method, And Apparatus For Performing Said Aid Reassignment Method
P20120482US	U.S.A.	14/411,302	12/24/2014	9913162	Aid Reassignment Method, And Apparatus For Performing Said Aid Reassignment Method
P20120482US C1	U.S.A.	15/875,075	1/19/2018	10,299,156	Aid Reassignment Method, And Apparatus For Performing Said Aid Reassignment Method
P20130322	KR	1020130075006	6/28/2013	10155385881	Method For Reassignment Of Association Identification And Apparatus For Performing The Method
P20130322P1	KR	1020140121116	9/12/2014	10199148281	Method For Reassignment Of Association Identification And Apparatus For Performing The Method
P20120482	KR	1020120069980	6/28/2012		Method For Reassignment Of Association Identification And Apparatus For Performing The Method
P20120482PC	WO	WOKR13005756	6/28/2013		AID Reassignment Method, And Apparatus For Performing Said AID Reassignment Method
P20120545CN	CHINA	201380038530.9	7/18/2013	1045415518	Active Scanning Method In Wireless Lan System
P20120545CN D1	CHINA	201810195660.8	7/18/2013		Active Scanning Method In Wireless Lan System
P20120545JP	JAPAN	2015-523011	7/18/2013	5982572	Active Scanning Method In Wireless Lan System

REF-NO	Country	Appl. No.	Filing Date	Patent No.	Title
P20120545JP D1	JAPAN	2016-149339	7/29/2016	6392277	Active Scanning Method in Wireless Lan System
P20120545US	U.S.A.	14/415,476	1/16/2015	9,756,554	Active Scanning Method in Wireless Lan System
P20120545US C1	U.S.A.	15/667,146	8/2/2017		Active Scanning Method in Wireless Lan System
P20130202	KR	1020130084911	7/18/2013	101561116B1	Method For Active Scanning in Wireless Local Area Network System
P20130202P1	KR	1020140121143	9/12/2014		Method For Active Scanning in Wireless Local Area Network System
P20120545	KR	1020120078036	7/18/2012		Method For Active Scanning in Wireless Local Area Network System
P20120545PC	WO	WOKR13006412	7/18/2013		Active Scanning Method in Wireless Lan System
P20120594US	U.S.A.	14/422,309	7/25/2013	9,591,566	Channel Access Method in Wireless Lan System
P20120594US D1	U.S.A.	15/407,843	1/17/2017	10321480	Channel Access Method in Wireless Lan System
P20121016	KR	1020130063670	6/3/2013	101553857B1	Method For Channel Access in Wireless Local Area Network System
P20121016P1	KR	1020140121151	9/12/2014	101962429B1	Method For Channel Access in Wireless Local Area Network System
P20120594	KR	1020120089531	8/16/2012		Method For Channel Access in Wireless Local Area Network System
P20120594PC	WO	WOKR13006671	7/25/2013		Channel Access Method in Wireless Lan System
P20100053US	U.S.A.	13/230,408	9/12/2011	8862154	Location Measuring Method And Apparatus Using Access Point For Wireless Local Area Network Service
P20100053	KR	1020100031505	4/6/2010	101260319	Method And Apparatus For Measuring Location Using Access Point
P20100051	KR	1020100031506	4/6/2010	101188194	Method And Apparatus For Measuring Location Using Access Point
P20100053PC	WO	WOKR11007545	10/11/2011		Method And Apparatus For Measuring Location Using Access Point
P20100877US	U.S.A.	13/308,130	11/30/2011	8,947,299	Location Measuring Method And Apparatus Using Access Point For Wireless Local Area Network Service

REF-NO	Country	Appl. No.	Filing Date	Patent No.	Title
P20100877	KR	1020100121494	12/01/2010	101280290B1	Method And Apparatus For Measuring Location Using Access Point
P20100877PC	WO	WOKR11009260	12/1/2011		Position Measuring Method And Position Measuring Apparatus Using Access Points For A Wireless Lan Service
P20101217US	U.S.A.	13/310,142	12/2/2011	9,661,600	Location Measuring Method And Apparatus Using Access Point For Wireless Local Area Network Service And Method For Estimating Location Coordinate Of Access Point
P20101217US C1	U.S.A.	15/488,741	4/17/2017	9,918,297	Location Measuring Method And Apparatus Using Access Point For Wireless Local Area Network Service And Method For Estimating Location Coordinate Of Access Point
P20101217	KR	1020100131606	12/21/2010	101301979B1	Method And Apparatus For Measuring Location Using Access Point, And Method For Estimating Location Coordinate Of Access Point
P20101217P1	KR	1020130009194	01/28/2013	101270012B1	Method And Apparatus For Measuring Location Using Access Point, And Method For Estimating Location Coordinate Of Access Point
P20101217PC	WO	WOKR11009387	12/6/2011		Method And Device For Measuring Position Using Access Points For Wireless Lan Service And Method For Estimating Position Coordinates Of Access Points
P20101218US	U.S.A.	13/310,072	12/2/2011	9,380,472	Method And Apparatus For Updating Access Point Information For Location Measurement
P20101218	KR	1020100131608	12/21/2010	101293659B1	Method And Apparatus For Updating Information Of Access Point
P20101218PC	WO	WOKR11009388	12/6/2011		Method For Controlling Uplink Transmission In Mobile Communication Network And Apparatus Therefor
P20101219US	U.S.A.	13/311,197	12/5/2011	8,812,022	Method And Apparatus For Indoor Location Measurement
P20101219	KR	1020100140370	12/31/2010	101292690B1	Method And Apparatus For Sectorising Indoor Area for Indoor Position Measurement
P20101222	KR	1020100140374	12/31/2010	101318369B1	Method And Apparatus For Sectorising Indoor Area for Indoor Position Measurement

REF-NO	Country	Appl. No.	Filing Date	Patent No.	Title
P20101219PC	WO	WOKR11009412	12/7/2011		Device And Method For Measuring Indoor Location
P20101221US	U.S.A.	13/311,163	12/5/2011	8,942,737	Location Measuring Method And Apparatus Using Access Point And Lamp
P20101221	KR	1020100140371	12/31/2010	101277277B1	Method And Apparatus For Measuring Location Using Access Point And Lamp
P20101221PC	WO	WOKR11009474	12/8/2011		Method And Device Using Access Point And Lighting For Measuring Location
P20110005US	U.S.A.	13/441,665	4/6/2012	9,077,548	Method And Apparatus For Providing Differential Location-Based Service Using Access Point
P20110005	KR	1020110032702	4/8/2011	101436542B1	Method And Apparatus For Providing Differential Location Based Service Using Access Point
P20110005PC	WO	WOKR12002640	4/6/2012		Method For Opening Wireless Internet Service Online And System Thereof
P20110007US	U.S.A.	13/337,834	12/27/2011	8,730,830	Indoor Location Measuring Method And Apparatus Using Access Point
P20110007	KR	1020110008597	1/31/2011	101422751B1	Method For Measuring Position Using Access Point And Apparatus Therefor
P20110007PC	WO	WOKR12000478	1/19/2012		Method And Device For Measuring An Indoor Location By Using An Access Point
P2009450US	U.S.A.	13/512,532	11/26/2010	9,055,451	Indoor Position Determination Method And System Based On Wlan Signal Strength
P2009450	KR	1020090115013	11/27/2009	100934840B1	Position Determination Method And System Based On Wlan Rssi Value
P2009450PC	WO	WOKR10008460	11/26/2010		Indoor Positioning Method And System Based On Wireless Lan (Wlan) Received Signal Strength Indication (Rssi) Value
P20110524US	U.S.A.	14/123,672	10/19/2011	9,271,243	Wireless Access Point And Method And Device For Controlling Wireless Access Point
P20110524	KR	1020110054124	6/3/2011	101343565B1	Wireless Access Point, Method And Apparatus For Controlling Thereof
P20110524PC	WO	WOKR11007792	10/19/2011		Wireless Access Point And Method And Device For Controlling Wireless Access Point
P20110900US	U.S.A.	13/668,310	11/4/2012	9,253,718	Establishing Wireless Connection Based On Network Status

REF-NO	Country	Appl. No.	Filing Date	Patent No.	Title
P20110900	KR	10-2011-0085199	8/25/2011	10-1806854	Method And System For Connecting Access Point Using Network Status Information
P20110900P1	KR	10-2016-0152173	11/15/2016	10-1867523	Method And System For Connecting Access Point Using Network Status Information
P20111023US	U.S.A.	13/668,313	11/4/2012	9,344,978	Access Point Having Multichannel And Multi Transmission Power, Cell Formation Method
P20111023US C1	U.S.A.	15/149,050	5/6/2016	9,918,236682	Access Point Having Multichannel And Multi Transmission Power, Cell Formation Method
P20111023US C1C1	U.S.A.	15/893,564	2/9/2018	10,555,186	Access Point Having Multichannel And Multi Transmission Power, Cell Formation Method
P20111023	KR	1020110126956	11/30/2011	101723214	Access Point Having Multi Channel And Multi Transmission Power Cell Formation Method
P20111023PC	WO	WOKR12009223	11/5/2012		Access Point Having Multiple Channels And Multiple Transmission Powers, And Cell Forming Method
P20111023P1	KR	1020170039280	3/28/2017	10-1771235	Access Point having multi channel and multi transmission power, cell formation method
P20130787US	U.S.A.	14/547,108	11/18/2014	9,635,606	Access Point Selection And Management
P20130787US C1	U.S.A.	15/453,033	3/8/2017	10,219,213	Access Point Selection And Management
P20130787	KR	1020130139730	11/18/2013	102103457	Method For Searching Access Point Managing Linkage in Wireless LAN System



UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/618,443	08/14/2018	10051556	Q233661	7227

23373 7590 07/25/2018
SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

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):

Byung Wan YOON, Seoul, KOREA, REPUBLIC OF;
KT Corporation, Seongnam-si, KOREA, REPUBLIC OF;
Su Hwan RIM, Seoul, KOREA, REPUBLIC OF;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

IR 103 (Rev. 10/09)

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail

Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22314-1450
(571) 273-2885

or Fax

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)

23373

SUGHRUE MION, PLLC
 2100 PENNSYLVANIA AVENUE, NW
 SUITE 800
 WASHINGTON, DC 20037

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, EFS-Web transmitted, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO	CONFIRMATION NO
15/618,443	06/09/2017	Byung Wan YOON	Q233661	7227

TITLE OF INVENTION: METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM

APPLN TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	Undiscounted	\$1000	\$0	\$0	\$1000	07/11/2018

EXAMINER	ART UNIT	CLASS-SUBCLASS
CATTUNGAL, AJAY P	2467	370-338000

- | | | |
|--|--|---|
| <p>1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).</p> <p>☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.</p> <p>☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached.</p> <p>Use of a Customer Number is required.</p> | <p>2. For printing on the patent front page, list</p> <p>(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,</p> <p>(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.</p> | <p>1. <u>Sughrue Mion, PLLC</u></p> <p>2. _____</p> <p>3. _____</p> |
|--|--|---|

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 has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

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

KT Corporation Seongnam-si, 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

- | | |
|--|--|
| <p>4a. The following fee(s) are submitted:</p> <p>☒ Issue Fee</p> <p>☐ Publication Fee (No small entity discount permitted)</p> <p>☐ Advance Order - # of Copies</p> | <p>4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)</p> <p>☐ A check is enclosed.</p> <p>☒ Payment by credit card. Form PTO-2038 is attached.</p> <p>☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number <u>19-4880</u> (enclose an extra copy of this form).</p> |
|--|--|

5. Change of 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 form 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	/ Nataliya Dvorson /	Date	July 11, 2018
Typed or Printed Name	Nataliya Dvorson	Registration No.	56,616

Electronic Patent Application Fee Transmittal				
Application Number:		15618443		
Filing Date:		09-Jun-2017		
Title of Invention:		METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM		
First Named Inventor/Applicant Name:		Byung Wan YOON		
Filer:		J. Lytle/Konata George		
Attorney Docket Number:		Q233661		
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	1000	1000

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				1000

Electronic Acknowledgement Receipt	
EFS ID:	33144282
Application Number:	15618443
International Application Number:	
Confirmation Number:	7227
Title of Invention:	METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM
First Named Inventor/Applicant Name:	Byung Wan YOON
Customer Number:	23373
Filer:	J. Lytle/Konata George
Filer Authorized By:	J. Lytle
Attorney Docket Number:	Q233661
Receipt Date:	11-JUL-2018
Filing Date:	09-JUN-2017
Time Stamp:	10:55:18
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$ 1000
RAM confirmation Number	071118INTEFSW10554500
Deposit Account	194880
Authorized User	Konata George
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.20 (Post Issuance fees)	

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)	Q233661IssueFeeTransmittal.pdf	33051	no	1
			bee73dd36d81754bc0788c064893293cff9dd458		
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30454	no	2
			b1cc5b8e72c30015b7585633ae15b1a181adac2e		
Warnings:					
Information:					
Total Files Size (in bytes):			63505		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					



UNITED STATES PATENT AND TRADEMARK OFFICE

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

NOTICE OF ALLOWANCE AND FEE(S) DUE

23373 7590 04/11/2018
SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER
CATTUNGAL, AJAY P

ART UNIT PAPER NUMBER
2467

DATE MAILED: 04/11/2018

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/618,443	06/09/2017	Byung Wan YOON	Q233661	7227

TITLE OF INVENTION: METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1000	\$0	\$0	\$1000	07/11/2018

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), to: **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (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)

23373 7590 04/11/2018
SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

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 facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/618,443	06/09/2017	Byung Wan YOON	Q233661	7227

TITLE OF INVENTION: METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$1000	\$0	\$0	\$1000	07/11/2018

EXAMINER	ART UNIT	CLASS-SUBCLASS
CATTUNGAL, AJAY P	2467	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 03-02 or more recent) attached. Use of a Customer Number is required.	2. For printing on the patent front page, list (1) The names of up to 3 registered patent attorneys or agents OR, alternatively, _____ 1 (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. _____ 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 has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(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. The following fee(s) are submitted:

- ☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

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

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

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.
15/618,443	06/09/2017	Byung Wan YOON	Q233661	7227
23373 7590 04/11/2018 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			EXAMINER CATTUNGAL, AJAY P	
			ART UNIT	PAPER NUMBER
			2467	

DATE MAILED: 04/11/2018

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 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, 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. 15/618,443	Applicant(s) YOON ET AL.	
	Examiner AJAY CATTUNGAL	Art Unit 2467	AIA (First Inventor to File) 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 02/12/18.
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

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

3. ☒ The allowed claim(s) is/are 1-11. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
Certified copies:
 a) ☒ All b) ☐ Some *c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 * Certified copies not received: _____.

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

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

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

Attachment(s)

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

/A. C./ Primary Examiner, Art Unit 2467	
--	--

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see pages 6-9, filed 02/12/18, with respect to claims 1-11 have been fully considered and are persuasive. The rejection of 10/12/17 has been withdrawn.

Allowable Subject Matter

2. Claims 1-11 are allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AJAY CATTUNGAL whose telephone number is (571)270-7525. The examiner can normally be reached on Monday- Friday 7:30 - 5:00, Alternating Fridays OFF.

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

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

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

/AJAY CATTUNGAL/
Primary Examiner, Art Unit 2467

Notice of References Cited	Application/Control No. 15/618,443		Applicant(s)/Patent Under Reexamination YOON ET AL.	
	Examiner AJAY CATTUNGAL		Art Unit 2467	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2005/0227623 A1	10-2005	Su, Wei-Kun	H04W16/10	455/62
*	B	US-2009/0046633 A1	02-2009	THOMSON; Allan	H04W64/00	370/328
*	C	US-2010/0118830 A1	05-2010	Stephenson; David Sheldon	H04L63/10	370/331
*	D	US-2012/0044914 A1	02-2012	Chen; John Anthony	H04W12/08	370/338
*	E	US-2012/0044862 A1	02-2012	Chen; John Anthony	H04W36/00	370/328
*	F	US-2012/0108173 A1	05-2012	Hahm; Seong-Il	H04W76/10	455/41.2
*	G	US-2013/0086665 A1	04-2013	Filippi; Geoff	H04L63/0272	726/7
*	H	US-2013/0231151 A1	09-2013	KNECKT; Jarkko Lauri Sakari	H04W40/246	455/515
*	I	US-2013/0294354 A1	11-2013	Zhang; Guodong	H04W72/04	370/329
*	J	US-2015/0098358 A1	04-2015	Park; Giwon	H04W48/16	370/254
*	K	US-2015/0189673 A1	07-2015	Park; Giwon	H04W48/08	370/329
*	L	US-2016/0007386 A1	01-2016	PARK; Giwon	H04W76/10	370/329
	M	US-				

FOREIGN PATENT DOCUMENTS

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

NON-PATENT DOCUMENTS

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

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

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

Notice of References Cited

Part of Paper No. 20180330

Search Notes 	Application/Control No. 15618443	Applicant(s)/Patent Under Reexamination YOON ET AL.
	Examiner AJAY CATTUNGAL	Art Unit 2467

CPC- SEARCHED		
Symbol	Date	Examiner
H04W48/14.cpc.	3/30/2018	AC
H04W84/12.cpc.	3/30/2018	AC

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 search	10/1/2017	AC
East search, History attached	10/1/2017	AC
Inventor search	3/30/2018	AC
CPC search	3/30/2018	AC
Inteference search	3/30/2018	AC
East search, History attached	3/30/2018	AC

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
H04W	ALL	4/8/2018	AC

	/A.C./ Primary Examiner.Art Unit 2467
--	--

<i>Index of Claims</i> 	Application/Control No. 15618443	Applicant(s)/Patent Under Reexamination YOON ET AL.
	Examiner AJAY CATTUNGAL	Art Unit 2467

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

☐ Claims renumbered in the same order as presented by applicant										☐ CPA										☐ T.D.										☐ R.1.47									
CLAIM		DATE																																					
Final	Original	10/01/2017	03/30/2018																																				
	1	✓	=																																				
	2	✓	=																																				
	3	✓	=																																				
	4	✓	=																																				
	5	✓	=																																				
	6	✓	=																																				
	7	✓	=																																				
	8	✓	=																																				
	9	✓	=																																				
	10	✓	=																																				
	11	✓	=																																				

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	4	"14411278"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:31
S2	19	("20080014934" "20100284303" "20110149766" "20110188486" "20110243013" "20120307685" "8509173").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:33
S3	8	S2 and probe request	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:33
S4	2	S2 and probe request and signal strength	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:34
S5	4	S2 and probe request and signal with strength	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:34
S6	0	S2 and probe request same signal with strength	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:34
S7	3	S2 and probe request same3 signal with strength	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:34
S8	3	S2 and probe request same3 (signal with strength) or RSSI)	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:36
S9	51	probe request frame with signal strength	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:39
S10	9	probe request frame with signal strength (information or data)	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:39

S11	1	S1 and probe request frame with signal strength (information or data)	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:41
S12	1	probe request frame with signal strength with uplink	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 23:27
S13	4	(("Byung Wan") near2 (Yoon)).INV.	US-PGPUB; USPAT; USOCR	ADJ	ON	2016/01/25 18:03
S14	1	(("Su Hwan") near2 (Rim)).INV.	US-PGPUB; USPAT; USOCR	ADJ	ON	2016/01/25 18:03
S15	3	probe request frame with signal strength (information or data) and probe response same time	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/10/17 10:05
S16	74	probe request frame with signal strength	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 00:18
S17	10	probe request frame with signal strength (information or data)	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 00:18
S18	1	probe request frame with signal strength with uplink	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 00:18
S19	3	probe request frame with signal strength (information or data) and probe response same time	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 00:18
S20	1	probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 00:50
S21	1	probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 00:51
S22	0	probe request frame with signal strength with uplink same wait with time	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 00:51
S23	6156	H04W48/14.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 00:58

S24	50901	H04W84/12.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06: 00:58
S25	55171	S23 or S24	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06: 00:59
S26	48	S25 and probe request frame with signal strength	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06: 00:59
S27	1	S25 and probe request frame with signal strength with uplink	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06: 00:59
S28	5	S25 and probe request frame with signal strength (information or data)	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06: 00:59
S29	1	S25 and probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06: 00:59
S30	1	S25 and probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06: 00:59
S31	1	S25 and probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06: 00:59
S32	0	S25 and probe request frame with signal strength with uplink same wait with time	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06: 00:59
S33	5	((("Byung Wan") near2 (Yoon)).INV.	US-PGPUB; USPAT; USOCR	ADJ	ON	2017/03/06: 01:04
S34	1	((("Su Hwan") near2 (Rim)).INV.	US-PGPUB; USPAT; USOCR	ADJ	ON	2017/03/06: 01:05
S35	5	S33 or S34	US-PGPUB; USPAT; USOCR	ADJ	ON	2017/03/06: 01:05
S36	1	S35 and probe request frame with signal strength	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06: 01:05
S37	1	S35 and probe request frame with signal strength with uplink	US-PGPUB; USPAT; USOCR; FPRS; EPO;	ADJ	ON	2017/03/06: 01:05

			DERWENT; IBM_TDB			
S38	1	S35 and probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 01:05
S39	1	S35 and probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 01:05
S40	1	S35 and probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 01:05
S41	1	S35 and probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 01:05
S42	0	S35 and probe request frame with signal strength with uplink same wait with time	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 01:06
S44	6	"14411278"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/10/01 21:54
S45	6	"14411278"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/10/01 21:54
S46	7171	H04W48/14.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2018/03/30 22:48
S47	63314	H04W84/12.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2018/03/30 22:48
S48	68472	S46 or S47	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2018/03/30 22:48
S49	59	S48 and probe request frame with signal strength	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2018/03/30 22:48
S50	3	S48 and probe request frame with signal strength with uplink	US-PGPUB; USPAT; USOCR; FPRS; EPO;	ADJ	ON	2018/03/30 22:48

			DERWENT; IBM_TDB			
S51	7	S48 and probe request frame with signal strength (information or data)	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2018/03/30 22:48
S52	3	S48 and probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2018/03/30 22:48
S53	3	S48 and probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2018/03/30 22:48
S54	3	S48 and probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2018/03/30 22:48
S55	7	((("Byung Wan") near2 (Yoon)).INV.	US-PGPUB; USPAT; USOCR	ADJ	ON	2018/03/30 22:49
S56	3	((("Su Hwan") near2 (Rim)).INV.	US-PGPUB; USPAT; USOCR	ADJ	ON	2018/03/30 22:49
S57	7	S55 or S56	US-PGPUB; USPAT; USOCR	ADJ	ON	2018/03/30 22:49
S58	3	S57 and probe request frame with signal strength	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2018/03/30 22:49
S59	3	S57 and probe request frame with signal strength with uplink	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2018/03/30 22:49
S60	3	S57 and probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2018/03/30 22:49
S61	3	S57 and probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2018/03/30 22:49
S62	3	S57 and probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2018/03/30 22:49
S63	3	S57 and probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2018/03/30 22:49

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S43	0	(active scan) and (performed) and (station) and (active scan) and (generating) and (probe request frame) and (signal strength information) and (station) and (transmitting) and (probe request frame) and (access points) and (receiving) and (probe response frame) and (probe request frame) and (certain access point) and (access points) and (accessing) and (certain) and (access point) and (maximum probe response time) and (maximum probe response time) and (preset maximum time period) and (station) and (required) and (wait) and (probe response frames) and (access points)	US-PGPUB; USPAT	ADJ	ON	2017/03/06 01:09
S64	2	(active scan) and (performed) and (station) and (active scan) and (generating) and (probe request frame) and (signal strength information) and (station) and (transmitting) and (probe request frame) and (access points) and (receiving) and (probe response frame) and (probe request frame) and (certain access point) and (access points) and (accessing) and (certain) and (access point) and (maximum probe response time) and (maximum probe response time) and (preset maximum time period) and (station) and (required) and (wait) and (probe response frames) and (access points)	US-PGPUB; USPAT	ADJ	ON	2018/03/30 23:17

3/ 30/ 2018 11:18:27 PM**C:\Users\acattungal\Documents\EAST\Workspaces\15618443.wsp**

Issue Classification 	Application/Control No. 15618443	Applicant(s)/Patent Under Reexamination YOON ET AL.
	Examiner AJAY CATTUNGAL	Art Unit 2467

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☒ T.D. ☐ R.1.47															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1														
	2														
	3														
	4														
	5														
	6														
	7														
	8														
	9														
	10														
	11														

NONE		Total Claims Allowed:	
		11	
(Assistant Examiner)	(Date)		
/AJAY CATTUNGAL/ Primary Examiner.Art Unit 2467	03/30/2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

Application Number 	Application/Control No. 15/618,443	Applicant(s)/Patent under Reexamination YOON ET AL.	
Document Code - DISQ	Internal Document – DO NOT MAIL		

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Date Filed : 2/12/18	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:
Lawana Hixon

U.S. Patent and Trademark Office

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Docket No: Q233661

Byung Wan YOON, et al.

Appln. No.: 15/618,443

Group Art Unit: 2467

Confirmation No.: 7227

Examiner: CATTUNGAL, AJAY P

Filed: June 9, 2017

For: METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM

AMENDMENT UNDER 37 C.F.R. § 1.111

MAIL STOP AMENDMENT

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

In response to the Office Action dated October 12, 2017, please amend the above-identified application as follows on the accompanying pages.

TABLE OF CONTENTS

AMENDMENTS TO THE CLAIMS	2
REMARKS	6

AMENDMENTS TO THE CLAIMS

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

LISTING OF CLAIMS:

1. (Currently Amended): A method for active scanning performed by a station, the method comprising:

transmitting, to an access point, a probe request frame including information on a signal strength; and

receiving, from the access point, a probe response frame in response to the probe request frame,

wherein the probe response frame is transmitted by the access point based on the information on the signal strength,

wherein the station accesses the access point based on the probe response frame and a maximum probe response time.

2. (currently amended): The method of claim 1,

~~wherein the station accesses the access point based on the probe response frame and a maximum probe response time;~~

wherein the maximum probe response time comprises a preset maximum time period during which the station is required to wait for the probe response frame from the access point.

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

wherein the information on the signal strength includes information about transmission power of the station.

4. (Original): The method of claim 1,
wherein the access point is an access point satisfying a predetermined standard for an uplink quality with respect to the station.

5. (Original): The method of claim 2, wherein the station accesses the access point before the maximum probe response time elapses.

6. (Original): The method of claim 1, further comprising:
acquiring a downlink path loss based on a signal strength of the probe response frame;
and
accessing the certain access point in response to determining that the downlink path loss satisfies a predetermined standard.

7. (Original): The method of claim 6, wherein the probe response frame includes target path loss information as the predetermined standard.

8. (Original): The method of claim 6, wherein the access point satisfies the predetermined standard for an uplink quality with respect to the station.

9. (Currently Amended): A method for active scanning performed by an access point, the method comprising:

receiving, from a station, a probe request frame including information on a signal strength; and

transmitting, to the station, a probe response frame in response to the probe request frame based on the information on the signal strength,

wherein an access of the station to the access point is based on the probe response frame and a maximum probe response time.

10. (Currently Amended): A station configured to perform an active scanning, the station comprising:

a transceiver; and

a processor,

wherein the processor is configured to:

cause the transceiver to transmit, to an access point, a probe request frame including information on a signal strength; and

cause the transceiver to receive, from the access point, a probe response frame in response to the probe request frame, and

wherein the probe response frame is transmitted by the access point based on the information on the signal strength,

wherein the station accesses the access point based on the probe response frame and a maximum probe response time.

11. (Currently Amended): An access point configured to perform an active scanning,
the access point comprising:

a transceiver; and

a processor,

wherein the processor is configured to:

cause the transceiver to receive, from a station, a probe request frame including
information on a signal strength; and

cause the transceiver to transmit, to the station, a probe response frame in response to the
probe request frame based on the information on the signal strength,

wherein an access of the station to the access point is based on the probe response frame
and a maximum probe response time.

REMARKS

I. Status of Application

Claims 1 and 3-11 are all the claims pending in the application. Claims 1-11 have been rejected.

Claims 1, 2, 9, 10, and 11 have been amended. No new matter has been added.

II. Formalities

Applicant thanks the Examiner for accepting the drawings filed June 9, 2017.

Applicant thanks the Examiner for returning a signed and initialed copy of the Information Disclosure Statement filed June 9, 2017, thereby indicating that the references cited therein have been considered.

III. Double Patenting Rejection

Claims 1-11 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-6, 8, 10 and 13 of U.S. Patent No. 9,717,037 B2.

In response, Applicant respectfully submits that a Terminal Disclaimer with respect to U.S. Patent No. 9,717,037 is being filed concurrently herewith.

Accordingly, Applicant respectfully submits that this rejection is moot. Withdrawal thereof is respectfully requested.

IV. Claim Rejections Under 35 U.S.C. §103

Claims 1 and 3-11 are rejected under 35 U.S.C. §103 as being unpatentable over U.S. Patent Application Publication No. 2016/0007386 A1 to Park et al. (hereinafter "Park") in view of U.S. Patent Application Publication No. 2009/0046633 A1 to Thomson (hereinafter "Thomson"). These rejections are hereby traversed.

As an initial matter, claim 2 is not rejected over the art of record and as such appears to contain allowable subject matter. The independent claims have been amended to incorporate at least some of the features of the allowable claim 2 and as such, should now be allowed.

For example, independent claim 1, as now amended, recites:

A method for active scanning performed by a station, the method comprising:
transmitting, to an access point, a probe request frame including information on a signal strength; and
receiving, from the access point, a probe response frame in response to the probe request frame,
wherein the probe response frame is transmitted by the access point based on the information on the signal strength,
wherein the station accesses the access point based on the probe response frame and a maximum probe response time

In particular, claim 1 recites that "the station accesses the access point based on the probe response frame and a maximum probe response time," and each of independent claims 9, 10, and 11 recites a similar combination of features.

By contrast, the cited references fail to disclose or suggest these recited claim features.

At pages 8 and 9 of the Office Action, with respect to claim 1, the Examiner admits that "Park et al. does not explicitly disclose . . . receiving, from the access point, a probe response frame in response to the probe request frame, wherein the probe response frame is transmitted by

the access point based on the information on the signal strength," and instead cites paragraphs [0054] - [0061] of Thomson as disclosing this feature.

However, Applicant respectfully submits that a careful inspection of the cited portions of Thomson reveals that Thomson provides no disclosure whatsoever in relation to "the station accesses the access point based on the probe response frame and *a maximum probe response time*" [emphasis added] as recited in independent claim 1. In particular, Applicant respectfully submits that Thomson fails to teach or suggest a maximum probe response time during which the station waits for a response.

Accordingly, Applicant respectfully submits that independent claim 1 is patentable over both of Park and Thomson, taken individually or in combination, for at least the foregoing reasons. Further, each of independent claims 9, 10, and 11 recites similar features as those discussed above with respect to claim 1, and therefore, Applicant respectfully submits that each of claims 9, 10, and 11 is also patentable over both of Park and Thomson, taken individually or in combination, for at least these same reasons. In addition, each of claims 2-8 depends from claim 1, and therefore, Applicant respectfully submits that each of claims 2-8 is also patentable over both of Park and Thomson, taken individually or in combination, at least by virtue of its respective dependency.

V. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the

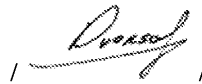
AMENDMENT UNDER 37 C.F.R. § 1.111
Appln. No.: 15/618,443

Attorney Docket No.: Q233661

Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned attorney at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



SUGHRUE MION, PLLC
Telephone: 202.293.7060
Facsimile: 202.293.7860

Nataliya Dvorson
Registration No. 56,616

WASHINGTON OFFICE

23373

CUSTOMER NUMBER

Date: February 12, 2018

TERMINAL DISCLAIMER TO OBTAIN A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT		Docket Number	Q233661
In re Application of: Byung Wan YOON, et al. Application No.: 15/618,443 Filed: June 9, 2017 For: METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM The owner*, KT Corporation, of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent No. 9,717,037 as the term of said prior patent is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns. In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later: - expires for failure to pay a maintenance fee; - is held unenforceable; - is found invalid by a court of competent jurisdiction; - is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321; - has all claims canceled by a reexamination certificate; - is reissued; or - is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer. Check either box 1 or 2 below, if appropriate. 1. ☐ For submissions on behalf of a business/organization (e.g., corporation, partnership, university, government agency, etc.), the undersigned is empowered to act on behalf of the business/organization. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon. 2. ☒ The undersigned is an attorney or agent of record. Reg. No. <u>56,616</u> _____ / Nataliya Dvorson / Signature _____ Nataliya Dvorson Typed or printed name _____ February 12, 2018 Date _____ 202.293.7060 Telephone Number ☒ Terminal disclaimer fee under 37 CFR 1.20(d) included. ☒ The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account. *Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner). Form PTO/SB/96 may be used for making this certification. See MPEP § 324.			

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of Docket No: Q233661
Byung Wan YOON, et al.
Appln. No.: 15/618,443 Group Art Unit: 2467
Confirmation No.: 7227 Examiner: CATTUNGAL, AJAY P
Filed: June 9, 2017
For: METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM

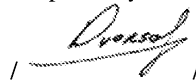
SUBMISSION OF TERMINAL DISCLAIMER

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

Sir:

Submitted herewith is a Terminal Disclaimer in the above-identified application. The statutory fee of \$160.00 (37 C.F.R. § 1.20(d)) is being remitted. The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



SUGHRUE MION, PLLC
Telephone: 202.293.7060
Facsimile: 202.293.7860

Nataliya Dvorson
Registration No. 56,616

WASHINGTON OFFICE

23373

CUSTOMER NUMBER

Date: February 12, 2018

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)		Docket Number Q233661	
		Confirmation Number 7227	
Application Number	15/618,443	Filed	June 9, 2017
For	METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM		
Art Unit	2467	Examiner	CATTUNGAL, AJAY P
This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above-identified application. The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):			
		<u>Fee</u>	<u>Small Entity Fee</u>
			<u>Micro Entity Fee</u>
☒	One month (37 CFR 1.17(a)(1))	\$200.00	\$100.00 \$50.00 \$200.00
☐	Two month (37 CFR 1.17(a)(2))	\$600.00	\$300.00 \$150.00
☐	Three month (37 CFR 1.17(a)(3))	\$1400.00	\$700.00 \$350.00
☐	Four month (37 CFR 1.17(a)(4))	\$2200.00	\$1100.00 \$550.00
☐	Five month (37 CFR 1.17(a)(5))	\$3000.00	\$1500.00 \$750.00
☐	Previous Payment Amount	Date Submitted	
☐	Applicant asserts small entity status. See 37 CFR 1.27.		
☐	Applicant certifies micro entity status. See 37 CFR 1.29. Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.		
☐	A check in the amount of the fee is enclosed.		
☒	Payment by credit card.		
☐	The Director has already been authorized to charge fees in this application to a Deposit Account.		
☒	The Director is hereby authorized to charge any fees, except for the Issue Fee and the Publication Fee , or credit any overpayment, to Deposit Account Number 19-4880.		
☒	Payment made via EFS-Web.		
I am the ☐ applicant/inventor. ☐ assignee of record of the entire interest. See 37 CFR 3.71. 37 CFR 3.73(b) statement is enclosed (Form PTO/SB/96). ☒ attorney or agent of record. Registration Number <u>56,616</u> ☐ attorney or agent under 37 CFR 1.34. Registration number <u> </u>			
WASHINGTON OFFICE 23373 CUSTOMER NUMBER			
<u> / Nataliya Dvorson /</u>		<u>February 12, 2018</u>	
Signature		Date	
<u>Nataliya Dvorson</u>		<u>202.293.7060</u>	
Typed or printed name		Telephone Number	
Note: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.			
☒	*Total of <u>1</u> form is submitted.		

Electronic Patent Application Fee Transmittal				
Application Number:		15618443		
Filing Date:		09-Jun-2017		
Title of Invention:		METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM		
First Named Inventor/Applicant Name:		Byung Wan YOON		
Filer:		Natalya Dvorson/margaret ahn		
Attorney Docket Number:		Q233661		
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	200	200
Miscellaneous:				
STATUTORY OR TERMINAL DISCLAIMER	1814	1	160	160
Total in USD (\$)				360

Electronic Acknowledgement Receipt	
EFS ID:	31766802
Application Number:	15618443
International Application Number:	
Confirmation Number:	7227
Title of Invention:	METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM
First Named Inventor/Applicant Name:	Byung Wan YOON
Customer Number:	23373
Filer:	Natalya Dvorson/margaret ahn
Filer Authorized By:	Natalya Dvorson
Attorney Docket Number:	Q233661
Receipt Date:	12-FEB-2018
Filing Date:	09-JUN-2017
Time Stamp:	16:14:10
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$360
RAM confirmation Number	021318INTEFSW16144700
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		Q233661Amendment111TDEO TasFiled.pdf	100008	yes	12
			61114a9c93d3a660173ca518d71516bd37c0c823		
	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	9	
	Terminal Disclaimer Filed		10	11	
	Extension of Time		12	12	
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	32752	no	2
			5beda76212ea5aa70459b8fc0d6074d7c57c4387		
Warnings:					
Information:					
Total Files Size (in bytes):			132760		

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.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875				Application or Docket Number 15/618,443		Filing Date 06/09/2017		☐ To be Mailed	
ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO									
APPLICATION AS FILED – PART I									
(Column 1)		(Column 2)							
FOR	NUMBER FILED	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), (j), 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 \$		=			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =		*	X \$		=			
☐ 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	02/12/2018	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)		ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 11	Minus	** 20	= 0	x \$100 =		0	
	Independent (37 CFR 1.16(h))	* 4	Minus	***4	= 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 \$			
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$			
	☐ 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. ** 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 number found in the appropriate box in column 1.						LIE /DORIS KING/			

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.



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.
15/618,443	06/09/2017	Byung Wan YOON	Q233661	7227
23373	7590	10/12/2017		
SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			EXAMINER CATTUNGAL, AJAY P	
			ART UNIT 2467	PAPER NUMBER
			NOTIFICATION DATE 10/12/2017	DELIVERY MODE 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):

PPROCESSING@SUGHRUE.COM
sughrue@sughrue.com
USPTO@sughrue.com

Office Action Summary	Application No. 15/618,443	Applicant(s) YOON ET AL.	
	Examiner AJAY CATTUNGAL	Art Unit 2467	AIA (First Inventor to File) 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 06/09/2017.
 ☐ 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) 1-11 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) 1-11 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 06/09/17 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 06/09/17

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.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

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

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

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

3. Claims 1-11 rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-6, 8, 10 and 13 of U.S. Patent No. 9,717,037 B2. Although the claims at issue are not identical, they are not patentably distinct from each other because

Claim 1. A method for active scanning performed by a station, the method comprising: transmitting, to an access point, a probe request frame including information on a signal strength; and receiving, from the access point, a probe response frame in response to the probe request frame, wherein the probe response frame is transmitted by the access point based on the information on the signal strength. (Claim

1 An active scan method performed by a station, the active scan method comprising:
generating a probe request frame including signal strength
information of the station; transmitting the probe request frame to access
points; receiving a probe response frame corresponding to the probe request
frame from a certain access point among the access points; and accessing the
certain access point based on the probe response frame and a maximum probe
response time, wherein the maximum probe response time comprises a preset
maximum time period during which the station is required to wait for probe
response frames from the access points.).

Claim 2. The method of claim 1, wherein the station accesses the access point
based on the probe response frame and a maximum probe response time, wherein the
maximum probe response time comprises a preset maximum time period during which
the station is required to wait for the probe response frame from the access point.(Claim

1. An active scan method performed by a station, the active scan method
comprising: generating a probe request frame including signal strength
information of the station; transmitting the probe request frame to access
points; receiving a probe response frame corresponding to the probe request
frame from a certain access point among the access points; and accessing the
certain access point based on the probe response frame and a maximum probe
response time, wherein the maximum probe response time comprises a preset
maximum time period during which the station is required to wait for probe

response frames from the access points.).

Claim 3. The method of claim 1, wherein the information on the signal strength includes information about transmission power of the station.(Claim 2. The active scan method of claim 1, wherein the signal strength information includes information about transmission power of the station.).

Claim 4. The method of claim 1, wherein the access point is an access point satisfying a predetermined standard for an uplink quality with respect to the station.(Claim 3. The active scan method of claim 1, wherein the certain access point is an access point satisfying a predetermined standard for an uplink quality with respect to the station.).

Claim 5. The method of claim 2, wherein the station accesses the access point before the maximum probe response time elapses.(Claim 4. The active scan method of claim 3, wherein the accessing of the certain access point comprises accessing the certain access point before the maximum probe response time elapses.).

Claim 6. The method of claim 1, further comprising: acquiring a downlink path loss based on a signal strength of the probe response frame; and accessing the certain access point in response to determining that the downlink path loss satisfies a predetermined standard.(Claim 5. The active scan method of claim 1, further comprising: acquiring a downlink path loss based on a signal strength of the probe response frame; and accessing the certain access point in response to determining that the downlink path loss satisfies a predetermined standard.).

Claim 7. The method of claim 6, wherein the probe response frame includes

target path loss information as the predetermined standard.(Claim 6. The active scan method of claim 5, wherein the probe response frame includes target path loss information as the predetermined standard.).

Claim 8. The method of claim 6, wherein the access point satisfies the predetermined standard for an uplink quality with respect to the station.(Claim 8. The active scan method of claim 5, wherein the certain access point is an access point satisfying the predetermined standard for an uplink quality with respect to the station.).

Claim 9. A method for active scanning performed by an access point, the method comprising: receiving, from a station, a probe request frame including information on a signal strength; and transmitting, to the station, a probe response frame in response to the probe request frame based on the information on the signal strength (Claim 13. An active scan method performed by an access point, the active scan method comprising: receiving a probe request frame from a station, the probe request frame including signal strength information of the station; acquiring information about uplink quality based on the signal strength information included in the probe request frame; transmitting a probe response frame to the station based on whether the uplink quality satisfies a predetermined standard; and granting access to the station based on the probe response frame and a maximum probe response time, wherein the maximum probe response time comprises a preset maximum time period during which the station is required to wait for probe response frames from the access points.).

Claim 10. A station configured to perform an active scanning, the station comprising: a transceiver; and a processor, wherein the processor is configured to: cause the transceiver to transmit, to an access point, a probe request frame including information on a signal strength; and cause the transceiver to receive, from the access point, a probe response frame in response to the probe request frame, and wherein the probe response frame is transmitted by the access point based on the information on the signal strength. (Claim 10. An active scan method performed by a station, the active scan method comprising: transmitting a probe request frame to access points; receiving a probe response frame corresponding to the probe request frame from a certain access point among the access points; acquiring information about downlink quality based on a signal strength of the probe response frame; and accessing the certain access point based on whether the downlink quality satisfies a predetermined standard and further based on a maximum probe response time, wherein the maximum probe response time comprises a preset maximum time period during which the station is required to wait for probe response frames from the access points.).

Claim 11. An access point configured to perform an active scanning, the access point comprising: a transceiver; and a processor, wherein the processor is configured to: cause the transceiver to receive, from a station, a probe request frame including information on a signal strength; and cause the transceiver to transmit, to the station, a probe response frame in response to the probe request frame based on the information on the signal strength. .(Claim 10. An active scan method performed by a station, the

active scan method comprising: transmitting a probe request frame to access points; receiving a probe response frame corresponding to the probe request frame from a certain access point among the access points; acquiring information about downlink quality based on a signal strength of the probe response frame; and accessing the certain access point based on whether the downlink quality satisfies a predetermined standard and further based on a maximum probe response time, wherein the maximum probe response time comprises a preset maximum time period during which the station is required to wait for probe response frames from the access points.).

Claim Rejections - 35 USC § 103

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

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

5. Claim 1, 3-11 is/are rejected under 35 U.S.C. 103 as being unpatentable over by Park et al. (US 2016/0007386 A1) in view of Thomson et al. (US 2009/0046633 A1).

6. Regarding claim 1, 9, 10, 11, Park et al. discloses a method for active scanning performed by a station, the method comprising: transmitting, to an access point, a probe request frame including information on a signal strength (Para 106-124). Park et al. does not explicitly disclose a method, receiving, from the access point, a probe response frame in response to the probe request frame, wherein the probe response

frame is transmitted by the access point based on the information on the signal strength. However Thomson et al. discloses a method, receiving, from the access point, a probe response frame in response to the probe request frame, wherein the probe response frame is transmitted by the access point based on the information on the signal strength (Para 54-61). It would have been obvious to one having ordinary skill in the art before the effective filing date of the claimed invention to use the method of having a response frame and a time limit to receive the response frame of Thomson et al. with the system of Park et al. in order to provide a client-based location tracking solution where the client itself determines location.

Regarding claim 3, Park et al. discloses a method, wherein the information on the signal strength includes information about transmission power of the station (Para 106-124).

Regarding claim 4, Park et al. discloses a method, wherein the access point is an access point satisfying a predetermined standard for an uplink quality with respect to the station (Para 106-124).

Regarding claim 5, Park et al. discloses a method, wherein the station accesses the access point before the maximum probe response time elapses. (Para 106-124).

Regarding claim 6, Park et al. discloses a method, further comprising: acquiring a downlink path loss based on a signal strength of the probe response frame; and accessing the certain access point in response to determining that the downlink path loss satisfies a predetermined standard. (Para 106-124).

Regarding claim 7, Park et al. discloses a method, wherein the probe response

frame includes target path loss information as the predetermined standard. (Para 106-124).

Regarding claim 8, Park et al. discloses a method wherein the access point satisfies the predetermined standard for an uplink quality with respect to the station. (Para 106-124).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AJAY CATTUNGAL whose telephone number is (571)270-7525. The examiner can normally be reached on Monday- Friday 7:30 - 5:00, Alternating Fridays OFF.

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

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

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

/AJAY CATTUNGAL/
Primary Examiner, Art Unit 2467

Notice of References Cited	Application/Control No. 15/618,443		Applicant(s)/Patent Under Reexamination YOON ET AL.	
	Examiner AJAY CATTUNGAL		Art Unit 2467	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2005/0227623 A1	10-2005	Su, Wei-Kun	H04W16/10	455/62
*	B	US-2009/0046633 A1	02-2009	THOMSON; Allan	H04W64/00	370/328
*	C	US-2010/0118830 A1	05-2010	Stephenson; David Sheldon	H04L63/10	370/331
*	D	US-2012/0044914 A1	02-2012	Chen; John Anthony	H04W12/08	370/338
*	E	US-2012/0044862 A1	02-2012	Chen; John Anthony	H04W36/00	370/328
*	F	US-2012/0108173 A1	05-2012	Hahm; Seong-Il	H04W76/02	455/41.2
*	G	US-2013/0086665 A1	04-2013	Filippi; Geoff	H04L63/0272	726/7
*	H	US-2013/0231151 A1	09-2013	KNECKT; Jarkko Lauri Sakari	H04W40/246	455/515
*	I	US-2013/0294354 A1	11-2013	Zhang; Guodong	H04W72/04	370/329
*	J	US-2015/0098358 A1	04-2015	Park; Giwon	H04W48/16	370/254
*	K	US-2015/0189673 A1	07-2015	Park; Giwon	H04W48/08	370/329
*	L	US-2016/0007386 A1	01-2016	PARK; Giwon	H04W48/14	370/329
	M	US-				

FOREIGN PATENT DOCUMENTS

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

NON-PATENT DOCUMENTS

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

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

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

Notice of References Cited

Part of Paper No. 20170930

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	Not Yet Assigned
	Confirmation Number	Not Yet Assigned
	Filing Date	June 7, 2017
	First Named Inventor	Byung Wan YOON
	Art Unit	Not Yet Assigned
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	Q233661

U.S. PATENTS						
Examiner Initials*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, where Relevant Passages or Relevant Figures Appear
	1.	8,509,173	B2	2013-08-13	KIM et al.	

U.S. PATENT APPLICATION PUBLICATIONS						
Examiner Initials*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, where Relevant Passages or Relevant Figures Appear
	2.	20100284303	A1	2010-11-11	CATOVIC et al.	
	3.	20110149766	A1	2011-06-23	CHOI et al.	
	4.	20110188486	A1	2011-08-04	KIM et al.	
	5.	20110243013	A1	2011-10-06	LEE et al.	
	6.	20120307685	A1	2012-12-06	KIM et al.	
	7.	20080014934	A1	2008-01-17	BLALASUBRAMANIAN et al.	
	8.	20050227623	A1	2005-10-13	Su, Wei-Kun	
	9.	20090046633	A1	2009-02-19	Thomson; Allen	
	10.	20100118830	A1	2010-05-13	Stephenson; David Sheldon	
	11.	20120044914	A1	2012-02-23	Chen; John Anthony	
	12.	20120044862	A1	2012-02-23	Chen; John Anthony	
	13.	20120108173	A1	2012-05-03	Hahn; Seong-II	
	14.	20130086665	A1	2013-04-04	Filippi; Geoff	
	15.	20130231151	A1	2013-09-05	Kneckt; Jarkko Lauri Sakari	
	16.	20130294354	A1	2013-11-07	Zhang; Guodong	
	17.	20150098358	A1	2015-04-09	Park; Giwon	
	18.	20150189673	A1	2015-07-02	Park; Giwon	
	19.	20160007386	A1	2016-01-07	Park; Giwon	

FOREIGN PATENT DOCUMENTS							
Examiner Initials*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, where Relevant Passages or Relevant Figures Appear

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city, and/or country where published.	T ⁵
	20.	International Search Report for PCT/KR2013/005733 dated October 25, 2013	

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

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

[Page 1 of 2]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.C./

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	Not Yet Assigned
	Confirmation Number	Not Yet Assigned
	Filing Date	June 7, 2017
	First Named Inventor	Byung Wan YOON
	Art Unit	Not Yet Assigned
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	Q233661

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city, and/or country where published.	T ⁵
	21.	Non-Final Office Action mailed February 2, 2016 in US 14/411,278	
	22.	Final Office Action mailed October 21, 2016 in US 14/411,278	
	23.	Advisory Action mailed January 26, 2017 in US 14/411,278	
	24.	Notice of Allowance mailed March 9, 2017 in US 14/411,278	

EXAMINER SIGNATURE			
Examiner Signature	/AJAY CATTUNGAL/	Date Considered	10/01/2017

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

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

[Page 2 of 2]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /A.C./

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	4	"14411278"	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:31
S2	19	("20080014934" "20100284303" "20110149766" "20110188486" "20110243013" "20120307685" "8509173").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:33
S3	8	S2 and probe request	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:33
S4	2	S2 and probe request and signal strength	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:34
S5	4	S2 and probe request and signal with strength	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:34
S6	0	S2 and probe request same signal with strength	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:34
S7	3	S2 and probe request same3 signal with strength	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:34
S8	3	S2 and probe request same3 (signal with strength) or RSSI)	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:36
S9	51	probe request frame with signal strength	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:39
S10	9	probe request frame with signal strength (information or data)	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:39

S11	1	S1 and probe request frame with signal strength (information or data)	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 22:41
S12	1	probe request frame with signal strength with uplink	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/01/20 23:27
S13	4	(("Byung Wan") near2 (Yoon)).INV.	US-PGPUB; USPAT; USOCR	ADJ	ON	2016/01/25 18:03
S14	1	(("Su Hwan") near2 (Rim)).INV.	US-PGPUB; USPAT; USOCR	ADJ	ON	2016/01/25 18:03
S15	3	probe request frame with signal strength (information or data) and probe response same time	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2016/10/17 10:05
S16	74	probe request frame with signal strength	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 00:18
S17	10	probe request frame with signal strength (information or data)	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 00:18
S18	1	probe request frame with signal strength with uplink	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 00:18
S19	3	probe request frame with signal strength (information or data) and probe response same time	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 00:18
S20	1	probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 00:50
S21	1	probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 00:51
S22	0	probe request frame with signal strength with uplink same wait with time	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 00:51
S23	6156	H04W48/14.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 00:58

S24	50901	H04W84/12.cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06: 00:58
S25	55171	S23 or S24	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06: 00:59
S26	48	S25 and probe request frame with signal strength	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06: 00:59
S27	1	S25 and probe request frame with signal strength with uplink	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06: 00:59
S28	5	S25 and probe request frame with signal strength (information or data)	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06: 00:59
S29	1	S25 and probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06: 00:59
S30	1	S25 and probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06: 00:59
S31	1	S25 and probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06: 00:59
S32	0	S25 and probe request frame with signal strength with uplink same wait with time	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06: 00:59
S33	5	((("Byung Wan") near2 (Yoon)).INV.	US-PGPUB; USPAT; USOCR	ADJ	ON	2017/03/06: 01:04
S34	1	((("Su Hwan") near2 (Rim)).INV.	US-PGPUB; USPAT; USOCR	ADJ	ON	2017/03/06: 01:05
S35	5	S33 or S34	US-PGPUB; USPAT; USOCR	ADJ	ON	2017/03/06: 01:05
S36	1	S35 and probe request frame with signal strength	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06: 01:05
S37	1	S35 and probe request frame with signal strength with uplink	US-PGPUB; USPAT; USOCR; FPRS; EPO;	ADJ	ON	2017/03/06: 01:05

			DERWENT; IBM_TDB			
S38	1	S35 and probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 01:05
S39	1	S35 and probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 01:05
S40	1	S35 and probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 01:05
S41	1	S35 and probe request frame with signal strength (information or data) and probe response same time same wait	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 01:05
S42	0	S35 and probe request frame with signal strength with uplink same wait with time	US-PGPUB; USPAT; USOCR; FPRS; EPO; DERWENT; IBM_TDB	ADJ	ON	2017/03/06 01:06

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S43	0	(active scan) and (performed) and (station) and (active scan) and (generating) and (probe request frame) and (signal strength information) and (station) and (transmitting) and (probe request frame) and (access points) and (receiving) and (probe response frame) and (probe request frame) and (certain access point) and (access points) and (accessing) and (certain) and (access point) and (maximum probe response time) and (maximum probe response time) and (preset maximum time period) and (station) and (required) and (wait) and (probe response frames) and (access points)	US-PGPUB; USPAT	ADJ	ON	2017/03/06 01:09

10/ 1/ 2017 11:09:08 PM

C:\Users\acattungal\Documents\EAST\Workspaces\15618443.wsp

Search Notes 	Application/Control No. 15618443	Applicant(s)/Patent Under Reexamination YOON ET AL.
	Examiner AJAY CATTUNGAL	Art Unit 2467

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

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

SEARCH NOTES		
Search Notes	Date	Examiner
Inventor search	10/1/2017	AC
East search, History attached	10/1/2017	AC

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

	/A.C./ Primary Examiner.Art Unit 2467
--	--

Index of Claims 	Application/Control No. 15618443	Applicant(s)/Patent Under Reexamination YOON ET AL.
	Examiner AJAY CATTUNGAL	Art Unit 2467

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

☐ Claims renumbered in the same order as presented by applicant										☐ CPA										☐ T.D.										☐ R.1.47									
CLAIM			DATE																																				
Final	Original	10/01/2017																																					
	1	✓																																					
	2	✓																																					
	3	✓																																					
	4	✓																																					
	5	✓																																					
	6	✓																																					
	7	✓																																					
	8	✓																																					
	9	✓																																					
	10	✓																																					
	11	✓																																					



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

BIB DATA SHEET

CONFIRMATION NO. 7227

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
15/618,443	06/09/2017	370	2467	Q233661		
APPLICANTS KT Corporation, Seongnam-si, KOREA, REPUBLIC OF; INVENTORS Byung Wan YOON, Seoul, KOREA, REPUBLIC OF; Su Hwan RIM, Seoul, KOREA, REPUBLIC OF; ** CONTINUING DATA ***** This application is a CON of 14/411,278 12/24/2014 PAT 9717037 which is a 371 of PCT/KR2013/005733 06/27/2013 ** FOREIGN APPLICATIONS ***** REPUBLIC OF KOREA 10-2012-0070043 06/28/2012 REPUBLIC OF KOREA 10-2013-0063860 06/04/2013 ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 06/16/2017						
Foreign Priority claimed ☒ Yes ☐ No 35 USC 119(a-d) conditions met ☒ Yes ☐ No Verified and /AJAY P CATTUNGAL/ Acknowledged Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY KOREA, REPUBLIC OF	SHEETS DRAWINGS 11	TOTAL CLAIMS 11	INDEPENDENT CLAIMS 4
ADDRESS SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037 UNITED STATES						
TITLE METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM						
FILING FEE RECEIVED 2020	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		



UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/618,443	06/09/2017	Byung Wan YOON	Q233661

CONFIRMATION NO. 7227

PUBLICATION NOTICE



OC000000094404311

23373
SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

Title:METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM

Publication No.US-2017-0280375-A1

Publication Date:09/28/2017

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 publicly available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently <http://www.uspto.gov/patft/>.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

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



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.

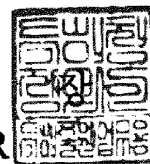
출 원 번 호 : 10-2012-0070043
Application Number

출 원 년 월 일 : 2012년 06월 28일
Filing Date JUN. 28, 2012

출 원 인 : 주식회사 케이티
Applicant(s) KT Corporation

2017년 06월 23일

특 허 청
COMMISSIONER



【서지사항】

【서류명】 특허출원서

【참조번호】 KT120009NP1

【출원구분】 특허출원

【출원인】

 【명칭】 주식회사 케이티

 【특허고객번호】 2-1998-005456-3

【대리인】

 【명칭】 특허법인 이상

 【대리인번호】 9-2008-100021-0

 【지정된변리사】 이재관, 김영아, 정용인, 전호진

 【포괄위임등록번호】 2011-072484-1

【발명의 국문명칭】 와이파이 시스템에서 액티브 스캐닝을 위한 프로브 요청 구조 및 방법

【발명의 영문명칭】 PROBE REQUEST STRUCTURE AND PROBE REQUEST METHOD FOR ACTIVE SCANNING IN WIFI SYSTEM

【발명자】

 【성명】 윤병완

 【성명의 영문표기】 YOON, Byung Wan

 【주민등록번호】 790108-1XXXXXX

 【우편번호】 137-140

 【주소】 서울특별시 서초구 우면동 17번지 KT연구개발센터

 【국적】 KR

【발명자】

 【성명】 임수환

 【성명의 영문표기】 RIM, Su Hwan

제출 일자 : 2012-06-28

【주민등록번호】 711126-1XXXXXX
【우편번호】 137-140
【주소】 서울특별시 서초구 우면동 17번지 KT연구개발센터
【국적】 KR
【취지】 위와 같이 특허청장에게 제출합니다.

대리인 특허법인 이상 (서명 또는 인)

【수수료】

【출원료】	0 면	38,000 원
【가산출원료】	13 면	0 원
【우선권주장료】	0 건	0 원
【심사청구료】	0 항	0 원
【합계】	38,000 원	

【발명의 설명】

【발명의 명칭】

와이파이 시스템에서 액티브 스캐닝을 위한 프로브 요청 구조 및 방법(PROBE REQUEST STRUCTURE AND PROBE REQUEST METHOD FOR ACTIVE SCANNING IN WIFI SYSTEM}

【기술분야】

<1> 본 발명은 무선랜 접속 방식에 있어서 단말의 출력 정보를 이용하여 무선 채널의 경로손실 계산 및 이를 이용하여 무선랜 접속에 관한 메시지 전송을 최소화하여 접속을 효율적으로 할 수 있는 방법에 관한 것이다.

【배경기술】

<2> 무선랜 AP와 단말간 접속을 위해서는 AP의 비콘 신호에 의존하여 단말이 접속을 결정하는 passive scanning 방법과 단말의 접속 요청에 의한 AP 응답으로 단말이 접속을 결정하는 active scanning 방법이 존재한다. 본 발명은 active scanning 방법을 효율적으로 수행하기 위한 Probe Request 메시지 및 AP와 단말간 무의미한 응답 메시지를 최소화 하여 AP의 효율성을 높이는 방법에 관해 기술하였다.

<3> 기존의 active scanning 방법은 Probe Request에 SSID를 null로 사용하여 불특정 다수의 AP에 응답 요청을 하거나, 특정 SSID를 포함하여 SSID에 해당하는 특정 AP에 응답 요청을 하는 두 가지 방법이 존재한다. AP는 Probe Request의 SSID

field가 null 형태이거나 자신의 SSID가 포함되어 있으면 Probe Response로 응답한다. 단말은 도1과 같이 Probe Request 전송 후 일정 시간이 경과할 때까지 AP들로부터 Probe Response를 수신하기 위해 수신모드로 동작을 하게 된다.

<4> 기존의 방법은 일정 시간(Max_Probe_Response_Time)내에 접속 가능한 AP가 응답을 하여도 단말은 수신모드로 동작을 한 후 응답한 AP들 중 무선환경이 가장 좋은 AP에 접속 요청을 하게 된다. 단말의 숫자가 많아 질 경우 많은 수의 단말들이 짧은 시간내에 접속을 하기 위해서는 일정 시간 동안 수신모드로 동작하기 보다는 일정 시간 중간에 접속할 수 있는 방법이 필요하다.

<5> AP는 단말들이 요청한 Probe Request에 매번 Probe Response를 air로 전송하게 된다. 단말과 AP사이의 무선채널 고려 없이 무조건적인 응답으로 AP의 자원이 낭비되는 문제점이 있다(도2).

【발명의 내용】

【해결하려는 과제】

<6> 본 발명의 목적은 단말의 출력 정보를 활용하여 AP와 단말간 접속을 효율적으로 수행하고, AP 자원을 효율적으로 사용할 수 있는 방법을 제공하는데 있다.

【과제의 해결 수단】

<7> 상기 목적을 달성하기 위한 본 발명의 일 실시예는, 와이파이(WiFi) 시스템에서 액티브 스캐닝(Active Scanning)을 위한 방법을 포함한다.

【발명의 효과】

<8> 본 발명에 따르면, Probe Response에 대한 신호 품질 신뢰성을 제공함으로써 AP와 단말간 무선 접속 시간을 최소화 할 수 있다. 또한 Probe Response를 제한적으로 전송함으로써 AP의 자원을 효율적으로 사용할 수 있다. AP에서 수신되는 RSSI가 같은 경우 pathloss가 작은 AP위주로 접속을 유도함으로써 AP 인접 거리에 위치한 단말을 우선 접속하는 등 전체 단말에 대해 적절한 load sharing등의 효과를 가질 수 있다.

【도면의 간단한 설명】

<9> 도 1은 단말이 프로브 응답(Probe Response)을 수신하는 것을 도시한 개념도이다.

도 2는 각각의 프레임이 채널을 점유하는 시간을 도시한 그래프이다.

도 3은 프로브 요청 프레임(Probe Request frame) 구조를 도시한 개념도이다.

도 4는 프로브 응답 프레임(Probe Response frame)의 구조를 도시한 개념도이다.

도 5는 액티브 스캐닝(active scanning) 과정을 도시한 개념도이다.

도 6은 액티브 스캐닝(active scanning) 과정을 도시한 흐름도이다.

도 7은 AP Side에서의 동작 스킴을 도시한 흐름도이다.

【발명을 실시하기 위한 구체적인 내용】

- <10> 본 발명은 다양한 변경을 가할 수 있고 여러 가지 실시예를 가질 수 있는 바, 특정 실시예들을 도면에 예시하고 상세하게 설명하고자 한다.
- <11> 그러나, 이는 본 발명을 특정한 실시 형태에 대해 한정하려는 것이 아니며, 본 발명의 사상 및 기술 범위에 포함되는 모든 변경, 균등물 내지 대체물을 포함하는 것으로 이해되어야 한다.
- <12> 제1, 제2 등의 용어는 다양한 구성요소들을 설명하는데 사용될 수 있지만, 상기 구성요소들은 상기 용어들에 의해 한정되어서는 안 된다. 상기 용어들은 하나의 구성요소를 다른 구성요소로부터 구별하는 목적으로만 사용된다. 예를 들어, 본 발명의 권리 범위를 벗어나지 않으면서 제1 구성요소는 제2 구성요소로 명명될 수 있고, 유사하게 제2 구성요소도 제1 구성요소로 명명될 수 있다. 및/또는 이라는 용어는 복수의 관련된 기재된 항목들의 조합 또는 복수의 관련된 기재된 항목들 중의 어느 항목을 포함한다.
- <13> 어떤 구성요소가 다른 구성요소에 "연결되어" 있다거나 "접속되어" 있다고 언급된 때에는, 그 다른 구성요소에 직접적으로 연결되어 있거나 또는 접속되어 있을 수도 있지만, 중간에 다른 구성요소가 존재할 수도 있다고 이해되어야 할 것이다. 반면에, 어떤 구성요소가 다른 구성요소에 "직접 연결되어" 있다거나 "직접 접속되어" 있다고 언급된 때에는, 중간에 다른 구성요소가 존재하지 않는 것으로 이해되어야 할 것이다.

<14> 본 출원에서 사용한 용어는 단지 특정한 실시예를 설명하기 위해 사용된 것으로, 본 발명을 한정하려는 의도가 아니다. 단수의 표현은 문맥상 명백하게 다르게 뜻하지 않는 한, 복수의 표현을 포함한다. 본 출원에서, "포함하다" 또는 "가지다" 등의 용어는 명세서상에 기재된 특징, 숫자, 단계, 동작, 구성요소, 부품 또는 이들을 조합한 것이 존재함을 지정하려는 것이지, 하나 또는 그 이상의 다른 특징들이나 숫자, 단계, 동작, 구성요소, 부품 또는 이들을 조합한 것들의 존재 또는 부가 가능성을 미리 배제하지 않는 것으로 이해되어야 한다.

<15> 다르게 정의되지 않는 한, 기술적이거나 과학적인 용어를 포함해서 여기서 사용되는 모든 용어들은 본 발명이 속하는 기술 분야에서 통상의 지식을 가진 자에 의해 일반적으로 이해되는 것과 동일한 의미를 가지고 있다. 일반적으로 사용되는 사전에 정의되어 있는 것과 같은 용어들은 관련 기술의 문맥 상 가지는 의미와 일치하는 의미를 가진 것으로 해석되어야 하며, 본 출원에서 명백하게 정의하지 않는 한, 이상적이거나 과도하게 형식적인 의미로 해석되지 않는다.

<16> 이하, 첨부한 도면들을 참조하여, 본 발명의 바람직한 실시예를 보다 상세하게 설명하고자 한다. 본 발명을 설명함에 있어 전체적인 이해를 용이하게 하기 위하여 도면상의 동일한 구성요소에 대해서는 동일한 참조부호를 사용하고 동일한 구성요소에 대해서 중복된 설명은 생략한다.

<17> 상기의 문제점들을 개선하기 위해 본 발명에서는 단말 ERP 정보를 활용하여

무선 채널의 Pathloss를 이용하고자 한다. 단순 RSSI 고려 시 UL/DL Link Budget 불일치를 정확하게 예측할 수 없으며, 본 발명에서는 AP 관점에서 통신에 관한 통제권을 수행하고자 한다. 무선 채널의 Pathloss를 계산하기 위해서 Probe Request/Response frame은 도3, 도4와 같이 ERP정보를 포함하는 구조가 되어야 한다. 단말은 배터리 사용 등의 이유로 Tx Power에 제한이 있으며, 단말의 종류에 따라 Tx Power가 상이하다. 단말의 Tx Power 정보를 Probe Request에 포함하여 전송할 경우 AP에서는 Uplink Pathloss가 계산될 수 있다. Uplink Pathloss는 무선 접속 후 AP와 단말간 서비스 품질을 예측할 수 있는 Parameter로 이 값에 따라 서비스 품질이 일정 수준 이하가 될 것으로 예상될 경우 AP는 Probe Response를 전송하지 않는다. Probe Response에 신호 품질에 대한 신뢰성을 제공하는 방법으로 단말에서는 Probe Response가 수신되면 일정 시간(Max_Probe_Response_Time)을 기다리지 않고 Probe Response를 제공한 AP에 접속을 시도할 수 있게 된다(도5). UL/DL Link가 상이할 경우 DL Pathloss 정보를 활용할 경우 좀 더 정확한 무선 채널 환경 예측에 따라 AP에 접속을 시도할 수 있다. Probe Response 수신 시 포함된 ERP 정보와 Target pathloss를 활용하여 단말에서 계산 되어진 pathloss가 Target pathloss보다 작을 경우만 접속을 수행하면 AP 관점에서 무선 품질에 따른 단말 접속을 유도할 수 있게 된다(도6).

<18> AP의 경우 Probe Response를 모든 단말에 제공하지 않음으로써(신호 품질이 일정 수준 이상인 단말에게만 제공) Probe Response 점유 시간을 절약할 수 있게 된다. Probe Response 전송 여부는 도7과 같은 방법으로 사용될 수 있다. 또한 현

제출 일자 : 2012-06-28

제의 load(유효 단말 접속 수, CPU load 상태 etc.)등과 연동하여 서비스 조건에
맞을 경우만 사용될 수 있다.

<19> 이상 실시예를 참조하여 설명하였지만, 해당 기술 분야의 숙련된 당업자는
하기의 특허 청구의 범위에 기재된 본 발명의 사상 및 영역으로부터 벗어나지 않는
범위 내에서 본 발명을 다양하게 수정 및 변경시킬 수 있음을 이해할 수 있을 것이
다

제출 일자 : 2012-06-28

【특허청구범위】

【청구항 1】

와이파이(WiFi) 시스템에서 액티브 스캐닝(Active Scanning)을 위한 방법.

【요약서】

【요약】

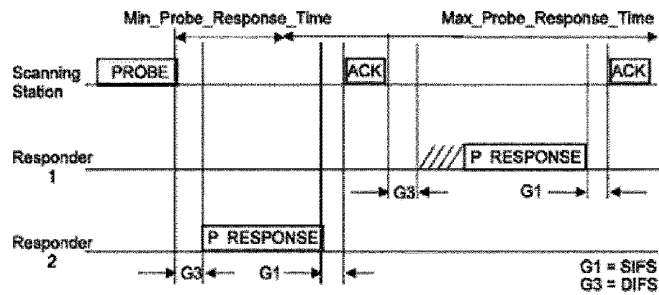
WiFi 시스템에서 Active Scanning을 위한 Probe request 구조 및 방법이 개시된다. 상기 목적을 달성하기 위한 본 발명의 일 실시예는, 와이파이(WiFi) 시스템에서 액티브 스캐닝(Active Scanning)을 위한 방법을 포함한다. 본 발명에 따르면, Probe Response에 대한 신호 품질 신뢰성을 제공함으로써 AP와 단말 간 무선 접속 시간을 최소화할 수 있다.

【대표도】

도 6

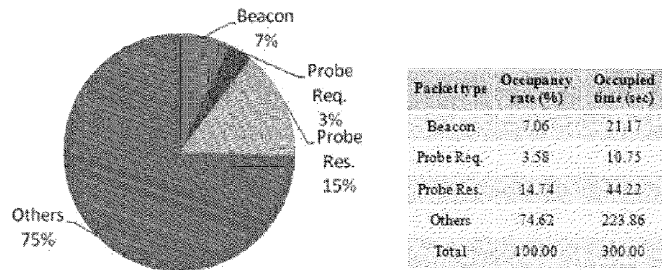
【도면】

【도 1】



【도 2】

Occupied Time Calculation Result



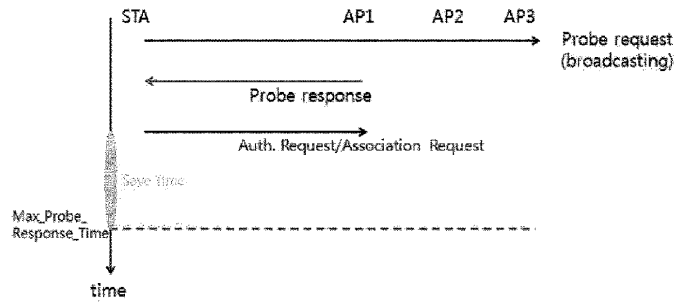
【도 3】

Order	Information	Notes
1	SSID	
2	Supported rates	
3	Request Information	May be included if do11MultiDomainCapabilityEnabled is true.
4	Extended Supported Rates	The Extended Supported Rates element is present whenever there are more than eight supported rates, and it is optional otherwise.
5	Tx Power	
Last	Vendor Specific	One or more vendor-specific information elements may appear in this frame. This information element follows all other information elements.

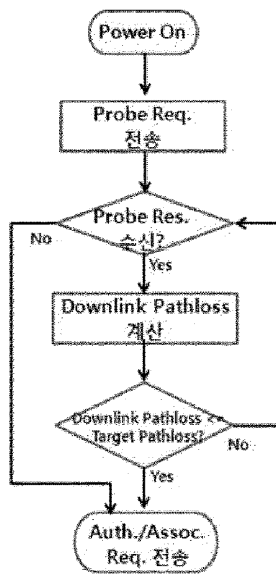
【도 4】

Order	Information	Notes
1	Timestamp	
2	Beacon interval	
3	Capability	
4	SSID	
5	Supported rates	
6	FH Parameter Set	The FH Parameter Set information element is present within Probe Response frames generated by STAs using FH PHYs.
7	DS Parameter Set	The DS Parameter Set information element is present within Probe Response frames generated by STAs using Clause 15, Clause 18, and Clause 19 PHYs.
8	CF Parameter Set	The CF Parameter Set information element is present only within Probe Response frames generated by APs supporting a PCF.
9	IBSS Parameter Set	The IBSS Parameter Set information element is present only within Probe Response frames generated by STAs in an IBSS.
10	Country	Included if dot11MultiDomainCapabilityEnabled or dot11SpectrumManagementRequired is true.
11	FH Parameters	FH Parameters, as specified in 7.3.2.10, may be included if dot11MultiDomainCapabilityEnabled is true.
12	FH Pattern Table	FH Pattern Table information, as specified in 7.3.2.11, may be included if dot11MultiDomainCapabilityEnabled is true.
13	Power Constraint	Shall be included if dot11SpectrumManagementRequired is true.
14	Channel Switch Announcement	May be included if dot11SpectrumManagementRequired is true.
15	Quiet	May be included if dot11SpectrumManagementRequired is true.
16	IBSS DFS	Shall be included if dot11SpectrumManagementRequired is true in an IBSS.
17	TPC Report	Shall be included if dot11SpectrumManagementRequired is true.
18	ERP Information	The ERP Information element is present within Probe Response frames generated by STAs using ERPs and is optionally present in other cases.
19	Extended Supported Rates	The Extended Supported Rates element is present whenever there are more than eight supported rates, and it is optional otherwise.
20	RSN	The RSN information element is only present within Probe Response frames generated by STAs that have dot11RSNAEnabled set to TRUE.
21	BSS Load	The BSS Load element is present when dot11QoSOptionImplemented and dot11QBSSLoadImplemented are both true.
22	EDCA Parameter Set	The EDCA Parameter Set element is present when dot11QoSOptionImplemented is true.
23	Target Pathloss	

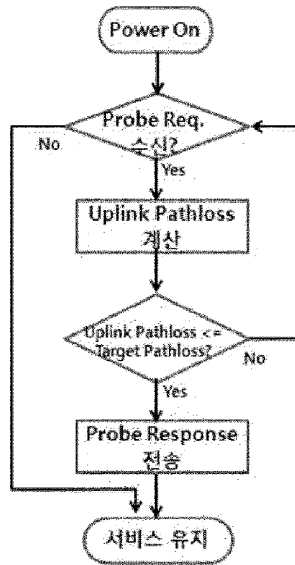
【도 5】



【도 6】



【도 7】





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.

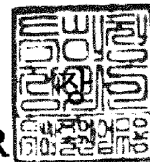
출 원 번 호 : 10-2013-0063860
Application Number

출 원 년 월 일 : 2013년 06월 04일
Filing Date JUN. 04, 2013

출 원 인 : 주식회사 케이티
Applicant(s) KT Corporation

2017년 06월 23일

특 허 청
COMMISSIONER



【서지사항】

【서류명】 특허출원서

【참조번호】 KT120009NR

【출원구분】 특허출원

【출원인】

 【명칭】 주식회사 케이티

 【특허고객번호】 2-1998-005456-3

【대리인】

 【명칭】 특허법인 이상

 【대리인번호】 9-2008-100021-0

 【지정된변리사】 이재관, 김영아, 정용인, 전호진, 유광철

 【포괄위임등록번호】 2011-072484-1

【발명의 국문명칭】 무선랜 시스템에서 액세스 포인트의 검색 방법

【발명의 영문명칭】 METHOD FOR SCANNING ACCESS POINT IN WIRELESS LOCAL AREA NETWORK SYSTEM

【발명자】

 【성명】 윤병완

 【성명의 영문표기】 YOON, Byung Wan

 【주민등록번호】 790108-1XXXXXX

 【우편번호】 137-140

 【주소】 서울특별시 서초구 우면동 17번지 KT연구개발센터

 【국적】 KR

【발명자】

 【성명】 임수환

 【성명의 영문표기】 LIM, Su Hwan

 【주민등록번호】 711126-1XXXXXX

제출 일자 : 2013-06-04

【우편번호】 137-140
【주소】 서울특별시 서초구 우면동 17번지 KT연구개발센터
【국적】 KR
【우선권 주장】
【출원국명】 KR
【출원번호】 10-2012-0070043
【출원일자】 2012.06.28
【증명서류】 첨부
【취지】 위와 같이 특허청장에게 제출합니다.

대리인 특허법인 이상 (서명 또는 인)

【수수료】
【출원료】 0 면 38,000 원
【가산출원료】 40 면 0 원
【우선권주장료】 1 건 18,000 원
【심사청구료】 0 항 0 원
【합계】 56,000 원

【발명의 설명】

【발명의 명칭】

무선랜 시스템에서 액세스 포인트의 검색 방법(METHOD FOR SCANNING ACCESS POINT IN WIRELESS LOCAL AREA NETWORK SYSTEM)

【기술분야】

<1> 본 발명은 액세스 포인트의 검색 방법에 관한 것으로, 더욱 상세하게는 무선랜 시스템에서 능동 검색 방식을 사용한 액세스 포인트의 검색 방법에 관한 것이다.

【배경기술】

<2> 정보통신 기술의 발전과 더불어 다양한 무선 통신 기술이 개발되고 있다. 이 중에서 무선랜(wireless local area network, WLAN)은 무선 주파수 기술을 바탕으로 개인용 휴대 정보 단말기(personal digital assistant, PDA), 랩탑 컴퓨터(laptop computer), 휴대형 멀티미디어 플레이어(portable multimedia player, PMP) 등과 같은 휴대형 단말기를 사용하여 가정이나 기업 또는 특정 서비스 제공지역에서 무선으로 인터넷에 접속할 수 있도록 하는 기술이다.

<3> 무선랜 기술에 대한 표준은 IEEE(Institute of Electrical and Electronics Engineers) 802.11 표준으로서 개발되고 있다. IEEE 802.11a는 5 GHz에서 비면허대역(unlicensed band)을 이용하여, 54 Mbps의 전송 속도를 제공한다. IEEE 802.11b는 2.4 GHz에서 직접 시퀀스 방식(direct sequence spread spectrum, DSS

S)을 적용하여, 11 Mbps의 전송 속도를 제공한다. IEEE 802.11g는 2.4 GHz에서 직교 주파수 분할 다중화(orthogonal frequency division multiplexing, OFDM)를 적용하여, 54 Mbps의 전송 속도를 제공한다. IEEE 802.11n은 다중입출력 OFDM(multiple input multiple output-OFDM, MIMO-OFDM)을 적용하여, 2 개의 공간적인 스트림(spatial stream)에 대해서 300 Mbps의 전송 속도를 제공한다. IEEE 802.11n에서는 채널 대역폭(channel bandwidth)을 40 MHz까지 지원하며, 이 경우에 600 Mbps의 전송 속도를 제공한다.

<4> 이와 같은 무선랜의 보급이 활성화되고 이를 이용한 어플리케이션이 다양화됨에 따라, IEEE 802.11n이 지원하는 데이터 처리 속도보다 더 높은 처리율을 지원하기 위한 새로운 무선랜 기술에 대한 필요성이 증가하고 있다. 초고처리율(very high throughput, VHT) 무선랜 기술은 1 Gbps 이상의 데이터 처리 속도를 지원하기 위하여 제안되고 있는 IEEE 802.11 무선랜 기술 중의 하나이다. 그 중, IEEE 802.11ac는 5 GHz 이하 대역에서 초고처리율 제공을 위한 표준으로서 개발되고 있고, IEEE 802.11ad는 60 GHz 대역에서 초고처리율 제공을 위한 표준으로서 개발되고 있다.

<5> 이러한 무선랜 기술을 기초로 한 시스템에 있어서, 액세스 포인트(access point)의 검색 방법에는 능동 검색(active scan) 방법과 수동 검색(passive scan) 방법이 있다. 액세스 포인트의 능동 검색 방법은 단말(station)이 프로브 요청 프레임(probe request frame)을 전송하고, 이를 수신한 액세스 포인트가 프로브 응답 프레임(probe response frame)으로 응답하는 방식으로 진행된다.

<6> 프로브 요청 프레임의 SSID(service set identifier)를 null로 설정하여 불특정 다수의 액세스 포인트에 응답을 요청한 경우, 단말은 최대 프로브 응답 시간(Max_Probe_Response_Time) 동안 액세스 포인트로부터 프로브 응답 프레임을 수신하고, 프로브 응답 프레임을 전송한 액세스 포인트들 중에서 무선 환경이 가장 좋은 액세스 포인트에 접속 요청을 한다. 즉, 무선 환경이 좋은 액세스 포인트로부터 프로브 응답 프레임을 수신한 경우에도 단말은 최대 프로브 응답 시간까지 기다린 후 액세스 포인트에 접속 요청을 해야 하므로, 불필요한 시간이 낭비되는 문제점이 있다.

<7> 액세스 포인트의 측면에서, 액세스 포인트는 수신된 프로브 요청 프레임에 매번 프로브 응답 프레임으로 응답을 해야 하므로, 무선 환경의 고려 없는 무조건적인 응답으로 인해 무선 자원이 낭비되는 문제점이 있다.

【발명의 내용】

【해결하려는 과제】

<8> 상기와 같은 문제점을 해결하기 위한 본 발명의 목적은, 단말의 출력 정보를 포함하는 프로브 요청 프레임을 사용하여 능동 검색을 수행하기 위한 액세스 포인트의 능동 검색 방법을 제공하는 데 있다.

<9> 상기와 같은 문제점을 해결하기 위한 본 발명의 다른 목적은, 액세스 포인트의 출력 정보를 포함하는 프로브 응답 프레임을 사용하여 능동 검색을 수행하기 위한 액세스 포인트의 능동 검색 방법을 제공하는 데 있다.

【과제의 해결 수단】

- <10> 상기 목적을 달성하기 위한 본 발명의 일 실시예에 따른 능동 검색 방법은, 단말의 신호 강도 정보를 포함하는 프로브 요청 프레임을 생성하는 단계 및 상기 프로브 요청 프레임을 액세스 포인트에 전송하는 단계를 포함한다.
- <11> 여기서, 상기 신호 강도 정보는 상기 단말의 전송 파워 정보를 포함할 수 있다.
- <12> 여기서, 상기 능동 검색 방법은, 임의의 액세스 포인트로부터 상기 프로브 요청 프레임에 대응된 프로브 응답 프레임을 수신하는 단계 및 상기 임의의 액세스 포인트와의 접속을 수행하는 단계를 더 포함하되, 상기 임의의 액세스 포인트는 상기 단말에 대한 상향링크 품질이 미리 정의된 기준을 만족하는 액세스 포인트일 수 있다.
- <13> 여기서, 상기 임의의 액세스 포인트와의 접속을 수행하는 단계는, 최대 프로브 응답 시간이 지나기 전에 상기 임의의 액세스 포인트와의 접속을 수행할 수 있다.
- <14> 여기서, 상기 능동 검색 방법은, 임의의 액세스 포인트로부터 상기 프로브 요청 프레임에 대응된 프로브 응답 프레임을 수신하는 단계, 상기 프로브 응답 프레임의 신호 강도를 기반으로 하향링크 경로손실을 획득하는 단계 및 상기 하향링크 경로손실이 미리 정의된 기준을 만족하는 경우, 상기 임의의 액세스 포인트와의 접속을 수행하는 단계를 더 포함할 수 있다.

- <15> 여기서, 상기 프로브 응답 프레임은 상기 미리 정의된 기준인 목표 경로손실 정보를 포함할 수 있다.
- <16> 여기서, 상기 제1 액세스 포인트와의 접속을 수행하는 단계는, 최대 프로브 응답 시간이 지나기 전에 상기 임의의 액세스 포인트와의 접속을 수행할 수 있다.
- <17> 여기서, 상기 임의의 액세스 포인트는 상기 단말에 대한 상향링크 품질이 미리 정의된 기준을 만족하는 액세스 포인트일 수 있다.
- <18> 상기 목적을 달성하기 위한 본 발명의 다른 실시예에 따른 능동 검색 방법은, 프로브 요청 프레임을 액세스 포인트에 전송하는 단계, 임의의 액세스 포인트로부터 상기 프로브 요청 프레임에 대응된 프로브 응답 프레임을 수신하는 단계, 상기 프로브 응답 프레임의 신호 강도를 기반으로 하향링크 품질 정보를 획득하는 단계 및 하향링크 품질이 미리 정의된 기준을 만족하는 경우, 상기 임의의 액세스 포인트와의 접속을 수행하는 단계를 포함한다.
- <19> 여기서, 상기 하향링크 품질 정보는 하향링크 경로손실 정보를 포함할 수 있다.
- <20> 여기서, 상기 프로브 응답 프레임은 상기 미리 정의된 기준인 목표 경로손실 정보를 포함할 수 있다.
- <21> 상기 다른 목적을 달성하기 위한 본 발명의 일 실시예에 따른 능동 검색 응답 방법은, 단말로부터 프로브 요청 프레임을 수신하는 단계, 상기 프로브 요청 프레임에 포함된 상기 단말의 신호 강도 정보를 기반으로 상향링크 품질 정보를 획득

하는 단계 및 상향링크 품질이 미리 정의된 기준을 만족하는 경우, 상기 단말에 프로브 응답 프레임을 전송하는 단계를 포함한다.

<22> 여기서, 상기 신호 강도 정보는 상기 단말의 전송 파워 정보를 포함할 수 있다.

<23> 여기서, 상기 상향링크 품질 정보는 상향링크 경로손실 정보를 포함할 수 있다.

<24> 여기서, 상기 프로브 응답 프레임을 전송하는 단계는, 목표 경로손실 정보를 포함하는 상기 프로브 응답 프레임을 전송할 수 있다.

【발명의 효과】

<25> 본 발명에 의하면, 액세스 포인트는 프로브 요청 프레임에 대한 상향링크 경로손실이 미리 정의된 기준을 만족하는 단말에만 프로브 응답 프레임으로 응답할 수 있으므로, 불필요한 무선 자원이 낭비되는 것을 방지할 수 있다.

<26> 한편, 단말은 프로브 응답 프레임에 대한 하향링크 경로손실이 미리 정의된 기준을 만족하는 경우, 최대 프로브 응답 시간까지 기다리지 않고 즉시 해당 액세스 포인트에 연결을 수행할 수 있으므로, 불필요한 시간이 낭비되는 것을 방지할 수 있다.

【도면의 간단한 설명】

<27> 도 1은 IEEE 802.11 무선랜 시스템의 구성에 대한 일 실시예를 도시한 개념도이다.

<29> 그러나, 이는 본 방법을 특정된 실시 형태에 대해 한정하려는 것이 아니며,

바, 특정 실시예를 도면에 예시하고 상세하게 설명하고자 한다.

<28> 본 방법은 다양한 변경을 가할 수 있고 여러 가지 실시예를 가질 수 있는

【발명을 실시하기 위한 구체적인 내용】

시한 순서도이다.

도 12는 본 방법의 일 실시예에 따른 액세스 포인트의 응용 검색 방법을 도

이다.

도 11은 본 방법의 일 실시예에 따른 응용 검색 응답 방법을 도시한 흐름도

이다.

도 10은 본 방법의 또 다른 실시예에 따른 응용 검색 방법을 도시한 흐름도

도 9는 프로브 응답 프레임(15~23)의 구성을 도시한 개념도이다.

도 8은 프로브 응답 프레임(1~14)의 구성을 도시한 개념도이다.

도 7은 본 방법의 다른 실시예에 따른 응용 검색 방법을 도시한 흐름도이다.

도 6은 프로브 요청 프레임의 구성을 도시한 개념도이다.

도 5는 본 방법의 일 실시예에 따른 응용 검색 방법을 도시한 흐름도이다.

도 4는 응용 검색 방법의 일 실시예를 도시한 개념도이다.

도이다.

도 3은 액세스 포인트의 데이터 전송 과정에 대한 일 실시예를 도시한 개념

도 2는 인프라스트럭처 BSS에서 단말의 연결 과정을 도시한 개념도이다.

제출 일자 : 2013-06-04

본 발명의 사상 및 기술 범위에 포함되는 모든 변경, 균등물 내지 대체물을 포함하는 것으로 이해되어야 한다.

<30> 제1, 제2 등의 용어는 다양한 구성요소들을 설명하는데 사용될 수 있지만, 상기 구성요소들은 상기 용어들에 의해 한정되어서는 안 된다. 상기 용어들은 하나의 구성요소를 다른 구성요소로부터 구별하는 목적으로만 사용된다. 예를 들어, 본 발명의 권리 범위를 벗어나지 않으면서 제1 구성요소는 제2 구성요소로 명명될 수 있고, 유사하게 제2 구성요소도 제1 구성요소로 명명될 수 있다. 및/또는 이라는 용어는 복수의 관련된 기재된 항목들의 조합 또는 복수의 관련된 기재된 항목들 중의 어느 항목을 포함한다.

<31> 어떤 구성요소가 다른 구성요소에 "연결되어" 있다거나 "접속되어" 있다고 언급된 때에는, 그 다른 구성요소에 직접적으로 연결되어 있거나 또는 접속되어 있을 수도 있지만, 중간에 다른 구성요소가 존재할 수도 있다고 이해되어야 할 것이다. 반면에, 어떤 구성요소가 다른 구성요소에 "직접 연결되어" 있다거나 "직접 접속되어" 있다고 언급된 때에는, 중간에 다른 구성요소가 존재하지 않는 것으로 이해되어야 할 것이다.

<32> 본 출원에서 사용한 용어는 단지 특정한 실시예를 설명하기 위해 사용된 것으로, 본 발명을 한정하려는 의도가 아니다. 단수의 표현은 문맥상 명백하게 다르게 뜻하지 않는 한, 복수의 표현을 포함한다. 본 출원에서, "포함하다" 또는 "가지다" 등의 용어는 명세서상에 기재된 특징, 숫자, 단계, 동작, 구성요소, 부품 또는 이들을 조합한 것이 존재함을 지정하려는 것이지, 하나 또는 그 이상의 다른 특징

들이나 숫자, 단계, 동작, 구성요소, 부품 또는 이들을 조합한 것들의 존재 또는 부가 가능성을 미리 배제하지 않는 것으로 이해되어야 한다.

<33> 다르게 정의되지 않는 한, 기술적이거나 과학적인 용어를 포함해서 여기서 사용되는 모든 용어들은 본 발명이 속하는 기술 분야에서 통상의 지식을 가진 자에 의해 일반적으로 이해되는 것과 동일한 의미를 가지고 있다. 일반적으로 사용되는 사전에 정의되어 있는 것과 같은 용어들은 관련 기술의 문맥 상 가지는 의미와 일치하는 의미를 가진 것으로 해석되어야 하며, 본 출원에서 명백하게 정의하지 않는 한, 이상적이거나 과도하게 형식적인 의미로 해석되지 않는다.

<34> 이하, 첨부한 도면들을 참조하여, 본 발명의 바람직한 실시예를 보다 상세하게 설명하고자 한다. 본 발명을 설명함에 있어 전체적인 이해를 용이하게 하기 위하여 도면상의 동일한 구성요소에 대해서는 동일한 참조부호를 사용하고 동일한 구성요소에 대해서 중복된 설명은 생략한다.

<35> 명세서 전체에서, 스테이션(station, STA)은 IEEE(Institute of Electrical and Electronics Engineers) 802.11 표준의 규정을 따르는 매체 접속 제어(media access control, MAC)와 무선 매체(media)에 대한 물리 계층(physical layer) 인터페이스(interface)를 포함하는 임의의 기능 매체를 의미한다. 스테이션(STA)은 액세스 포인트(access point, AP)인 스테이션(STA)과 비-액세스 포인트(non-AP)인 스테이션(STA)으로 구분할 수 있다. 액세스 포인트(AP)인 스테이션(STA)은 단순히 액세스 포인트(AP)로 불릴 수 있고, 비-액세스 포인트(non-AP)인 스테이션(STA)은

단순히 단말(terminal)로 불릴 수 있다.

<36> 스테이션(STA)은 프로세서(Processor)와 트랜시버(transceiver)를 포함하고, 사용자 인터페이스와 디스플레이(display) 장치 등을 더 포함할 수 있다. 프로세서는 무선 네트워크를 통해 전송할 프레임을 생성하거나 무선 네트워크를 통해 수신된 프레임을 처리하도록 고안된 유닛(unit)을 의미하며, 스테이션(STA)을 제어하기 위한 여러 가지 기능을 수행한다. 트랜시버는 프로세서와 기능적으로 연결되어 있으며, 스테이션(STA)을 위하여 무선 네트워크를 통해 프레임을 송수신하도록 고안된 유닛을 의미한다.

<37> 엑세스 포인트(AP)는 집중 제어기, 기지국(base station, BS), 노드-B(node-B), e노드-B, BTS(base transceiver system), 또는 사이트 제어기 등을 지칭할 수 있고, 그 것들의 일부 또는 전부 기능을 포함할 수 있다.

<38> 단말은 무선 송수신 유닛(wireless transmit/receive unit, WTRU), 사용자 장비(user equipment, UE), 사용자 단말(user terminal, UT), 액세스 단말(access terminal, AT), 이동국(mobile station, MS), 휴대용 단말(mobile terminal), 가입자 유닛(subscriber unit), 가입자 스테이션(subscriber station, SS), 무선 기기(wireless device), 또는 이동 가입자 유닛(mobile subscriber unit) 등을 지칭할 수 있고, 그 것들의 일부 또는 전부 기능을 포함할 수 있다.

<39> 여기서, 단말로 통신이 가능한 데스크탑 컴퓨터(desktop computer), 랩탑 컴퓨터(laptop computer), 태블릿(tablet) PC, 무선전화기(wireless phone), 모바일 폰(mobile phone), 스마트폰(smart phone), e-book 리더기, PMP(Portable

Multimedia Player), 휴대용 게임기, 네비게이션(navigation) 장치, 디지털 카메라(digital camera), DMB (Digital Multimedia Broadcasting) 재생기, 디지털 음성 녹음기(digital audio recorder), 디지털 음성 재생기(digital audio player), 디지털 영상 녹화기(digital picture recorder), 디지털 영상 재생기(digital picture player), 디지털 동영상 녹화기(digital video recorder), 디지털 동영상 재생기(digital video player) 등을 사용할 수 있다.

<40> 도 1은 IEEE 802.11 무선랜 시스템의 구성에 대한 일 실시예를 도시한 개념도이다.

<41> 도 1을 참조하면, IEEE 802.11 무선랜 시스템은 적어도 하나의 기본 서비스 세트(basic service set, BSS)를 포함한다. BSS는 성공적으로 동기화를 이루어서 서로 통신할 수 있는 스테이션(STA 1, STA 2(AP 1), STA 3, STA 4, STA 5(AP 2))의 집합을 의미하며, 특정 영역을 의미하는 개념은 아니다.

<42> BSS는 인프라스트럭처 BSS(infrastructure BSS)와 독립 BSS(independent BSS, IBSS)로 구분할 수 있으며, BSS 1과 BSS 2는 인프라스트럭처 BSS를 의미한다. BSS 1은 단말(STA 1), 분배 서비스(distribution service)를 제공하는 액세스 포인트(STA 2(AP 1)) 및 다수의 액세스 포인트(STA 2(AP 1), STA 5(AP 2))를 연결하는 분배 시스템(Distribution System, DS)을 포함할 수 있다. BSS 1에서 액세스 포인트(STA 2(AP 1))는 단말(STA 1)을 관리한다.

<43> BSS 2는 단말(STA 3, STA 4), 분배 서비스를 제공하는 액세스 포인트(STA 5(AP 2)) 및 다수의 액세스 포인트(STA 2(AP 1), STA 5(AP 2))를 연결하는 분배 시스템을 포함할 수 있다. BSS 2에서 액세스 포인트(STA 5(AP 2))는 단말(STA 3, STA 4)을 관리한다.

<44> 한편, 독립 BSS는 애드-혹(ad-hoc) 모드로 동작하는 BSS이다. IBSS는 액세스 포인트를 포함하지 않으므로, 중앙에서 관리 기능을 수행하는 개체(centralized management entity)가 존재하지 않는다. 즉, IBSS에서 단말들은 분산된 방식(distributed manner)으로 관리된다. IBSS에서 모든 단말은 이동 단말로 이루어질 수 있으며, 분배 시스템(DS)으로 접속이 허용되지 않으므로 자기 완비적 네트워크(self-contained network)를 이룬다.

<45> 액세스 포인트(STA 2(AP 1), STA 5(AP 2))는 자신에게 결합된 단말(STA 1, STA 3, STA 4)을 위하여 무선 매체를 통한 분산 시스템(DS)에 대한 접속을 제공한다. BSS 1 또는 BSS 2에서 단말들(STA 1, STA 3, STA 4) 사이의 통신은 일반적으로 액세스 포인트(STA 2(AP 1), STA 5(AP 2))를 통해 이루어지나, 다이렉트 링크(direct link)가 설정된 경우에는 단말들(STA 1, STA 3, STA 4) 간의 직접 통신이 가능하다.

<46> 복수의 인프라스트럭처 BSS는 분배 시스템(DS)을 통해 상호 연결될 수 있다. 분배 시스템(DS)을 통하여 연결된 복수의 BSS를 확장 서비스 세트(extended service set, ESS)라 한다. ESS에 포함되는 스테이션들은 서로 통신할 수 있으며, 동일한 ESS 내에서 단말은 끊임 없이 통신하면서 하나의 BSS에서 다른 BSS로 이동

할 수 있다.

<47> 분배 시스템(DS)은 하나의 액세스 포인트가 다른 액세스 포인트와 통신하기 위한 메커니즘(mechanism)으로서, 이에 따르면 액세스 포인트는 자신이 관리하는 BSS에 결합되어 있는 단말들을 위해 프레임 전송하거나, 다른 BSS로 이동한 임의의 단말을 위해 프레임 전송할 수 있다. 또한, 액세스 포인트는 유선 네트워크 등과 같은 외부 네트워크와 프레임을 송수신할 수가 있다. 이러한 분배 시스템(DS)은 반드시 네트워크일 필요는 없으며, IEEE 802.11 표준에 규정된 소정의 분배 서비스를 제공할 수 있다면 그 형태에 대해서는 아무런 제한이 없다. 예컨대, 분배 시스템은 메쉬 네트워크(mesh network)와 같은 무선 네트워크이거나, 액세스 포인트들을 서로 연결시켜 주는 물리적인 구조물일 수 있다.

<48> 후술할 본 발명의 일 실시예에 따른 액세스 포인트의 능동 검색 방법은 상기에서 설명한 IEEE 802.11 무선랜 시스템에 적용될 수 있으며, 더불어 IEEE 802.11 무선랜 시스템뿐만 아니라 WPAN(Wireless Personal Area Network), WBAN(Wireless Body Area Network) 등과 같은 다양한 네트워크에 적용될 수 있다.

<49> 도 2는 인프라스트럭처 BSS에서 단말의 연결 과정을 도시한 개념도이다.

<50> 인프라스트럭처 BSS에서 단말(STA)이 데이터를 송수신하기 위해, 먼저 단말(STA)은 액세스 포인트(AP)와 연결되어야 한다.

<51> 도 2를 참조하면, 인프라스트럭처 BSS에서 단말(STA)의 연결 과정은 크게 1)

액세스 포인트(AP)를 탐지하는 단계(probe step), 2) 탐지된 액세스 포인트(AP)와의 인증 단계(authentication step), 3) 인증된 액세스 포인트(AP)와의 연결 단계(association step)로 구분된다.

<52> 단말(STA)은 먼저 탐지 프로세스(process)를 통해 이웃하는 액세스 포인트들(APs)을 탐지할 수 있다. 탐지 프로세스는 수동 스캐닝(passive scanning) 방법과 능동 스캐닝(active scanning) 방법으로 구분된다. 수동 스캐닝 방법은 이웃하는 액세스 포인트들(APs)이 전송하는 비컨을 엿들음(overhearing)으로써 수행될 수 있다. 한편, 능동 스캐닝 방법은 프로브 요청 프레임(probe request frame)을 브로드캐스팅(broadcasting)함으로써 수행될 수 있다. 프로브 요청 프레임을 수신한 액세스 포인트(AP)는 프로브 요청 프레임에 대응된 프로브 응답 프레임(probe response frame)을 해당 단말(STA)에 전송할 수 있다. 단말(STA)은 프로브 응답 프레임을 수신함으로써 이웃하는 액세스 포인트들(APs)의 존재를 알 수 있다.

<53> 그 후, 단말(STA)은 탐지된 액세스 포인트(AP)와의 인증을 수행하며, 탐지된 복수의 액세스 포인트들(APs)과의 인증을 수행할 수 있다. IEEE 802.11 표준에 따른 인증 알고리즘(algorithm)은 두 개의 인증 프레임을 교환하는 오픈 시스템(open system) 알고리즘, 네 개의 인증 프레임을 교환하는 공유 키(shared key) 알고리즘으로 구분된다. 이러한 인증 알고리즘을 기초로 인증 요청 프레임(authentication request frame)과 인증 응답 프레임(authentication response frame)을 교환하는 과정을 통해, 단말(STA)은 액세스 포인트(AP)와의 인증을 수행할 수 있다.

<54> 마지막으로, 단말(STA)은 인증된 복수의 액세스 포인트들(APs) 중 하나의 액

세스 포인트(AP)를 선택하고, 선택된 액세스 포인트(AP)와 연결 과정을 수행한다. 즉, 단말(STA)은 선택된 액세스 포인트(AP)에 연결 요청 프레임(association request frame)을 전송하고, 연결 요청 프레임을 수신한 액세스 포인트(AP)는 연결 요청 프레임에 대응된 연결 응답 프레임(association response frame)을 해당 단말(STA)에 전송한다. 이와 같이, 연결 요청 프레임과 연결 응답 프레임을 교환하는 과정을 통해, 단말(STA)은 액세스 포인트(AP)와 연결 과정을 수행할 수 있다.

<55> 도 3은 액세스 포인트의 데이터 전송 과정에 대한 일 실시예를 도시한 개념도이다.

<56> 도 3을 참조하면, 액세스 포인트(AP)는 주기적으로 비컨을 브로드캐스팅(broadcasting) 하며, 3개의 비컨 간격(interval)으로 DTIM이 포함된 비컨을 브로드캐스팅할 수 있다. 전력 절감 모드(power save mode, PSM)의 단말(STA 1, STA 2)은 주기적으로 깨어나(awake) 비컨을 수신하고, 비컨에 포함된 TIM 또는 DTIM을 확인하여 자신에게 전송될 데이터가 액세스 포인트에 버퍼링되어 있는지 확인한다. 이때, 버퍼링된 데이터가 존재하는 경우 단말(STA 1, STA 2)은 깨어있는 상태를 유지하여 액세스 포인트(AP)로부터 데이터를 수신하고, 버퍼링된 데이터가 존재하지 않는 경우 단말(STA 1, STA 2)은 절력 절감 상태(즉, doze 상태)로 돌아간다.

<57> 즉, 자신의 AID에 대응하는 TIM 내의 비트가 1로 설정되어 있는 경우, 단말(STA 1, STA 2)은 자신이 깨어 있고 데이터를 받을 준비가 되어 있음을 알리는 PS(Power Save)-Poll 프레임(또는, 트리거(trigger) 프레임)을 액세스 포인트(AP)

에 전송하고, 액세스 포인트(AP)는 PS-Poll 프레임을 수신함으로써 단말(STA 1, STA 2)이 데이터 수신을 위한 준비가 되었음을 확인하고, 단말(STA 1, STA 2)에 데이터 또는 ACK(acknowledgement)을 전송할 수 있다. ACK을 단말(STA 1, STA 2)에 전송한 경우, 액세스 포인트(AP)는 적절한 시점에 데이터를 단말(STA 1, STA 2)에 전송한다. 한편, 자신의 AID에 대응하는 TIM 내의 비트가 0 으로 설정되어 있는 경우, 단말(STA 1, STA 2)은 전력 절감 상태로 돌아간다.

<58> 도 4는 능동 검색 방법의 일 실시예를 도시한 개념도이다.

<59> 도 4를 참조하면, 단말(STA)은 프로브 요청 프레임을 브로드캐스팅할 수 있고, 프로브 요청 프레임을 수신한 액세스 포인트들(AP 1, AP 2)은 프로브 응답 프레임으로 응답할 수 있다. 단말(STA)은 최소 프로브 응답 시간(min_probe_response_time) 동안 프로브 응답 프레임을 수신하지 못한 경우 프로브 요청 프레임을 다시 전송할 수 있다. 단말(STA)은 최대 프로브 응답 시간(max_probe_response_time) 동안 프로브 응답 프레임을 수신하며, 프로브 응답 프레임을 전송한 액세스 포인트들(AP 1, AP 2) 중에서 무선 환경이 가장 좋은 액세스 포인트에 접속 요청을 한다. 즉, 무선 환경이 좋은 액세스 포인트로부터 프로브 응답 프레임을 수신한 경우에도 단말은 최대 프로브 응답 시간까지 기다린 후 액세스 포인트에 접속 요청을 해야 하므로, 불필요한 시간이 낭비되는 문제가 있다.

- <60> 도 5는 본 발명의 일 실시예에 따른 능동 검색 방법을 도시한 흐름도이다.
- <61> 도 5를 참조하면, 단말에서 수행되는 능동 검색 방법은 단말의 신호 강도 (signal strength) 정보를 포함한 프로브 요청 프레임을 생성하는 단계(S100) 및 프로브 요청 프레임을 액세스 포인트에 전송하는 단계(S110)를 포함한다. 또한, 능동 검색 방법은 임의의 액세스 포인트로부터 프로브 요청 프레임에 대응된 프로브 응답 프레임을 수신하는 단계(S120) 및 임의의 액세스 포인트와의 접속(access)을 수행하는 단계(S130)를 더 포함할 수 있다.
- <62> 단계 S100에서, 단말은 자신의 신호 강도 정보를 포함하는 프로브 요청 프레임을 생성할 수 있으며, 신호 강도 정보는 전송 파워(Tx power) 정보를 포함할 수 있다. 즉, 신호 강도는 전송 파워를 의미할 수 있다.
- <63> 도 6은 프로브 요청 프레임의 구성을 도시한 개념도이다.
- <64> 도 6을 참조하면, 프로브 요청 프레임은 전송 파워(5, Tx Power) 정보를 포함한다. 즉, 단말은 도 6에 도시된 바와 같이 전송 파워 정보를 포함한 프로브 요청 프레임을 생성할 수 있다.
- <65> 다시 도 5를 참조하면, 단계 S110에서, 단말은 프로브 요청 프레임을 액세스 포인트에 전송할 수 있다. 여기서, 단말은 특정 액세스 포인트에 프로브 요청 프레임을 전송할 수 있고, 또는 불특정 액세스 포인트에 프로브 요청 프레임을 전송(즉, 브로드캐스팅)할 수 있다.
- <66> 단계 S120에서, 단말은 임의의 액세스 포인트로부터 프로브 요청 프레임에

<68> 도 7은 본 발명의 다른 실시예에 따른 응용 검색 방법을 도시한 흐름도이다.

<69> 도 7을 참조하면, 단말에서 수행되는 응용 검색 방법은 단말의 신호 강도 정보를 포함하는 프로토콜 요청 프레임(예를 들어, S200), 프로토콜 요청 프레임(예를 들어, S210), 임의의 액세스 포인트로부터 프로토콜 요청

<67> 단계 S130에서, 단말은 임의의 액세스 포인트와의 접속(즉, 인증(authentication) 과정 및 연결(association) 과정)을 수행할 수 있다. 단말은 미리 설정된 최대 프로토콜 응답 시간이 지나기 전에 임의의 액세스 포인트와의 접속을 수행할 수 있다. 즉, 단말은 프로토콜 응답 프레임의 수신 후 즉시 임의의 액세스 포인트와의 접속을 수행할 수 있다. 상황링크 경로선택이 미리 정의된 기준을 만족하는 경우는 임의의 액세스 포인트와 단말 간의 상황링크 품질이 양호한 것을 의미하므로, 단말은 남은 최대 프로토콜 응답 시간 동안 다른 프로토콜 응답 프레임의 수신

위치를 취할 수 있다.

대응된 프로토콜 응답 프레임의 수신할 수 있다. 임의의 액세스 포인트는 프로토콜 요청 프레임의 수신한 액세스 포인트들 중 하나의 액세스 포인트를 의미한다. 또한, 임의의 액세스 포인트는 단말에 대한 상황링크 품질(예를 들어, 경로선택)이 미리 정의된 기준을 만족하는 액세스 포인트를 의미할 수 있다. 여기서, 미리 정의된 기준은 (상황링크) 목표 경로선택(target pathloss)을 의미하며, 임의의 액세스 포인트는 목표 경로선택보다 작거나 같은 상황링크 경로선택을 가지는 액세스 포인트를

제출 일자 : 2013-06-04

프레임에 대응된 프로브 응답 프레임을 수신하는 단계(S220), 프로브 응답 프레임의 신호 강도를 기반으로 하향링크 경로손실을 획득하는 단계(S230) 및 하향링크 경로손실이 미리 정의된 기준을 만족하는 경우 임의의 액세스 포인트와의 접속을 수행하는 단계(S240)를 포함한다.

<70> 단계 S200에서, 단말은 자신의 신호 강도 정보를 포함하는 프로브 요청 프레임을 생성할 수 있으며, 신호 강도 정보는 전송 파워 정보를 포함할 수 있다. 즉, 신호 강도는 전송 파워를 의미할 수 있다.

<71> 단계 S210에서, 단말은 프로브 요청 프레임을 액세스 포인트에 전송할 수 있다. 여기서, 단말은 특정 액세스 포인트에 프로브 요청 프레임을 전송할 수 있고, 또는 불특정 액세스 포인트에 프로브 요청 프레임을 전송(즉, 브로드캐스팅)할 수 있다.

<72> 단계 S220에서, 단말은 임의의 액세스 포인트로부터 프로브 요청 프레임에 대응된 프로브 응답 프레임을 수신할 수 있다. 임의의 액세스 포인트는 프로브 요청 프레임을 수신한 액세스 포인트들 중 하나의 액세스 포인트를 의미한다. 또한, 임의의 액세스 포인트는 단말에 대한 상향링크 품질(예를 들어, 경로손실)이 미리 정의된 기준을 만족하는 액세스 포인트를 의미할 수 있다. 여기서, 미리 정의된 기준은 (상향링크) 목표 경로손실을 의미하며, 임의의 액세스 포인트는 목표 경로손실보다 작거나 같은 상향링크 경로손실을 가지는 액세스 포인트를 의미할 수 있다.

<73> 단계 S230에서, 단말은 프로브 응답 프레임의 신호 강도를 기반으로 하향링크 경로손실을 획득할 수 있다. 임의의 액세스 포인트의 전송 파워를 알고 있는 경

프로토콜 응답 프로세싱을 수신한 경우 즉시 임의의 액세스 포인트와의 접속을 수행할 수 있다. 단, 단말은 미리 정의된 기준을 만족하는 프로토콜 응답 프로세싱을 수신한 경우 즉시 임의의 액세스 포인트와의 접속을 수행할 수 있다. 단, 단말은 미리 설정된 최대 프로토콜 응답 시간이 지나기 전에 임의의 액세스 포인트와의 접속(즉, 인증 과정 및 연결 과정)을 수행할 수 있다. 단, 단말은 하향링크 경로 손실이 목표 경로 손실보다 작거나 도 7을 참조하면, 단말은

<77>

생성된 프로토콜 응답 프로세싱을 단말에 제공할 수 있다. 이와 같이 목표 경로 손실 정보를 포함한 프로토콜 응답 프로세싱을 생성할 수 있으며, Pathloss) 정보를 포함한다. 즉, 임의의 액세스 포인트는 도 8 및 도 9에 도시된 도 8 및 도 9를 참조하면, 프로토콜 응답 프로세싱은 목표 경로 손실(23, Target <76> 도 8 및 도 9는 프로토콜 응답 프로세싱의 구성을 도시한 개념도이다. <75> 도 8 및 도 9는 프로토콜 응답 프로세싱의 구성을 도시한 개념도이다.

단말에 전송될 수 있다.

원(크) 목표 경로 손실은 의미하며, 목표 경로 손실은 프로토콜 응답 프로세싱에 포함되어 <74> 단말 S240에서, 하향링크 경로 손실이 미리 정의된 기준을 만족하는 경우 단말은 임의의 액세스 포인트와의 접속을 수행할 수 있다. 미리 정의된 기준은 (하향 <73> 원(크) 목표 경로 손실은 의미하며, 목표 경로 손실은 프로토콜 응답 프로세싱에 포함되어 <72> 단말 S240에서, 하향링크 경로 손실이 미리 정의된 기준을 만족하는 경우 단말은 임의의 액세스 포인트와의 접속을 수행할 수 있다.

를 생성하여 단말에 전송할 수 있고, 단말은 이러한 프로토콜 응답 프로세싱을 통해 임 <71> 즉, 임의의 액세스 포인트는 자신의 전송 파워 정보를 포함한 프로토콜 응답 프로세싱 <70> 와 액세스 포인트의 전송 파워를 프로토콜 응답 프로세싱을 통해 획득할 수도 있다. <69> 강도 간의 차이를 통해 하향링크 경로 손실을 획득할 수 있다. 여기서, 단말은 임의 <68> 후, 단말은 임의의 액세스 포인트의 전송 파워와 프로토콜 응답 프로세싱의 수신 신호 <67> <66> <65> <64> <63> <62> <61> <60> <59> <58> <57> <56> <55> <54> <53> <52> <51> <50> <49> <48> <47> <46> <45> <44> <43> <42> <41> <40> <39> <38> <37> <36> <35> <34> <33> <32> <31> <30> <29> <28> <27> <26> <25> <24> <23> <22> <21> <20> <19> <18> <17> <16> <15> <14> <13> <12> <11> <10> <9> <8> <7> <6> <5> <4> <3> <2> <1> <0>

제출 일자 : 2013-06-04

<82> 단계 S300에서, 단말은 프로브 요청 프레임용 액세스 포인트에 전송할 수 있다. 여기서, 단말은 특정 액세스 포인트에 프로브 요청 프레임용 전송할 수 있고, 또는 불특정 액세스 포인트에 프로브 요청 프레임용 전송(즉, 브로드캐스팅)할 수

해하는 단계(S330)를 포함한다.

도 10을 참조하면, 단말에서 수행되는 응용 검색 방법은 프로브 요청 프레임에 대응된 프로브 응답 프레임용 수신하는 단계(S310), 프로브 응답 프레임에 대응된 프로브 응답 프레임용 수신하는 단계(S320) 및 하향링크 물리적 계층을 획득하는 단계(S330) 및 하향링크 물리적 계층이 미리 정의된 기준을 만족하는 경우 임의의 액세스 포인트와의 접속을 수

<80> 도 10은 본 발명의 또 다른 실시예에 따른 응용 검색 방법을 도시한 흐름도

이다.

포인트로부터 프로브 응답 프레임용 수신할 수 있다.

<79> 한편, 하향링크 경로손실이 목표 경로손실보다 큰 경우, 단말은 다른 액세스

포인트와의 접속을 수행할 수 있다.

<78> 하향링크 경로손실이 미리 정의된 기준을 만족하는 경우는 임의의 액세스 포

수 있다.

제출 일자 : 2013-06-04

세스 포인트와의 접속(즉, 인증 과정 및 연결 과정)을 수행할 수 있다. 단말은 미

<86>

단말은 하향링크 경로순환이 목표 경로순환보다 작거나 같은 경우 임의의 해

단말에 전송될 수 있다.

링크) 목표 경로순환을 의미하며, 목표 경로순환은 프로브 응답 프레임에 포함되어

단말은 임의의 액세스 포인트와의 접속을 수행할 수 있다. 미리 정의된 기준은 (하향

<85>

단말 S330에서, 하향링크 경로순환이 미리 정의된 기준을 만족하는 경우 단

할 수 있다.

단말은 이러한 프로브 응답 프레임용 물체 임의의 액세스 포인트의 전송 패킷을 획득

송 패킷 정보를 포함한 프로브 응답 프레임용 생성하여 단말에 전송할 수 있고, 단

브 응답 프레임용 물체 획득할 수도 있다. 즉, 임의의 액세스 포인트는 자신의 전

순환을 획득할 수 있다. 여기서, 단말은 임의의 액세스 포인트의 전송 패킷을 프로

송 패킷과 프로브 응답 프레임의 수신 신호 간에 차이를 통해 하향링크 경로

액세스 포인트의 전송 패킷을 받고 있는 경우, 단말은 임의의 액세스 포인트의 전

보를 포함한다. 즉, 하향링크 물체는 하향링크 경로순환을 의미할 수 있다. 임의의

하향링크 물체 정보를 획득할 수 있다. 하향링크 물체 정보는 하향링크 경로순환 정

<84>

단말 S320에서, 단말은 프로브 응답 프레임의 수신 신호 강도를 기반으로 하

향 프레임을 수신한 액세스 포인트를 중 하나의 액세스 포인트를 의미한다.

대응된 프로브 응답 프레임용 수신할 수 있다. 임의의 액세스 포인트는 프로브 요

<83>

단말 S310에서, 단말은 임의의 액세스 포인트로부터 프로브 요청 프레임에

있다.

제출 일자 : 2013-06-04

리 설정된 최대 프로브 응답 시간이 지나기 전에 임의의 액세스 포인트와의 접속을 수행할 수 있다. 즉, 단말은 미리 정의된 기준을 만족하는 프로브 응답 프레임을 수신한 경우 즉시 임의의 액세스 포인트와의 접속을 수행할 수 있다.

<87> 하향링크 경로손실이 미리 정의된 기준을 만족하는 경우는 임의의 액세스 포인트와 단말 간의 하향링크 품질이 양호한 것을 의미하므로, 단말은 남은 최대 프로브 응답 시간 동안 다른 프로브 응답 프레임을 수신하지 않고 임의의 액세스 포인트와의 접속을 수행할 수 있다.

<88> 한편, 하향링크 경로손실이 목표 경로손실보다 큰 경우, 단말은 다른 액세스 포인트로부터 프로브 응답 프레임을 수신할 수 있다.

<89> 도 11은 본 발명의 일 실시예에 따른 능동 검색 응답 방법을 도시한 흐름도이다.

<90> 도 11을 참조하면, 액세스 포인트에서 수행되는 능동 검색 응답 방법은 단말로부터 프로브 요청 프레임을 수신하는 단계(S400), 프로브 요청 프레임에 포함된 단말의 신호 강도 정보를 기반으로 상향링크 품질 정보를 획득하는 단계(S410) 및 상향링크 품질이 미리 정의된 기준을 만족하는 경우, 단말에 프로브 응답 프레임을 전송하는 단계(S420)를 포함한다.

<91> 단계 S400에서, 액세스 포인트는 단말로부터 프로브 요청 프레임을 수신할 수 있다. 즉, 프로브 요청 프레임에 포함된 SSID가 자신의 SSID인 경우 또는 SSID

가 null로 설정되어 있는 경우, 액세스 포인트는 해당 프로브 요청 프레임에 수신할 수 있다.

<92> 단계 S410에서, 액세스 포인트는 프로브 요청 프레임에 포함된 단말의 신호 강도 정보를 기반으로 상향링크 품질 정보를 획득할 수 있다. 여기서, 단말의 신호 강도 정보는 단말의 전송 파워 정보를 의미하고, 상향링크 품질 정보는 상향링크 경로손실을 의미한다. 즉, 액세스 포인트는 프로브 요청 프레임에 포함된 단말의 전송 파워와 프로브 요청 프레임의 수신 신호 강도 간의 차이를 통해 상향링크 경로손실을 획득할 수 있다.

<93> 단계 S420에서, 액세스 포인트는 상향링크 품질이 미리 정의된 기준을 만족하는 경우 단말에 프로브 응답 프레임을 전송할 수 있다. 여기서, 미리 정의된 기준은 (상향링크) 목표 경로손실을 의미한다. 즉, 액세스 포인트는 상향링크 품질 (즉, 경로손실)이 목표 경로손실보다 작거나 같은 경우 단말에 프로브 응답 프레임을 전송할 수 있다. 한편, 상향링크 품질(즉, 경로손실)이 목표 경로손실보다 큰 경우, 액세스 포인트는 단말에 프로브 응답 프레임을 전송하지 않는다.

<94> 단말에 프로브 응답 프레임을 전송하는 경우, 액세스 포인트는 (하향링크) 목표 경로손실 정보를 포함한 프로브 응답 프레임을 단말에 전송할 수 있다. 프로브 응답 프레임에 포함된 목표 경로손실 정보는 단말에서 하향링크 품질을 획득하는데 사용될 수 있다.

<95> 도 12는 본 발명의 일 실시예에 따른 액세스 포인트의 능동 검색 방법을 도시한 순서도이다.

<96> 도 12를 참조하면, 단말(10)은 프로브 요청 프레임(broadcast)을 브로드캐스팅할 수 있다(S500). 액세스 포인트들(20, 21, 22)은 수신한 프로브 요청 프레임을 기반으로 상향링크 경로손실을 산출할 수 있다. 즉, 프로브 요청 프레임에 포함된 단말(10)의 전송 파워와 프로브 요청 프레임의 수신 신호 강도를 기반으로 상향링크 경로손실을 산출할 수 있다. 상향링크 경로손실이 미리 정의된 기준(즉, 상향링크 목표 경로손실)보다 작거나 같은 경우, 해당 액세스 포인트는 프로브 응답 프레임을 단말(10)에 전송할 수 있다(S510).

<97> 예를 들어, 제1 액세스 포인트(20)에 대한 상향링크 경로손실이 미리 정의된 기준보다 작거나 같은 경우, 제1 액세스 포인트(20)는 프로브 응답 프레임을 단말(10)에 전송할 수 있다.

<98> 단말(10)은 제1 액세스 포인트(20)로부터 프로브 응답 프레임을 수신할 수 있고, 프로브 응답 프레임을 수신한 후 즉시 제1 액세스 포인트(20)와의 접속(즉, 인증 과정 및 연결 과정)을 수행할 수 있다(S520). 즉, 단말은 미리 설정된 최대 프로브 응답 시간이 지나기 전에 제1 액세스 포인트(20)와의 접속을 수행할 수 있다. 상향링크 경로손실이 미리 정의된 기준을 만족하는 경우는 제1 액세스 포인트(20)와 단말 간의 상향링크 품질이 양호한 것을 의미하므로, 단말은 남은 최대 프로브 응답 시간 동안 다른 프로브 응답 프레임을 수신하지 않고 제1 액세스 포인트(20)와의 접속을 수행할 수 있다.

<99> 이상 실시예를 참조하여 설명하였지만, 해당 기술 분야의 숙련된 당업자는 하기의 특허 청구의 범위에 기재된 본 발명의 사상 및 영역으로부터 벗어나지 않는 범위 내에서 본 발명을 다양하게 수정 및 변경시킬 수 있음을 이해할 수 있을 것이다.

【부호의 설명】

<100> 10: 단말
 20: 제1 액세스 포인트
 21: 제2 액세스 포인트
 22: 제3 액세스 포인트

【특허청구범위】

【청구항 1】

단말(station)에서 수행되는 능동 검색 방법으로서,
상기 단말의 신호 강도(signal strength) 정보를 포함하는 프로브 요청 프레임(probe request frame)을 생성하는 단계; 및
상기 프로브 요청 프레임을 액세스 포인트(access point)에 전송하는 단계를 포함하는 것을 특징으로 하는 능동 검색 방법.

【청구항 2】

청구항 1에 있어서,
상기 신호 강도 정보는 상기 단말의 전송 파워(Tx power) 정보를 포함하는 것을 특징으로 하는 능동 검색 방법.

【청구항 3】

청구항 1에 있어서,
상기 능동 검색 방법은,
임의의 액세스 포인트로부터 상기 프로브 요청 프레임에 대응된 프로브 응답 프레임(probe response frame)을 수신하는 단계; 및
상기 임의의 액세스 포인트와의 접속을 수행하는 단계를 더 포함하되,
상기 임의의 액세스 포인트는 상기 단말에 대한 상향링크 품질이 미리 정의된 기준을 만족하는 액세스 포인트인 것을 특징으로 하는 능동 검색 방법.

【청구항 4】

청구항 3에 있어서,
상기 임의의 액세스 포인트와의 접속을 수행하는 단계는,
최대 프로브 응답 시간(max probe response time)이 지나기 전에 상기 임의의 액세스 포인트와의 접속을 수행하는 것을 특징으로 하는 능동 검색 방법.

【청구항 5】

청구항 1에 있어서,
상기 능동 검색 방법은,
임의의 액세스 포인트로부터 상기 프로브 요청 프레임에 대응된 프로브 응답 프레임을 수신하는 단계;
상기 프로브 응답 프레임의 신호 강도를 기반으로 하향링크 경로손실을 획득하는 단계; 및
상기 하향링크 경로손실이 미리 정의된 기준을 만족하는 경우, 상기 임의의 액세스 포인트와의 접속을 수행하는 단계를 더 포함하는 것을 특징으로 하는 능동 검색 방법.

【청구항 6】

청구항 5에 있어서,
상기 프로브 응답 프레임은 상기 미리 정의된 기준인 목표 경로손실(target pathloss) 정보를 포함하는 것을 특징으로 하는 능동 검색 방법.

【청구항 7】

청구항 5에 있어서,
상기 제1 액세스 포인트와의 접속을 수행하는 단계는,
최대 프로브 응답 시간이 지나기 전에 상기 임의의 액세스 포인트와의 접속
을 수행하는 것을 특징으로 하는 능동 검색 방법.

【청구항 8】

청구항 5에 있어서,
상기 임의의 액세스 포인트는 상기 단말에 대한 상향링크 품질이 미리 정의
된 기준을 만족하는 액세스 포인트인 것을 특징으로 하는 능동 검색 방법.

【청구항 9】

단말(station)에서 수행되는 능동 검색 방법으로서,
프로브 요청 프레임(probe request frame)을 액세스 포인트(access point)에
전송하는 단계;
임의의 액세스 포인트로부터 상기 프로브 요청 프레임에 대응된 프로브 응답
프레임(probe response frame)을 수신하는 단계;
상기 프로브 응답 프레임의 신호 강도를 기반으로 하향링크 품질 정보를 획득하는 단계; 및
하향링크 품질이 미리 정의된 기준을 만족하는 경우, 상기 임의의 액세스 포
인트와의 접속을 수행하는 단계를 포함하는 것을 특징으로 하는 능동 검색 방법.

【청구항 10】

청구항 9에 있어서,

상기 하향링크 품질 정보는 하향링크 경로손실 정보를 포함하는 것을 특징으로 하는 능동 검색 방법.

【청구항 11】

청구항 9에 있어서,

상기 프로브 응답 프레임은 상기 미리 정의된 기준인 목표 경로손실(target pathloss) 정보를 포함하는 것을 특징으로 하는 능동 검색 방법.

【청구항 12】

액세스 포인트(access point)에서 수행되는 능동 검색 응답 방법으로서,

단말(station)로부터 프로브 요청 프레임(probe request frame)을 수신하는 단계;

상기 프로브 요청 프레임에 포함된 상기 단말의 신호 강도 정보를 기반으로 상향링크 품질 정보를 획득하는 단계; 및

상향링크 품질이 미리 정의된 기준을 만족하는 경우, 상기 단말에 프로브 응답 프레임(probe response frame)을 전송하는 단계를 포함하는 것을 특징으로 하는 능동 검색 응답 방법.

【청구항 13】

청구항 12에 있어서,

제출 일자 : 2013-06-04

상기 신호 강도 정보는 상기 단말의 전송 파워(Tx power) 정보를 포함하는
것을 특징으로 하는 능동 검색 응답 방법.

【청구항 14】

청구항 12에 있어서,

상기 상향링크 품질 정보는 상향링크 경로손실 정보를 포함하는 것을 특징으
로 하는 능동 검색 응답 방법.

【청구항 15】

청구항 12에 있어서,

상기 프로브 응답 프레임을 전송하는 단계는,

목표 경로손실(target pathloss) 정보를 포함하는 상기 프로브 응답 프레임
을 전송하는 것을 특징으로 하는 능동 검색 응답 방법.

【요약서】

【요약】

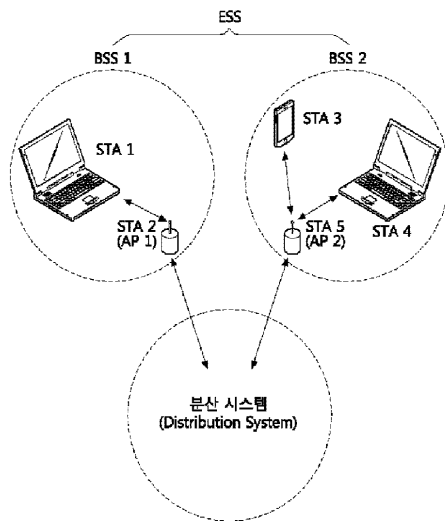
액세스 포인트의 검색 방법이 개시된다. 능동 검색 방법은, 단말의 신호 강도 정보를 포함하는 프로브 요청 프레임을 생성하는 단계 및 프로브 요청 프레임을 액세스 포인트에 전송하는 단계를 포함한다. 따라서, 불필요한 시간 및 무선 자원이 낭비되는 것을 방지할 수 있다.

【대표도】

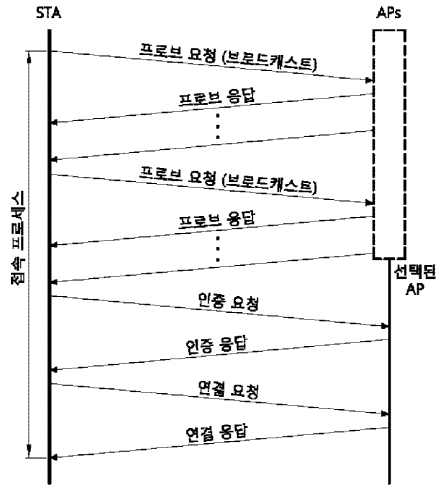
도 5

【도면】

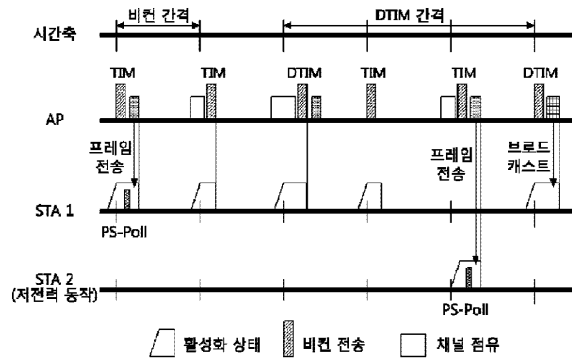
【도 1】



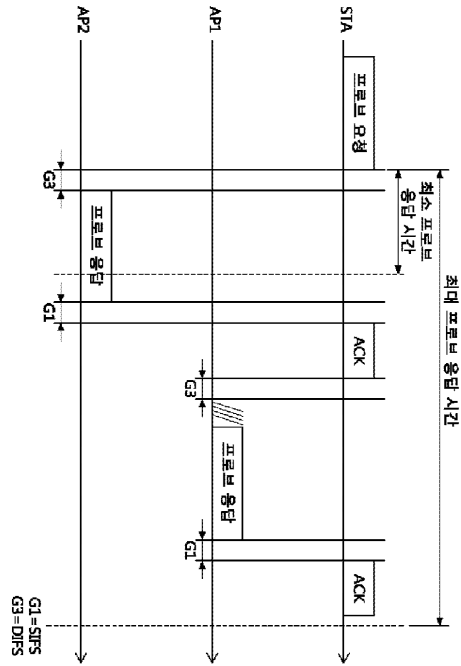
【도 2】



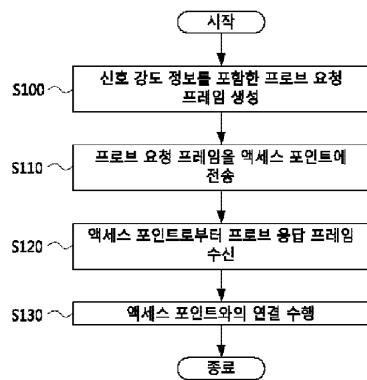
【도 3】



【도 4】



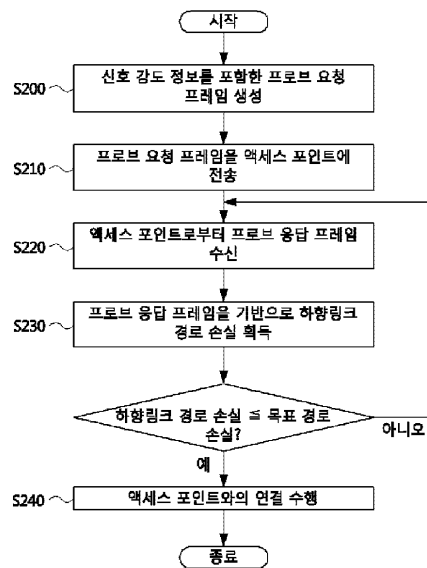
【도 5】



【도 6】

Order	Information	Notes
1	SSID	
2	Supported rates	
3	Request information	May be included if dot11MultiDomainCapabilityEnabled is true.
4	Extended Supported Rates	The Extended Supported Rates element is present whenever there are more than eight supported rates, and it is optional otherwise.
5	Tx Power	
Last	Vendor Specific	One or more vendor-specific information elements may appear in this frame. This information element follows all other information elements.

【도 7】



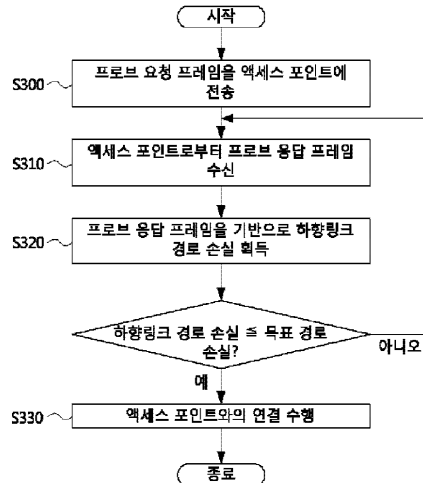
【도 8】

Order	Information	Notes
1	Timestamp	
2	Beacon interval	
3	Capability	
4	SSID	
5	Supported rates	
6	FH Parameter Set	The FH Parameter Set information element is present within Probe Response frames generated by STAs using FH PHYs.
7	DS Parameter Set	The DS Parameter Set information element is present within Probe Response frames generated by STAs using Clause 15, Clause 18, and Clause 19 PHYs.
8	CF Parameter Set	The CF Parameter Set information element is present only within Probe Response frames generated by APs supporting a PCF.
9	IBSS Parameter Set	The IBSS Parameter Set information element is present only within Probe Response frames generated by STAs in an IBSS.
10	Country	Included if dot11MultiDomainCapabilityEnabled or dot11SpectrumManagementRequired is true.
11	FH Parameters	FH Parameters, as specified in 7.3.2.10, may be included if dot11MultiDomainCapabilityEnabled is true.
12	FH Pattern Table	FH Pattern Table information, as specified in 7.3.2.11, may be included if dot11MultiDomainCapabilityEnabled is true.
13	Power Constraint	Shall be included if dot11SpectrumManagementRequired is true.
14	Channel Switch Announcement	May be included if dot11SpectrumManagementRequired is true.

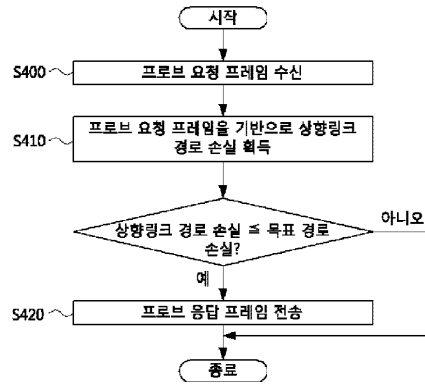
【도 9】

Order	Information	Notes
15	Quiet	May be included if dot11SpectrumManagementRequired is true.
16	IBSS DFS	Shall be included if dot11SpectrumManagementRequired is true in an IBSS.
17	TPC Report	Shall be included if dot11SpectrumManagementRequired is true.
18	ERP Information	The ERP Information element is present within Probe Response frames generated by STAs using ERPs and is optionally present in other cases.
19	Extended Supported Rates	The Extended Supported Rates element is present whenever there are more than eight supported rates, and it is optional otherwise.
20	RSN	The RSN information element is only present within Probe Response frames generated by STAs that have dot11RSNAEnabled set to TRUE.
21	BSS Load	The BSS Load element is present when dot11QosOptionImplemented and dot11QBSSLoadImplemented are both true.
22	EDCA Parameter Set	The EDCA Parameter Set element is present when dot11QosOptionImplemented is true.
23	Target Pathloss	

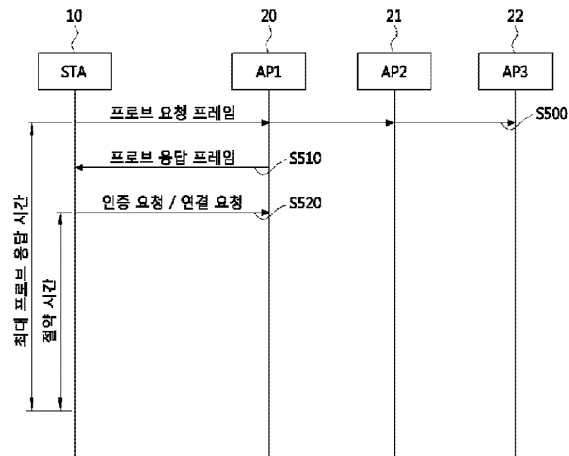
【도 10】



【도 11】



【도 12】





UNITED STATES PATENT AND TRADEMARK OFFICE

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

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO.	TOT CLAIMS	IND CLAIMS
15/618,443	06/09/2017	2858	2020	Q233661	11	4

CONFIRMATION NO. 7227

FILING RECEIPT



CC00000092199992

23373
SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

Date Mailed: 06/20/2017

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**

Inventor(s)

Byung Wan YOON, Seoul, KOREA, REPUBLIC OF;
Su Hwan RIM, Seoul, KOREA, REPUBLIC OF;

Applicant(s)

KT Corporation, Seongnam-si, KOREA, REPUBLIC OF;

Assignment For Published Patent Application

KT Corporation, Seongnam-si, KOREA, REPUBLIC OF

Power of Attorney: The patent practitioners associated with Customer Number 23373

Domestic Priority data as claimed by applicant

This application is a CON of 14/411,278 12/24/2014
which is a 371 of PCT/KR2013/005733 06/27/2013

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 10-2012-0070043 06/28/2012

REPUBLIC OF KOREA 10-2013-0063860 06/04/2013

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: No

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: 06/16/2017

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/618,443**

Projected Publication Date: 09/28/2017

Non-Publication Request: No

Early Publication Request: No

Title

METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM

Preliminary Class

324

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

page 2 of 4

countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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

GRANTED

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

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

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

NOT GRANTED

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

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

technology, manufacture products, deliver services, and grow your business, visit <http://www.SelectUSA.gov> or call +1-202-482-6800.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875						Application or Docket Number 15/618,443			
APPLICATION AS FILED - PART I									
(Column 1)		(Column 2)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY			
FOR	NUMBER FILED	NUMBER EXTRA	RATE(\$)	FEE(\$)		RATE(\$)	FEE(\$)		
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	280		
SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A	600		
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	720		
TOTAL CLAIMS (37 CFR 1.16(i))	11	minus 20 = *				x 80 =	0.00		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	4	minus 3 = *	1			x 420 =	420		
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00		
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00		
				TOTAL		TOTAL	2020		
* If the difference in column 1 is less than zero, enter "0" in column 2.									
APPLICATION AS AMENDED - PART II									
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
	Total (37 CFR 1.16(i))	*	Minus **	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))						OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						OR		
				TOTAL ADD'L FEE		TOTAL ADD'L FEE			
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY	
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE(\$)	ADDITIONAL FEE(\$)		RATE(\$)	ADDITIONAL FEE(\$)	
	Total (37 CFR 1.16(i))	*	Minus **	=	x	=	OR	x	=
	Independent (37 CFR 1.16(h))	*	Minus ***	=	x	=	OR	x	=
	Application Size Fee (37 CFR 1.16(s))						OR		
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						OR		
				TOTAL ADD'L FEE		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.									

UTILITY PATENT APPLICATION TRANSMITTAL
ADDITIONAL PAGE

Priority is claimed from:

Country	Application No	Filing Date
US	14/411,278	2014-12-24
PCT	PCT/KR2013/005733	2013-06-27
KR	10-2012-0070043	2012-06-28
KR	10-2013-0063860	2013-06-04

The priority document(s) are attached herewith.

Attorney Docket No.		Q233661
CORRESPONDENCE ADDRESS		
☒ The address associated with Customer Number:	WASHINGTON OFFICE 23373 CUSTOMER NUMBER	OR ☐ Correspondence address below

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Docket No: Q233661

Byung Wan YOON, et al.

Appln. No.: Not Yet Assigned

Group Art Unit: Not Yet Assigned

Confirmation No.: Not Yet Assigned

Examiner: Not Yet Assigned

Filed: June 8, 2017

For: METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM

**INFORMATION DISCLOSURE STATEMENT
UNDER 37 CFR §§ 1.97 and 1.98**

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

Sir:

In accordance with the duty of disclosure under 37 CFR §1.56, Applicant hereby notifies the U.S. Patent and Trademark Office of the documents which are listed on the attached PTO/SB/08 A & B (modified) form which are all the references of record in parent application No. 14/411,278. Applicant is not submitting duplicate copies of these references but requests that they be listed on the face of any patent granted on the above application. (See 37 CFR §1.98(d)). Copies of any cited copending applications, if not previously submitted, are being submitted herewith.

INFORMATION DISCLOSURE STATEMENT
UNDER 37 CFR §§ 1.97 and 1.98
U.S. Appln. No.: Not Yet Assigned

Attorney Docket No.: Q233661

The submission of the listed documents is not intended as an admission that any such document constitutes prior art against the claims of the present application. Applicant does not waive any right to take any action that would be appropriate to antedate or otherwise remove any listed document as a competent reference against the claims of the present application.

Respectfully submitted,

SUGHRUE MION, PLLC
Telephone: 202.293.7060
Facsimile: 202.293.7860

/ Douglas E. Agopsowicz /
Douglas E. Agopsowicz
Registration No. 56,792

WASHINGTON OFFICE

23373

CUSTOMER NUMBER

Date: June 9, 2017

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	Not Yet Assigned
	Confirmation Number	Not Yet Assigned
	Filing Date	June 7, 2017
	First Named Inventor	Byung Wan YOON
	Art Unit	Not Yet Assigned
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	Q233661

U.S. PATENTS						
Examiner Initials*	Cite No	Patent Number	Kind Code ¹	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, where Relevant Passages or Relevant Figures Appear
	1.	8,509,173	B2	2013-08-13	KIM et al.	

U.S. PATENT APPLICATION PUBLICATIONS						
Examiner Initials*	Cite No	Publication Number	Kind Code ¹	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, where Relevant Passages or Relevant Figures Appear
	2.	20100284303	A1	2010-11-11	CATOVIC et al.	
	3.	20110149766	A1	2011-06-23	CHOI et al.	
	4.	20110188486	A1	2011-08-04	KIM et al.	
	5.	20110243013	A1	2011-10-06	LEE et al.	
	6.	20120307685	A1	2012-12-06	KIM et al.	
	7.	20080014934	A1	2008-01-17	BLALASUBRAMANIAN et al.	
	8.	20050227623	A1	2005-10-13	Su, Wei-Kun	
	9.	20090046633	A1	2009-02-19	Thomson; Allen	
	10.	20100118830	A1	2010-05-13	Stephenson; David Sheldon	
	11.	20120044914	A1	2012-02-23	Chen; John Anthony	
	12.	20120044862	A1	2012-02-23	Chen; John Anthony	
	13.	20120108173	A1	2012-05-03	Hahm; Seong-II	
	14.	20130086665	A1	2013-04-04	Filippi; Geoff	
	15.	20130231151	A1	2013-09-05	Kneckt; Jarkko Lauri Sakari	
	16.	20130294354	A1	2013-11-07	Zhang; Guodong	
	17.	20150098358	A1	2015-04-09	Park; Giwon	
	18.	20150189673	A1	2015-07-02	Park; Giwon	
	19.	20160007386	A1	2016-01-07	Park; Giwon	

FOREIGN PATENT DOCUMENTS							
Examiner Initials*	Cite No	Foreign Document Number ³	Country Code ²	Kind Code ⁴	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines, where Relevant Passages or Relevant Figures Appear

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city, and/or country where published.	T ⁵
	20.	International Search Report for PCT/KR2013/005733 dated October 25, 2013	

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

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

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)	Application Number	Not Yet Assigned
	Confirmation Number	Not Yet Assigned
	Filing Date	June 7, 2017
	First Named Inventor	Byung Wan YOON
	Art Unit	Not Yet Assigned
	Examiner Name	Not Yet Assigned
	Attorney Docket Number	Q233661

NON-PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city, and/or country where published.	T ⁵
	21.	Non-Final Office Action mailed February 2, 2016 in US 14/411,278	
	22.	Final Office Action mailed October 21, 2016 in US 14/411,278	
	23.	Advisory Action mailed January 26, 2017 in US 14/411,278	
	24.	Notice of Allowance mailed March 9, 2017 in US 14/411,278	

EXAMINER SIGNATURE			
Examiner Signature		Date Considered	

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

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

[Page 2 of 2]

METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM

CLAIM FOR PRIORITY

This application is a continuation of U.S. Application no. 14/411,278 filed December
5 24, 2014, which claims priority to Korean Patent Application No. 2012-0070043 filed on
June 28, 2012 and No. 2013-0063860 filed on June 4, 2013 in the Korean Intellectual
Property Office (KIPO), the entire contents of which are hereby incorporated by reference.

BACKGROUND

10 1. Technical Field

Example embodiments of the present invention relate in general to the field of an
access point scan method, and more particularly, to an access point scan method using an
active scan scheme in a wireless LAN system.

15 2. Related Art

Various wireless communication technologies have been developed together with
information communication technologies. Wireless local area network (WLAN) belonging
to the wireless communication technologies is a technology allowing wireless internet access
at home or business or at a designated service providing region by using a portable terminal,
20 such as a personal digital assistant (PDA), a laptop computer, and a portable multimedia
player (PMP) based on wireless frequency technologies.

As the standard of the WLAN, Institute of Electrical and Electronics Engineers
(IEEE) 802.11 standards have been developed. IEEE 802.11a provides a transmission speed
of 54 Mbps by using an unlicensed band of 5 GHz. IEEE 802.11b provides a transmission
25 speed of 11 Mbps by using direct sequence spread spectrum (DSSS) at 2.4 GHz. IEEE
802.11g provides a transmission speed of 54 Mbps by using orthogonal frequency division

multiplexing (OFDM) at 2.4 GHz. IEEE 802.11n provides a transmission speed of 300 Mbps with respect to two spatial streams by using multiple input multiple output-OFDM (MIMO-OFDM). IEEE 802.11n supports a channel bandwidth of 40 MHz at the maximum, and provides a transmission speed of 600 Mbps.

5 As the propagation of the WLAN becomes more active and applications using the WLAN are diversified, there is an increasing need for a new WLAN technology capable of supporting a throughput higher than the data processing speed supported by IEEE 802.11n. WLAN technology for very high throughput (VHT) is one of the IEEE 802.11 WLAN technologies suggested to support a data processing speed of 1 Gps or more. As one of the
10 VHT WLAN technologies, IEEE 802.11ac is developed as a standard for supporting a VHT at a frequency band of 5 GHz or below, and IEEE 802.11ad is developed as a standard for supporting a VHT at a frequency band of 60 GHz.

 In a system based on the WLAN technology, an access point scan method includes an active scan method and a passive scan method. According to the active access point scan
15 method, a station transmits a probe request frame, and an access point having received the probe request frame transmits a probe response frame in response to the received probe request frame.

 Upon requesting responses from a plurality of undesignated access points by setting a service set identifier (SSID) of a probe request frame in a state of null, the station receives a
20 probe response frame from the access points during a maximum probe response time Max_Probe_Response_Time, and requests access at an access point whose wireless environment is the most superior among the access points having transmitted probe response frames. That is, even after a probe response frame is received from an access point having a superior wireless environment, the station waits for the maximum probe response time to pass,
25 and then requests an access at the access point, thereby causing waste of time.

 In the position of an access point, the access point needs to respond in the form of a

probe response frame at each of the probe request frames being received, so the response is unconditionally made without consideration of a wireless environment, thereby causing waste of wireless resources.

5 SUMMARY

Accordingly, example embodiments of the present invention are provided to substantially obviate one or more problems due to limitations and disadvantages of the related art.

Example embodiments of the present invention provide an access point scan method
10 capable of performing an active scan by using a probe request frame including output information of a station.

Example embodiments of the present invention also provide an access point scan method capable of performing an active scan by using a probe response frame including output information of an access point.

15 In some example embodiments, an active scan method performed at a station includes generating a probe request frame including signal strength information of the station, and transmitting the probe request frame to access points.

The signal strength information may include information about transmission power of the station.

20 The active scan method may further include: receiving a probe response frame corresponding to the probe request frame from a certain access point; and performing an access to the certain access point, wherein the certain access point may be an access point satisfying a predetermined standard for an uplink quality with respect to the station.

In the performing of the access to the certain access point, an access to the certain
25 access point may be performed before a maximum probe response time elapses.

The active scan method may further include: receiving a probe response frame

corresponding to the probe request frame from a certain access point; acquiring a downlink path loss based on signal strength of the probe response frame; and performing an access to the certain access point if the downlink path loss satisfies a predetermined standard.

5 The probe response frame may include target path loss information as the predetermined standard.

In the performing of access to the certain access point, the access to the certain access point may be performed before a maximum probe response time elapses.

The certain access point may be an access point satisfying the predetermined standard for the uplink quality with respect to the station.

10 In other example embodiments, an active scan method performed at a station includes: transmitting a probe request frame to access points; receiving a probe response frame corresponding to the probe request frame from a certain access point; acquiring information about downlink quality based on signal strength of the probe response frame; and performing an access to the certain access point if the downlink quality satisfies a
15 predetermined standard.

The downlink quality information may include downlink path loss information.

The probe response frame may include target path loss information as the predetermined standard.

20 In still other example embodiments, an active scan method performed at an access point include: receiving a probe request frame from a station; acquiring information about uplink quality based on signal strength information of the station included in the probe request frame; and transmitting a probe response frame to the station if the uplink quality satisfies a predetermined standard.

The signal strength information may include transmission power of the station.

25 The uplink quality information may include uplink path loss information.

In the transmitting of the probe response frame, the probe response frame including

target path loss information may be transmitted.

BRIEF DESCRIPTION OF DRAWINGS

Example embodiments of the present invention will become more apparent by
5 describing in detail example embodiments of the present invention with reference to the
accompanying drawings, in which:

FIG. 1 is a conceptual view illustrating the configuration of an IEEE 802.11 wireless
LAN system according to an example embodiment of the present invention;

FIG. 2 is a conceptual view illustrating an association process of a station in an
10 infrastructure basic service set (BSS);

FIG. 3 is a conceptual view illustrating a data transmission process of an access point
according to an example embodiment of the present invention;

FIG. 4 is a conceptual view illustrating an active scan method according to an
example embodiment of the present invention;

15 FIG. 5 is a flowchart showing an active scan method according to an example
embodiment of the present invention;

FIG. 6 is a conceptual view illustrating the configuration of a probe request frame;

FIG. 7 is a flowchart showing an active scan method according to another example
embodiment of the present invention;

20 FIG. 8 is a conceptual view illustrating the configuration of a probe response frame (1
to 14);

FIG. 9 is a conceptual view illustrating the configuration of a probe response frame
(15 to 23);

FIG. 10 is a flowchart showing an active scan method according to still another
25 example embodiment of the present invention;

FIG. 11 is a flowchart showing an active scan-based responding method according to

an example embodiment of the present invention; and

FIG. 12 is a flowchart showing an active scan method of an access point according to an example embodiment of the present invention.

5 DESCRIPTION OF EXAMPLE EMBODIMENTS

Example embodiments of the present invention are disclosed herein. However, specific structural and functional details disclosed herein are merely representative for purposes of describing example embodiments of the present invention, and thus example embodiments of the present invention may be embodied in many alternate forms and should
10 not be construed as limited to example embodiments of the present invention set forth herein.

Accordingly, while the invention is susceptible to various modifications and alternative forms, specific embodiments thereof are shown by way of example in the drawings and will herein be described in detail. It should be understood, however, that there is no intent to limit the invention to the particular forms disclosed, but on the contrary, the
15 invention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the invention. Like numbers refer to like elements throughout the description of the figures.

It will be understood that, although the terms first, second, etc. may be used herein to describe various elements, these elements should not be limited by these terms. These terms
20 are only used to distinguish one element from another. For example, a first element could be termed a second element, and similarly, a second element could be termed a first element, without departing from the scope of the present invention. As used herein, the term "and/or" includes any and all combinations of one or more of the associated listed items.

It will be understood that when an element is referred to as being "connected" or
25 "coupled" to another element, it can be directly connected or coupled to the other element or intervening elements may be present. In contrast, when an element is referred to as being

"directly connected" or "directly coupled" to another element, there are no intervening elements present. Other words used to describe the relationship between elements should be interpreted in a like fashion (*i.e.*, "between" versus "directly between", "adjacent" versus "directly adjacent", etc.).

5 The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the invention. As used herein, the singular forms "a," "an," and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms "comprises," "comprising," "includes," and/or "including," when used herein, specify the presence of stated features,
10 integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof.

 Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one of ordinary skill in the art to
15 which this invention belongs. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

 Hereinafter, preferred example embodiments of the present invention will be
20 described in detail with reference to the accompanying drawings. The same elements may have the same reference numerals to provide better understanding of the specification, and the details of elements identical will be omitted in order to avoid redundancy.

 In this specification, a station (STA) represents a certain functional medium including a physical layer interface with respect to a medium access control (MAC) and a wireless
25 medium according to provisions in IEEE 802.11 standards. The station STA is classified into a station serving as an access point (AP) and a station serving as a non-access point (non-

AP). A station serving as an access point AP is referred to as an access point AP, and a station serving as a non-access point AP is referred to as a terminal.

The station STA includes a processor and a transceiver, and may further include a user interface and a display device. The processor represents a unit that is designed to generate a frame to be transmitted through a wireless network, or designed to process a frame received through a wireless network, and in order to control the station STA, the processor performs various functions. The transceiver represents a unit functionally connected to the processor, and designed to transmit and receive a frame for the station STA through a wireless network.

An access point AP may represent a centralized control device, a base station BS, a node-B, an e node-B, a base transceiver system (BTS), or a site control device, and may have some or the entire functions thereof.

A station may represent a wireless transmit/receive unit (WTRU), user equipment (UE), a user terminal (UT), an access terminal (AT), a mobile station (MS), a mobile terminal, a subscriber unit, a subscriber station (SS), a wireless device, or a mobile subscriber unit, and may have some or the entire functions thereof.

A station may perform communication using a desktop computer, a laptop computer, a tablet PC, a wireless phone, a mobile phone, a smart phone, an e-book reader, a Portable Multimedia Player (PMP), a portable game console, a navigation system, a digital camera, a Digital Multimedia Broadcasting (DMB) player, a digital audio recorder, a digital audio player, a digital picture recorder, a digital picture player, a digital video recorder, and a digital video player.

FIG. 1 is a conceptual view illustrating the configuration of an IEEE 802.11 wireless LAN system according to an example embodiment of the present invention.

Referring to FIG. 1, an IEEE 802.11 wireless LAN system includes at least one basic

service set (BSS). BSS represents a set of stations STA 1, STA 2(AP 1), STA 3, STA 4, and STA 5(AP 2), rather than representing a designated region.

BSS is divided into an infrastructure BSS and an independent BSS (IBSS), and BSS 1 and BSS 2 each represent the infrastructure BSS. BSS1 may include a station STA1, an
5 access point STA2 (AP1) providing a distribution service, and a distribution system DS connecting a plurality of access points STA2 (AP1) and STA5 (A2). In BSS1, the access point STA2 (AP1) manages the station STA1.

BSS2 may include stations STA3 and STA4, an access point STA5 (AP2) providing a distribution service, and the distribution system DS connecting the plurality of access points
10 STA2 (AP1) and STA5 (A2). In BSS2, the access point STA5 (AP2) manages the stations STA3 and STA4.

Meanwhile, the independent BSS is a BSS operating in an ad-hoc mode. Since an IBSS does not include an access point, a centralized management entity performing a management function is not present at the center of the IBSS. That is, stations in an IBSS
15 are managed in a distributed manner. All of the stations in the IBSS may be provided as a mobile station, and form a self-contained network since the stations are not allowed for an access to the DS.

The access points STA2 (AP1) and STA5 (AP2) each provide the stations STA1, STA3, and STA4 connected thereto with an access to a DS through a wireless medium. In
20 general, communication between the stations STA1, STA3, and STA4 in the BSS1 or the BSS2 is achieved through the access point STA 2(AP 1) and STA 5(AP 2). However, when a direct link is set, a direction communication between the stations STA1, STA3, and STA4 may be possible.

A plurality of infrastructure BSSs may be connected to each other through the
25 distribution system DS. The plurality of BSSs connected through the distribution system DS is referred to as an extended service set (ESS). Stations included in an ESS may

communicate with each other, and a station in the same ESS may move from one BSS to another BSS while performing seamlessly communication.

The distribution system DS is a mechanism for allowing one access point to communicate with another access point. The distribution system DS may allow an access point to transmit a frame provided for stations connected to a BSS that is managed by the access point, or to transmit a frame provided for a station that has moved to another BSS. In addition, the access point may transmit a frame with an external network, such as a wired network. The distribution system DS does not need to be a network, and may be implemented in various forms as long as it provides a predetermined distribution service set on IEEE 802.11 standards. For example, the distribution system may be a wireless network, such as a mesh network, or a physical structure connecting access points to each other.

An active scan method of an access point according to an example embodiment of the invention may be applied to the IEEE 802.11 wireless system described above, and further applied to various network, such as a WPAN (Wireless Personal Area Network) and a WBAN (Wireless Body Area Network), in addition to the IEEE 802.11 wireless system.

FIG. 2 is a conceptual view illustrating an association process of a station in an infrastructure basic service set (BSS).

In order for a station STA transmits and receives data in an infrastructure BSS, first, the station STA needs to be connected to an access point AP.

Referring to FIG. 2, an association process of a station STA in an infrastructure BSS is largely divided into a probe step of finding out an access point AP, 2) an authentication step of authenticating the found access point, and 3) an association step of performing association with the authenticated access point AP.

The station STA may search for nearby access points through a probe process. The probe process is classified into a passive scan method and an active scan method. The passive scan method is performed by overhearing a beacon transmitted by nearby access

points APs. Meanwhile, the active scan method is performed by broadcasting probe request frames. An access point having received the probe request frame may transmit a probe response frame corresponding to the probe request frame to a corresponding station STA. The station STA may determine existences of the nearby access points APs by receiving the
5 probe response frame.

Thereafter, the station STA performs authentication with respect to the found access point AP, thereby performing authentication with respect to the plurality of detected access points APs. An authentication algorithm according to the IEEE 802.11 standard is classified into an open system algorithm exchanging two authentication frames and a shared key
10 algorithm exchanging four authentication frames. By exchanging an authentication request frame and an authentication response frame based on such an authentication algorithm, the station STA performs authentication with respect to access points AP.

Finally, the station STA selects one access point among the plurality of authenticated access points APs, and performs an association with the selected access point AP. That is,
15 the station STA transmits an association request frame to the selected access point AP, and the access point AP having received the association request frame transmits an association response frame corresponding to the association request frame to the station STA. By the process of exchanging the association request frame and the association response frame, the station STA performs the association with the access point AP.

20 FIG. 3 is a conceptual view illustrating a data transmission process of an access point according to an example embodiment of the present invention.

Referring to FIG. 3, an access point AP periodically broadcasts a beacon, and in this case, may broadcast a beacon including a delivery traffic indication message (DTIM) at an interval of three beacons. The stations STA1 and STA2 in a power save mode (PSM) may
25 be periodically awake and receive beacons, and check a traffic indication map (TIM) or DTIM included in the beacon, thereby determining whether data to be transmitted to the

stations STA1 and STA2 is buffered in the access point. If buffered data exists in the access point, the stations STA1 and STA2 are kept awake to receive the data from the access point AP. If buffered data does not exist in the access point, the stations STA1 and STA2 return to a power save mode (PSM) that is, a doze state.

5 That is, if a bit in a TIM corresponding AID of the stations STA1 and STA2 is set to 1, the stations STA1 and STA2 send an access point AP a Power Save (PS)-Poll frame (or trigger frame) indicating that the stations STA1 and STA2 are awake and ready for receiving data, and the access point AP having received the PS-Poll frame verifies that the stations STA1 and STA2 are ready for receiving data, and transmits data or acknowledgement (ACK)
10 to the stations STA1 and STA2. When ACK is transmitted to the stations STA1 and STA2, the access point AP transmits data to the stations STA1 and STA2 at an adequate point of time. Meanwhile, if a bit in a TIM corresponding AID of the stations STA1 and STA2 is set to 0, the stations STA1 and STA2 return to a power save mode (PSM).

FIG. 4 is a conceptual view illustrating an active scan method according to an
15 example embodiment of the present invention.

Referring to FIG. 4, the station STA may broadcast probe request frames, and access points AP1 and AP2 having received the probe request frames each may transmit a probe response frame in response to the probe request frame. If the station STA fails to receive a probe response frame during a minimum probe response time min_probe_response_time, the
20 station STA may transmit probe request frames again. The station STA receives probe response frames during a maximum probe response time max_probe_response_time, and requests an access at an access point having the most superior wireless environment among the access points AP1 and AP2 having transmitted probe response frames. That is, the station needs to wait for the maximum probe response time to elapse even after receiving a
25 probe response frame from an access point having a superior wireless environment, , which causes waste of time.

FIG. 5 is a flowchart showing an active scan method according to an example embodiment of the present invention.

Referring to FIG. 5, an active scan method performed at a station includes generating a probe request frame including signal strength information of the station (S100), and
5 transmitting the probe request frame to access points (S110). In addition, the active scan method may further include receiving a probe response frame corresponding to the probe request frame from a certain access point (S120), and performing an access to the certain access point (S130).

In operation S100, the station may generate a probe request frame including signal
10 strength information of the station, and the signal strength information may include transmission power (Tx power) information. That is, the signal strength may represent transmission power.

FIG. 6 is a conceptual view illustrating the configuration of a probe request frame.

Referring to FIG. 6, the probe request frame may include transmission power
15 power). That is, the station may generate a probe request frame including transmission power information as shown in FIG. 6.

Referring again to FIG. 5, in operation S110, the station may transmit the probe request frame to access points. In this case, the station may transmit a probe request frame to a designated access point, or an undesignated access point (that is, broadcasting).

20 In operation S120, the station may receive a probe response frame corresponding to the probe request frame from a certain access point. The certain access point may represent one access point among access points having received the probe request frame. In addition, the certain access point may represent an access point satisfying a predetermined standard for uplink quality with respect to the station (for example, uplink path loss). The predetermined
25 standard may represent a target path loss (uplink target path loss), and the certain access point may represent an access point having an uplink path loss equal to or smaller than the target

path loss.

In operation 130, the station may perform an access (that is, an authentication process and an association process) to the certain access point. The station may perform an access to the certain access point before a preset maximum probe response time elapses. That is, the station may perform an access to the certain access point instantly after receiving a probe response frame. If the uplink path loss satisfies the predetermined standard, it is determined that uplink quality between the certain access point and the station is fair, and thus the station may perform an access to the certain access point without receiving another probe response frame during the time remaining in the maximum probe response time.

FIG. 7 is a flowchart showing an active scan method according to another example embodiment of the present invention.

Referring to FIG. 7, an active scan method performed at a station includes generating a probe request frame including signal strength information of the station (S200), transmitting the probe request frame to access points (S210), receiving a probe response frame corresponding to the probe request frame from a certain access point (S220), acquiring a downlink path loss based on signal strength of the probe response frame (S230), and performing an access to the certain access point if the downlink path loss satisfies a predetermined standard (S240).

In operation S200, the station may generate a probe request frame including signal strength information of the station, and the signal strength information may include transmission power information. That is, the signal strength may represent transmission power.

In operation S210, the station may transmit the probe request frame to access points. The station may transmit a probe request frame to a designated access point, or an undesignated access point (that is, broadcasting).

In operation S220, the station may receive a probe response frame corresponding to

the probe request frame from a certain access point. The certain access point may represent one access point among access points having received the probe request frame. In addition, the certain access point may represent an access point satisfying a predetermined standard for uplink quality with respect to the station (for example, uplink path loss). The predetermined
5 standard may represent a target path loss (uplink target path loss), and the certain access point may represent an access point having an uplink path loss equal to or smaller than the target path loss.

In operation S230, the station may acquire a downlink path loss based on signal strength of the probe response frame. If transmission power of the certain access point is
10 identified, the station may acquire the downlink path loss through a difference between the transmission power of the certain access point and the received signal strength of the probe response frame. Alternatively, the station may acquire transmission power of the certain access point through the probe response frame. That is, the certain access point may generate a probe response frame including transmission power information of the certain
15 access point, and transmit the probe response frame to the station, and the station may acquire the transmission power of the certain access point through the probe response frame.

In operation S240, the station may perform an access to the certain access point if the downlink path loss satisfies a predetermined standard. The predetermined standard may represent a target path loss (downlink target path loss), and the target path loss may be
20 transmitted to the station while included in the probe response frame.

FIGS. 8 and 9 are conceptual views illustrating the configuration of a probe response frame.

Referring to FIGS. 8 and 9, a probe response frame includes information about a target path loss 23. That is, a certain access point may generate a probe response frame
25 including target path loss information as shown in FIGS. 8 and 9, and provide a station with the generated probe response frame.

Referring again to FIG. 7, the station may perform an access (that is, an authentication process and an association process) to the certain access point if a downlink path loss is equal to or smaller than the target path loss. The station may perform an access to the certain access point before a preset maximum probe response time elapses. That is, the station may
5 perform an access to a certain access point instantly after receiving a probe response frame satisfying a predetermined standard.

If the downlink path loss satisfies the predetermined standard, it is determined that downlink quality between the certain access point and the station is fair, and thus the station may perform an access to the certain access point without receiving another probe response
10 frame during the time remaining in the maximum probe response time.

Meanwhile, the station may receive a probe response frame from another access point if the downlink path loss is larger than the target path loss.

FIG. 10 is a flowchart showing an active scan method according to still another example embodiment of the present invention.

Referring to FIG. 10, an active scan method performed at a station includes
15 transmitting a probe request frame to access points (S300), receiving a probe response frame corresponding to the probe request frame from a certain access point (S310), acquiring information about downlink quality based on signal strength of the probe response frame (S320), and performing an access to the certain access point if the downlink quality satisfies a
20 predetermined standard (S330).

In operation S300, the station may transmit a probe request frame to access points. In this case, the station may transmit a probe request frame to a designated access point, or an undesignated access point (that is, broadcasting).

In operation S310, the station may receive a probe response frame corresponding to
25 the probe request frame from a certain access point. The certain access point may represent one access point among access points having received the probe request frame.

In operation S320, the station may acquire information about downlink quality based on received signal strength of the probe response frame. The information about downlink quality may include information about downlink path loss. That is, the downlink quality may represent downlink path loss. When transmission power of a certain access point is identified, the station may acquire the downlink path loss through a difference between the transmission power of the certain access point and received signal strength of the probe response frame. Alternatively, the station may acquire the transmission power of the certain access point through the probe response frame. That is, a certain access point may generate a probe response frame including transmission power information of the certain access point, and transmit the probe response frame to a station, and the station may acquire the transmission power of the certain access point through the probe response frame.

In operation S330, if a downlink path loss satisfies a predetermined standard, the station may perform an access to the certain access point. The predetermined standard may represent a target path loss (downlink target path loss), and the target path loss may be transmitted to the station while included in the probe response frame.

The station may perform an access (that is, an authentication process and an association process) to the certain access point if the downlink path loss is equal to or smaller than the target path loss. The station may perform an access to the certain access point before a preset maximum probe response time elapses. That is, the station may perform an access to a certain access point instantly after receiving a probe response frame satisfying a predetermined standard.

Meanwhile, the station may receive a probe response frame from another access point if the downlink path loss is larger than the target path loss.

FIG. 11 is a flowchart showing an active scan-based responding method according to an example embodiment of the present invention.

Referring to FIG. 11, an active scan-based responding method performed at an access

point includes receiving a probe request frame from a station (S400), acquiring information about uplink quality based on signal strength information of the station included in the probe request frame (S410), and transmitting a probe response frame to the station if the uplink quality satisfies a predetermined standard (S420).

5 In operation S400, the access point may receive a probe request frame from a station. That is, an SSID included in the probe request frame corresponds to an SSID of the access point or sets in null, the access point may receive the probe request frame.

 In operation S410, the access point may acquire uplink quality information based on signal strength information of the station included in the probe request frame. The signal
10 strength information of the station represents transmission power information of the station, and the uplink quality information represents uplink path loss information. That is, the access point may acquire an uplink path loss through a difference between the transmission power of the station included in the probe request frame and received signal strength of the probe request frame.

15 In operation S420, the access point may transmit a probe response frame to the station if the uplink path loss satisfies a predetermined standard. The predetermined standard may represent a target path loss (uplink target path loss). That is, the access point may transmit a probe response frame to the station if uplink quality (that is, uplink path loss) is equal to or smaller than the target path loss. Meanwhile, the access point does not transmit a probe
20 response frame to the station if the uplink quality (that is, uplink path loss) is larger than the target path loss.

 When the access point transmits a probe response frame, the access point may transmit the probe response frame including target path loss information (downlink target path loss) to the station. The target path loss information included in the probe response
25 frame may be used for the station to acquire downlink quality.

FIG. 12 is a flowchart showing an active scan method of an access point according to

an example embodiment of the present invention.

Referring to FIG. 12, a station 10 may broadcast probe request frames (S500). Access points 20, 21, and 22 may calculate an uplink path loss based on the received probe request frame. That is, the uplink path loss may be calculated based on transmission power of the station 10 included in the probe request frame and received signal strength of the probe request frame. A corresponding access point may transmit a probe response frame to the station 10 if the uplink path loss is equal to or smaller than a predetermined standard (that is, uplink target path loss) (S510).

For example, a first access point 20 may transmit a probe response frame to the station 10 if an uplink path loss with respect to the first access point 20 is equal to or smaller than the predetermined standard.

The station 10 may receive the probe response frame from the first access point 20, and perform an access to the first access point 20 instantly after receiving the probe response frame, that is, perform an authentication process and an association process (S520). The station may perform an access to the first access point 20 before a preset maximum probe response time elapses. If the uplink path loss satisfies the predetermined standard, it is determined that an uplink quality between the first access point 20 and the station is fair, and thus the station may perform an access to the first access point 20 without receiving another probe response frame during the time remaining in the maximum probe response time.

As is apparent from the above, an access point transmits a probe response frame only to a station having an uplink path loss with respect to a probe request frame satisfying a predetermined standard, thereby preventing unnecessary wireless resources from being wasted.

Meanwhile, a station instantly performs association with respect to an access point without waiting for the maximum probe response time to pass, if a downlink path loss with respect to a probe response frame is satisfied with a predetermined standard, thereby

preventing unnecessary time from being wasted.

While the example embodiments of the present invention and their advantages have been described in detail, it should be understood that various changes, substitutions, and alterations may be made herein without departing from the scope of the invention.

WHAT IS CLAIMED IS:

1. A method for active scanning performed by a station, the method comprising:
5 transmitting, to an access point, a probe request frame including information on a signal strength; and
receiving, from the access point, a probe response frame in response to the probe request frame,
wherein the probe response frame is transmitted by the access point based on the
10 information on the signal strength.
2. The method of claim 1,
wherein the station accesses the access point based on the probe response frame and a maximum probe response time,
15 wherein the maximum probe response time comprises a preset maximum time period during which the station is required to wait for the probe response frame from the access point.
3. The method of claim 1,
20 wherein the information on the signal strength includes information about transmission power of the station.
4. The method of claim 1,
wherein the access point is an access point satisfying a predetermined standard for an
25 uplink quality with respect to the station.

5. The method of claim 2, wherein the station accesses the access point before the maximum probe response time elapses.

5 6. The method of claim 1, further comprising:
acquiring a downlink path loss based on a signal strength of the probe response frame;
and
accessing the certain access point in response to determining that the downlink path
loss satisfies a predetermined standard.

10

7. The method of claim 6, wherein the probe response frame includes target path loss information as the predetermined standard.

8. The method of claim 6, wherein the access point satisfies the predetermined
15 standard for an uplink quality with respect to the station.

9. A method for active scanning performed by an access point, the method comprising:
receiving, from a station, a probe request frame including information on a signal
20 strength; and
transmitting, to the station, a probe response frame in response to the probe request frame based on the information on the signal strength.

10. A station configured to perform an active scanning, the station comprising:
25 a transceiver; and

a processor,

wherein the processor is configured to:

cause the transceiver to transmit, to an access point, a probe request frame including information on a signal strength; and

5 cause the transceiver to receive, from the access point, a probe response frame in response to the probe request frame, and

wherein the probe response frame is transmitted by the access point based on the information on the signal strength.

10 11. An access point configured to perform an active scanning, the access point comprising:

a transceiver; and

a processor,

wherein the processor is configured to:

15 cause the transceiver to receive, from a station, a probe request frame including information on a signal strength; and

cause the transceiver to transmit, to the station, a probe response frame in response to the probe request frame based on the information on the signal strength.

ABSTRACT OF THE DISCLOSURE

Disclosed is a method for scanning for an access point. An active scan method comprises the steps of: generating a probe request frame including information on the signal strength of a terminal; and transmitting the probe request frame to an access point. Thus, a waste of time and radio resources can be prevented.

5

FIG. 1

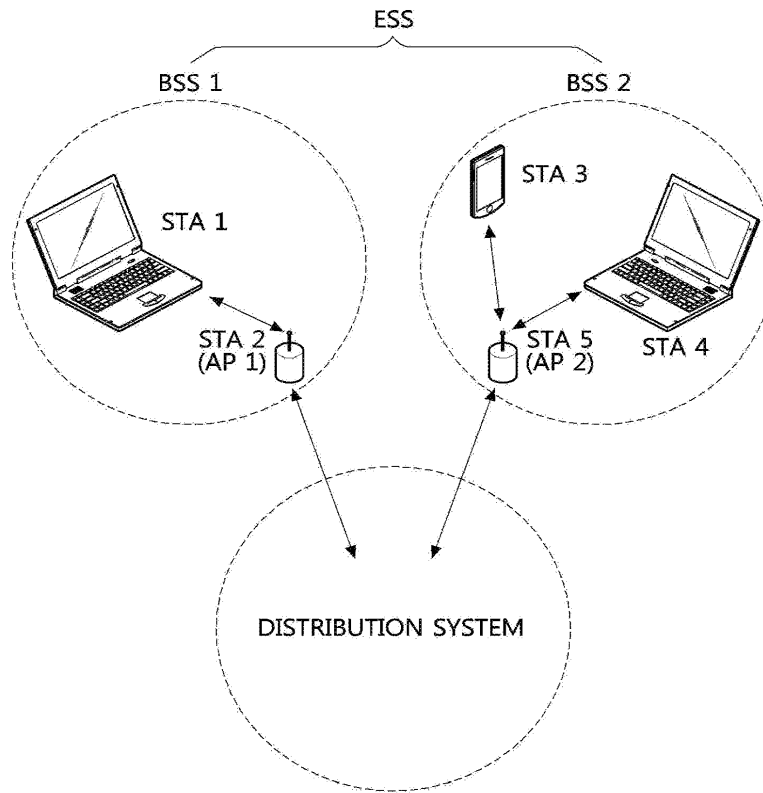


FIG. 2

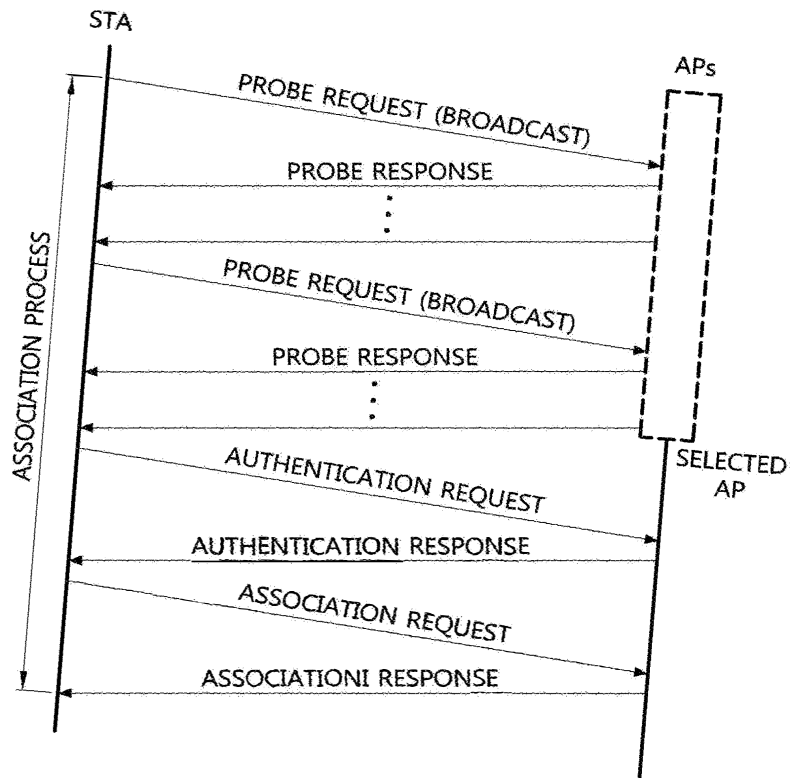


FIG. 3

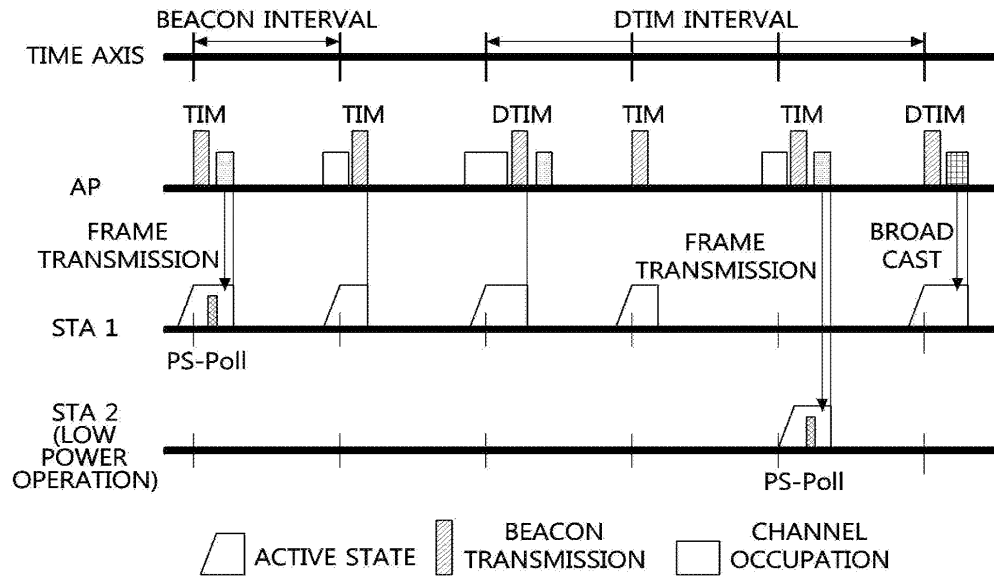


FIG. 4

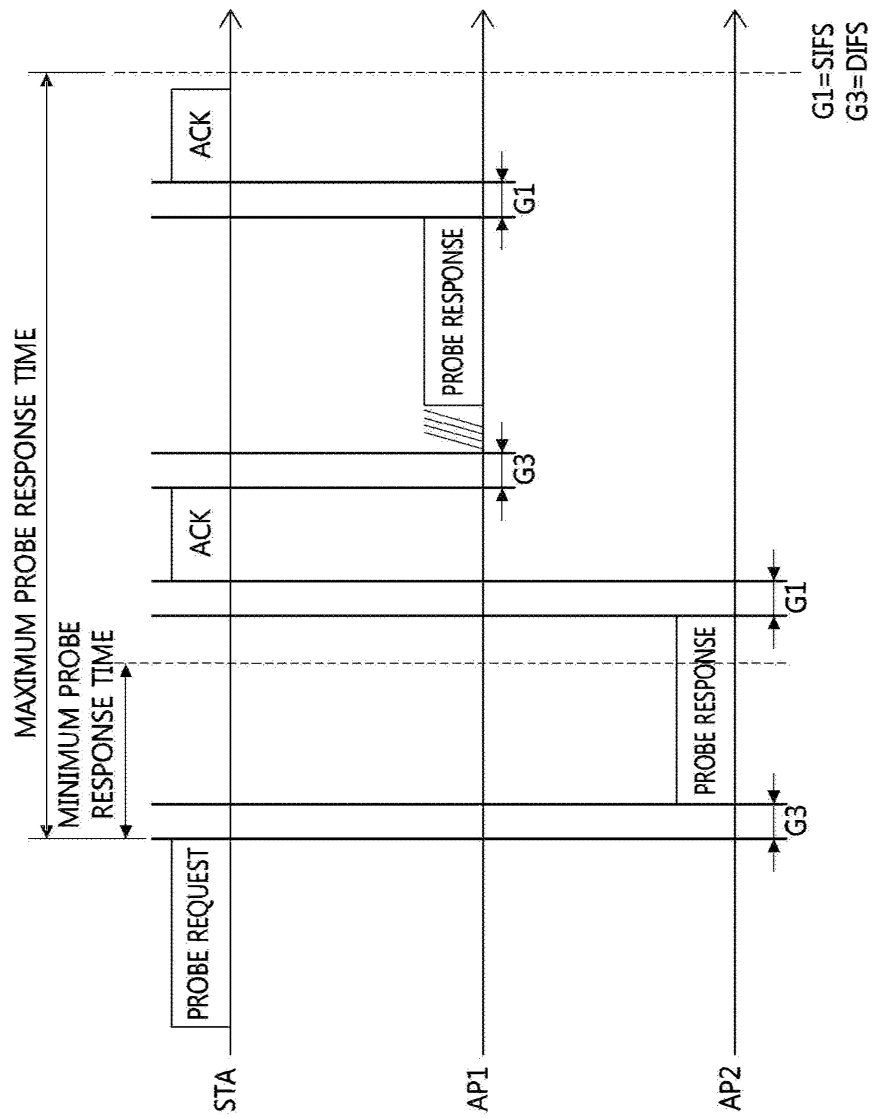


FIG. 5

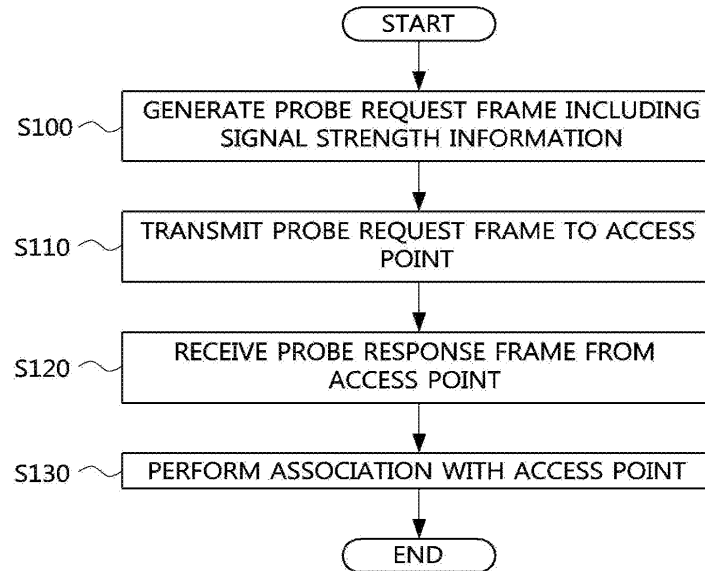


FIG. 6

Order	Information	Notes
1	SSID	
2	Supported rates	
3	Request information	May be included if dot11MultiDomainCapabilityEnabled is true.
4	Extended Supported Rates	The Extended Supported Rates element is present whenever there are more than eight supported rates, and it is optional otherwise.
5	Tx Power	
Last	Vendor Specific	One or more vendor-specific information elements may appear in this frame. This information element follows all other information elements.

FIG. 7

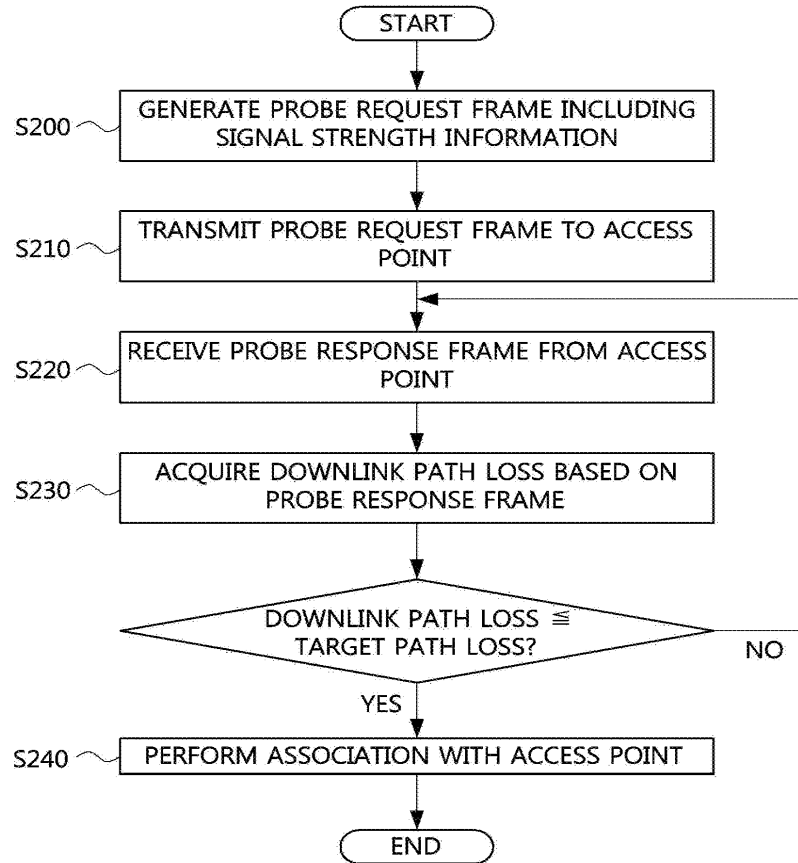


FIG. 8

Order	Information	Notes
1	Timestamp	
2	Beacon interval	
3	Capability	
4	SSID	
5	Supported rates	
6	FH Parameter Set	The FH Parameter Set information element is present within Probe Response frames generated by STAs using FH PHYs.
7	DS Parameter Set	The DS Parameter Set information element is present within Probe Response frames generated by STAs using Clause 15, Clause 18, and Clause 19 PHYs.
8	CF Parameter Set	The CF Parameter Set information element is present only within Probe Response frames generated by APs supporting a PCF.
9	IBSS Parameter Set	The IBSS Parameter Set information element is present only within Probe Response frames generated by STAs in an IBSS.
10	Country	Included if dot11MultiDomainCapabilityEnabled or dot11SpectrumManagementRequired is true.
11	FH Parameters	FH Parameters, as specified in 7.3.2.10, may be included if dot11MultiDomainCapabilityEnabled is true.
12	FH Pattern Table	FH Pattern Table information, as specified in 7.3.2.11, may be included if dot11MultiDomainCapabilityEnabled is true.
13	Power Constraint	Shall be included if dot11SpectrumManagementRequired is true.
14	Channel Switch Announcement	May be included if dot11SpectrumManagementRequired is true.

FIG. 9

Order	Information	Notes
15	Quiet	May be included if dot11SpectrumManagementRequired is true.
16	IBSS DFS	Shall be included if dot11SpectrumManagementRequired is true in an IBSS.
17	TPC Report	Shall be included if dot11SpectrumManagementRequired is true.
18	ERP Information	The ERP Information element is present within Probe Response frames generated by STAs using ERPs and is optionally present in other cases.
19	Extended Supported Rates	The Extended Supported Rates element is present whenever there are more than eight supported rates, and it is optional otherwise.
20	RSN	The RSN information element is only present within Probe Response frames generated by STAs that have dot11RSNAEnabled set to TRUE.
21	BSS Load	The BSS Load element is present when dot11QosOption- Implemented and dot11QBSSLoadImplemented are both true.
22	EDCA Parameter Set	The EDCA Parameter Set element is present when dot11QosOptionImplemented is true.
23	Target Pathloss	

FIG. 10

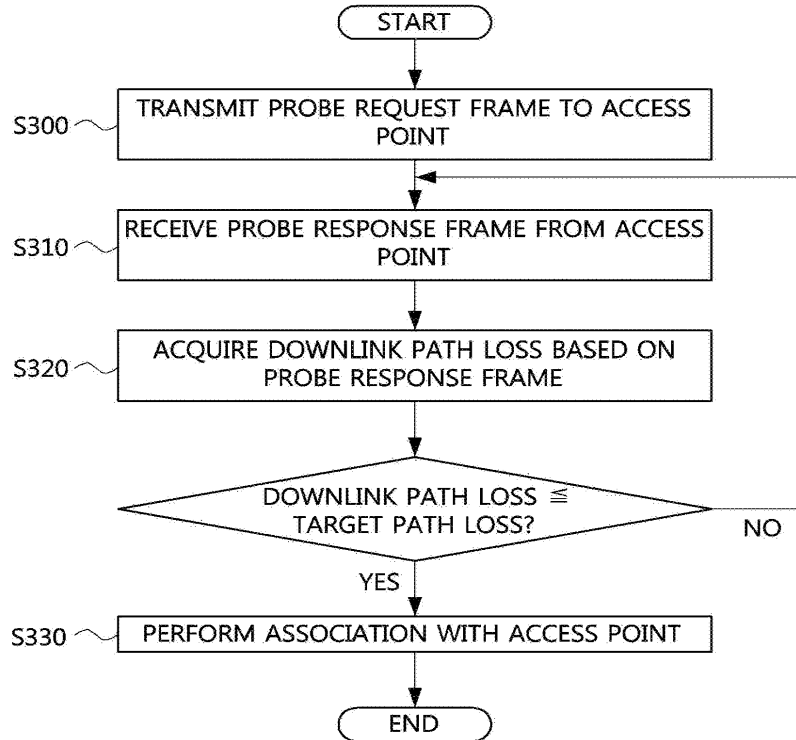


FIG. 11

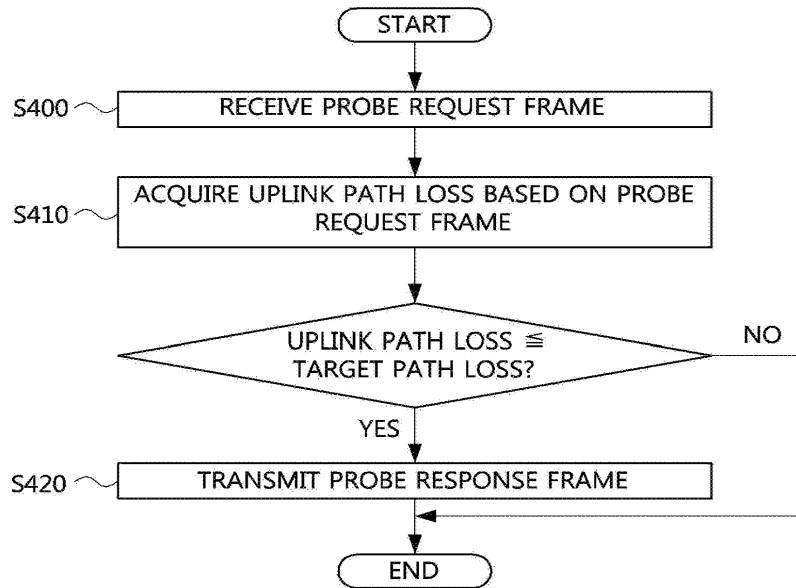
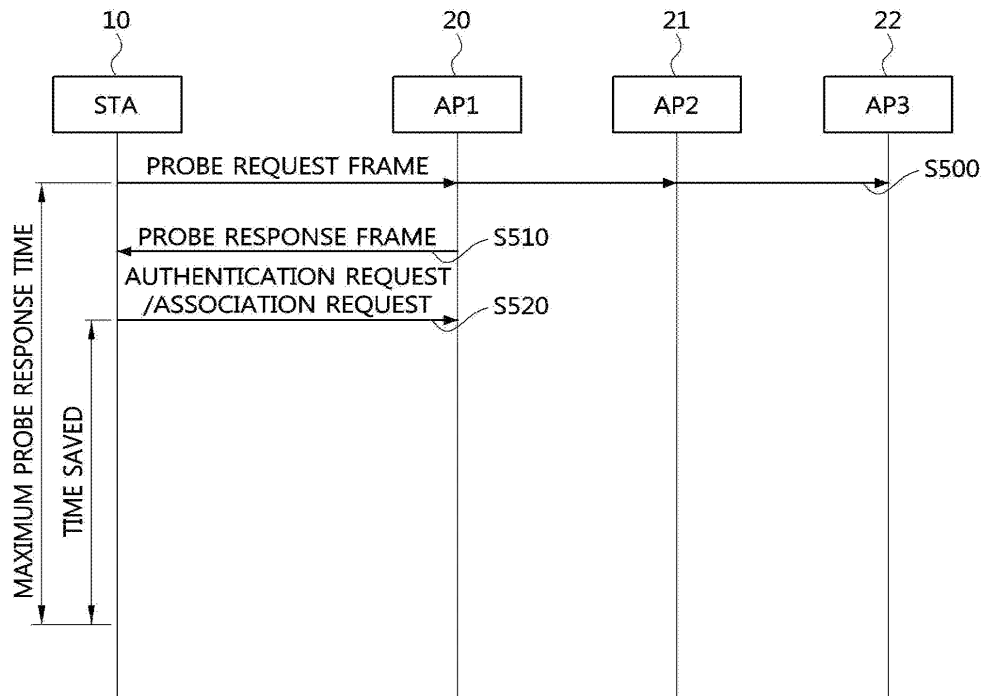


FIG. 12



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	Q233661
		Application Number	
Title of Invention	METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM		
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		
	Byung Wan		YOON			
Residence Information (Select One) US Residency ☒ Non US Residency Active US Military Service						
City	Seoul		Country of Residence ⁱ	KR		
Mailing Address of Inventor:						
Address 1		KT Research Development Center				
Address 2		17 Woomyeong-dong, Seocho-gu				
City	Seoul		State/Province			
Postal Code	137-140		Country ⁱ	KR		
Inventor 2					Remove	
Legal Name						
Prefix	Given Name	Middle Name	Family Name	Suffix		
	Su Hwan		RIM			
Residence Information (Select One) US Residency ☒ Non US Residency Active US Military Service						
City	Seoul		Country of Residence ⁱ	KR		
Mailing Address of Inventor:						
Address 1		KT Research Development Center				
Address 2		17 Woomyeong-dong, Seocho-gu				
City	Seoul		State/Province			
Postal Code	137-140		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:

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	Q233661
		Application Number	
Title of Invention	METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM		

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	23373		
Email Address	sughrue@sughrue.com	Add Email	Remove Email

Application Information:

Title of the Invention	METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM		
Attorney Docket Number	Q233661	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	11	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	23373		

EFS Web 2.2.11

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	Q233661
		Application Number	
Title of Invention	METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this 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 blank.

Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation of	14411278	2014-12-24
Prior Application Status	Pending	Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
14411278	a 371 of international	PCT/KR2013/005733	2013-06-27
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(d). 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(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

			Remove
Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ^j (if applicable)
10-2012-0070043	KR	2012-06-28	
			Remove
Application Number	Country ⁱ	Filing Date (YYYY-MM-DD)	Access Code ^j (if applicable)
10-2013-0063860	KR	2013-06-04	
Additional Foreign Priority Data may be generated within this form by selecting the Add button.			Add

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	Q233661
		Application Number	
Title of Invention	METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM		

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.
--

Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices If 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 World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application. In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application. In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.
--

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.
--

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	Q233661
	Application Number	
Title of Invention	METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM	

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	KT Corporation	
Mailing Address Information For Applicant:		
Address 1	90 Bulljeong-ro, Bundang-gu	
Address 2	Gyeonggi-do	
City	Seongnam-si	State/Province
Country	KR	Postal Code
Phone Number	82-1588-8448	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. ☒	

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	Q233661
		Application Number	
Title of Invention	METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM		

Organization Name	KT Corporation		
Mailing Address Information For Assignee including Non-Applicant Assignee:			
Address 1	90 Buljeong-ro, Bundang-gu		
Address 2	Gyeonggi-do		
City	Seongnam-si	State/Province	
Country ⁱ	KR	Postal Code	463-711
Phone Number	82-1588-8448	Fax Number	
Email Address			
Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add			

Signature:

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Remove					
Signature	/ Douglas E. Agopsowicz /		Date (YYYY-MM-DD)	2017-06-09	
First Name	Douglas	Last Name	Agopsowicz	Registration Number	56792
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.**

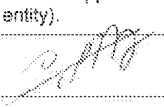
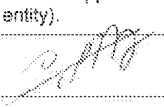
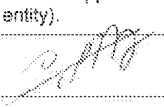
Privacy Act Statement

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

TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS			
NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.			
Application Number	Not Yet Assigned		
Filing Date	June 8, 2017		
First Named Inventor	Byung Wan YOON		
Title	METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM		
Art Unit	Not Yet Assigned		
Examiner Name	Not Yet Assigned		
Attorney Docket Number	Q233661		
SIGNATURE of Applicant or Patent Practitioner			
Signature	/ Douglas E. Agopsowicz /	Date (Optional)	
Name	Douglas E. Agopsowicz	Registration Number	56,792
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			
NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.			
☒ *Total of <u>1</u> forms are submitted.			

POWER OF ATTORNEY BY APPLICANT													
I hereby revoke all previous powers of attorney given in the application identified in the attached transmittal letter. I hereby appoint: Patent Practitioner(s) associated with the following Customer Number: WASHINGTON OFFICE 23373 CUSTOMER NUMBER as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (Form PTO/AIA/82A).													
Please recognize or change the correspondence address for the application identified in the attached transmittal letter to: The address associated with the above-mentioned Customer Number.													
I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box): KT Corporation ☐ Inventor or Joint Inventor (title not required below) ☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below) ☒ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity) ☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a Petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document)(provide signer's title if applicant is a juristic entity)													
SIGNATURE of Applicant for Patent The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity). <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="width: 30%; padding: 5px;">Signature</td> <td style="width: 40%; padding: 5px; text-align: center;"></td> <td style="width: 20%; padding: 5px;">Date (Optional)</td> <td style="width: 10%; padding: 5px; text-align: center;">30. Mar. 2016</td> </tr> <tr> <td style="padding: 5px;">Name</td> <td colspan="3" style="padding: 5px; text-align: center;">Sang-Kyu Woo</td> </tr> <tr> <td style="padding: 5px;">Title</td> <td colspan="3" style="padding: 5px; text-align: center;">Team Leader</td> </tr> </table> NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms. ☒ Total of 1 forms are submitted.		Signature		Date (Optional)	30. Mar. 2016	Name	Sang-Kyu Woo			Title	Team Leader		
Signature		Date (Optional)	30. Mar. 2016										
Name	Sang-Kyu Woo												
Title	Team Leader												

ASSIGNMENT WITH DECLARATION FOR PATENT APPLICATION (37 CFR 1.63)

특허 출원 관련 양도 및 선언 (연방규칙집 제 37 조 1.63 항)

Korean Language Assignment with Declaration

이와 양도인으로 지정되는 하기 서명 발명자인 본인(들)은 아래에
명기된 출원에서 서술한 특정 개선을 발명하였으므로 그리고

이제 소개한 (양수인)은(은) 출원 및 발명의
그리고 이에 따라 특허권 일체의 미국 특허에 대한 권리, 소유권
및 이익을 획득하기를 원하므로,

이제 대가를 위한 그 수령을 인정합니다.

상기 양도인인 본인(들)은 상기 명칭의 양수인, 그 승계자 및 그
양수인에게 모든 분할과 그 연속을 포함하여 미국 용으로 공개된
출원과 발명 그리고 그에 대해 승인될 수 있는 미국의 모든 특허증서와
미합중국 코드 제 35 장 제119 항에 의거한 우선권 청구권을 포함한,
개정된 파리 국제협약(1883)에 의거한 우선권을 포함한 모든 그
제발행과 모든 외국에 대한 전체 권리, 소유권 및 이익을 관여, 양도 및
허전하며 그리고 본인(들)은 출원서에 제시된 발명에 대해 승인된
일체의 특허증서를 양수인, 그 승계자 또는 그 양수인에게 발급하도록
미국 특허청장에게 요청하는 바이며 또한 본인(들)은 양수인이 본
발명에 대한 외국 특허증서를 신청할 수 있다는데 동의하며,
본인(들)은 양수인의 요청할 경우 미국 및 외국 출원과 관련하여
양수인이 필요하다고 생각하는 모든 서류를 더 이상의 보수 없이
서명날인할 것입니다.

(공인은 기록을 위해 요구되지는 않지만 미합중국 코드 제 35 장
제261 항에 의거 서명날인에 대한 일종의 증거입니다)

본인은 아래 서명의 발명자로서 다음과 같이 선언합니다.

본 양도 및 선언서는 다음 사항을 위한 것입니다:

- ☐ 정부 출원 또는
☒ 미합중국 출원 또는 PCT
국제출원 번호:
출원일:

본 출원의 제목은 다음과 같습니다:

Whereas, I/We, the undersigned inventor(s) hereinafter called
assignor(s), have invented certain improvements described in the
application identified below; and

Whereas, KT CORPORATION of Bulilong-ro 90, Bundang-gu,
Seongnam-si, Gyeonggi-do, 463-711, Republic of Korea,
(assignee), desires to acquire the entire right, title, and interest in
the application and invention, and to any United States patents to
be obtained therefor;

Now therefore, for valuable consideration, receipt whereof is
hereby acknowledged.

I/We, the above named assignor(s), hereby sell, assign and
transfer to the above named assignee, its successors and assigns,
the entire right, title and interest in the application and the
invention disclosed therein for the United States of America,
including all divisions, and continuations thereof, and all Letters
Patent of the United States that may be granted thereon, and all
reissues thereof, and all countries foreign thereto, including rights
of priority under the International Convention of Paris (1883) as
amended, including the right to claim priority under 35 USC 119,
and I/we request the Director of the U.S. Patent and Trademark
Office to issue any Letters Patent granted upon the invention set
forth in the application to the assignee, its successors and assigns;
and I/we hereby agree that the assignee may apply for foreign
Letters Patent on the invention and I/we will execute without
further consideration all papers deemed necessary by the assignee
in connection with the United States and foreign applications
when called upon to do so by the assignee.

(Legalization not required for recording but is prima facie
evidence of execution under 35 USC 261)

As the below named inventor, I hereby declare that:

This assignment with declaration is directed to:

- ☐ The attached application, or
☒ United States Application or PCT International
Application Number PCT/KR2013/005233 filed on
June 27, 2013.

The application is entitled:

METHOD FOR SCANNING FOR ACCESS POINT IN
WIRELESS LAN SYSTEM

Korean Language Assignment with Declaration

위에 표시된 출원은 본인이 신청하였거나 또는 신청하도록 허가를 받았습니 다.

본인은, 본인이 본 출원에서 청구된 발명의 원 발명자 또는 원 공동 발명자라고 믿습니다.

본인은 본 양도 및 선언서 제출과 관련된 출원의 내용을 검토하였으 며 아울러 이해합니다.

본인은 연방 규정 코드 제 37 장 제 1.56 항에 규정된 바에 따라, 특허성의 판단에 중요한 본인이 아는 모든 정보를 특허청에 공개할 의무가 있음을 알고 있습니다.

본 양도 및 선언서 내에 의도적 허위 진술이 있을 경우 미합중국 코드 제 18 장의 1001 항에 의거 벌금이나 5 년 이하의 징역 또는 두 가지 처벌을 모두 받을 수 있음을 인정합니다.

해당 관청의 특허출원 공개 허용 권한

☒ 이 칸에 표시한 경우, 하기의 서명자는 상기 언급된 출원에 대해 우선권을 주장하는 외국 특허청구 사항이 출원되어 있는 유럽특허청(EPO), 일본특허청(JPO), 한국특허청(KIPO), 세계지식재산기구(WIPO) 및 기타 특허청들에게 상기 언급된 특허 출원 정보를 공개할지 여부를 결정할 권한을 미국특허청(USPTO)에 부여합니다. 연방규정 코드 제 37 장 제 1.14(c)항과 (h)항을 참조하십시오. 만약 상기 출원자가 상기 언급된 출원에 대해 우선권을 주장하는 외국 특허청구 사항이 출원되어 있는 EPO, JPO, KIPO, 또는 기타 특허청들이 본 특허출원 내용을 열람하는 것을 원하지 않는다면 이 칸에 표시하지 않습니다.

연방규정 코드 제 37 장 제 1.14(h)(3)항에 따라, 다음의 경우에 한해 출원된 내용의 사본을 열람할 수 있습니다: 1) 상기 언급된 특허 출원, 2) 미합중국 코드 제 35 장 115(a)-(d)항에 따라 상기 언급된 특허출원이 우선권을 주장하는 대상인 기타 외국 특허출원으로, 그 외국 특허출원 사본이 연방규정 코드 제 37 장 제 1.56 항의 사본 증명 요건에 부합되며, 상기 언급된 특허출원에 이미 출원되어 있는 경우, 3) 상기 언급된 특허출원이 부수적인 이익을 주장하고자 하는 대상인 기타 미국 특허출원.

연방규정 코드 제 37 장 제 1.14(c) 항에 따라, "해당관청의 특허출원 공개 허용 권한" 서류 제출 일자에 관한 정보를 입수할 수 있습니다.

The above identified application was made or was 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 have reviewed and understand the contents of the application for which this assignment with declaration is being submitted.

I am aware of the duty to disclose to the Office all information known to me to be material to patentability as defined in 37 CFR 1.56.

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

Authorization To Permit Access To Application by Participating Office

☒ If 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 World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the above-identified application is filed access to the above-identified patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, or other intellectual property office in which a foreign application claiming priority to the above-identified application is filed to have access to the application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the application-as-filed with respect to: 1) the above-identified patent application-as-filed, 2) any foreign application to which the above-identified application claims priority under 35 USC 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the above-identified patent application, and 3) any U.S. application-as-filed from which benefit is sought in the above-identified patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing the Authorization to Permit Access to Application by Participating Office.

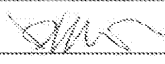
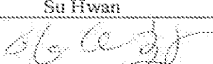
STATEMENT OF ACCURATE TRANSLATION IN ACCORDANCE WITH 37 CFR §1.69(b):

The assignment with declaration is an accurate translation of the corresponding English language assignment with declaration.

Signature

Date

8/30/2012

NAME OF SOLE OR FIRST INVENTOR: 단독 혹은 최초 발명자의 성명		
Given Name (first and middle [if any]) 이름(성씨는 제외)	Byung Wan	Family Name or Surname 성(姓)
Inventor's signature 발명자의 서명		Date 일자
Residence: 거주지:		December 23, 2014
Seoul, Republic of Korea		
Mailing Address: 우편 주소:		
KT Research Development Center 17 Woomyeon-dong, Seocho-gu, Seoul 137-140, Republic of Korea		
NAME OF SECOND INVENTOR: 두번째 발명자의 성명		
Given Name (first and middle [if any]) 이름(성씨는 제외)	Su Hwan	Family Name or Surname 성(姓)
Inventor's signature 발명자의 서명		Date 일자
Residence: 거주지:		December 23, 2014
Seoul, Republic of Korea		Citizenship 국적
		KR
Mailing Address: 우편 주소:		
KT Research Development Center 17 Woomyeon-dong, Seocho-gu, Seoul 137-140, Republic of Korea		

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM		
First Named Inventor/Applicant Name:		Byung Wan YOON		
Filer:		Natalya Dvorson/Milly Cabrera		
Attorney Docket Number:		Q233661		
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	280	280
UTILITY SEARCH FEE	1111	1	600	600
UTILITY EXAMINATION FEE	1311	1	720	720
Pages:				
Claims:				
INDEPENDENT CLAIMS IN EXCESS OF 3	1201	1	420	420
Miscellaneous-Filing:				
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				2020

Electronic Acknowledgement Receipt	
EFS ID:	29448212
Application Number:	15618443
International Application Number:	
Confirmation Number:	7227
Title of Invention:	METHOD FOR SCANNING FOR ACCESS POINT IN WIRELESS LAN SYSTEM
First Named Inventor/Applicant Name:	Byung Wan YOON
Customer Number:	23373
Filer:	Natalya Dvorson/Milly Cabrera
Filer Authorized By:	Natalya Dvorson
Attorney Docket Number:	Q233661
Receipt Date:	09-JUN-2017
Filing Date:	
Time Stamp:	13:18:58
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	\$2020
RAM confirmation Number	060917INTEFSW13200300
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		Q233661NewContinuationApplication.pdf	83034	yes	7
			c76f13c553b86a3fc97e4f2943ed0206fc64dc8f		
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Fee Worksheet (SB06)		1	1	
	Transmittal of New Application		2	3	
	Information Disclosure Statement (IDS) Form (SB08)		4	7	
Warnings:					
Information:					
2	Specification	Q233661SpecificationTBF.pdf	97816	no	24
			2e5674f99eb7169a4524c5452895ec25f597d3f8		
Warnings:					
Information:					
3	Drawings-only black and white line drawings	Q233661DrawingsTBF.pdf	4685652	no	11
			115760d6e915baec868d9f36df9ba49ef5c4bfc5		
Warnings:					
Information:					
4	Application Data Sheet	Q233661ADSTBF.pdf	1561204	no	7
			a3664a2b2263dc2fd069da484af663c34ebff34		
Warnings:					
Information:					
5	Power of Attorney	Q233661TransmittalandPOA.pdf	109107	no	2
			a7993d98f2360877ab7c4a175b1fc60bf8f59		

Warnings:					
Information:					
6	Oath or Declaration filed	Q233661AssignmentwithDeclarationfromParent.pdf	360241 e7b312b20ddf390784ef8c9d0e7824652e5241da	no	3
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:					
7	Fee Worksheet (SB06)	fee-info.pdf	36646 5968625d8164c42ea5260b66aa1c5591b1f5de36	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			6933700		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

FEE TRANSMITTAL		Complete if Known	
☐ Applicant asserts small entity status. See 37 CFR 1.27.		Application Number	Not Yet Assigned
☐ Applicant certifies micro entity status. See 37 CFR 1.29. Form PTO/SB/15A or B or equivalent must either be attached or have been submitted previously.		Filing Date	June 8, 2017
TOTAL AMOUNT OF PAYMENT (\$2,020)		First Named Inventor	Byung Wan YOON
		Examiner Name	Not Yet Assigned
		Art Unit	Not Yet Assigned
		Docket No.	Q233661

METHOD OF PAYMENT (check all that apply)	
☐ Check ☒ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____	
☐ Deposit Account Deposit Account Number: 19-4880 Deposit Account Name: Sughrue Mion, PLLC	
For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)	
☐ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, except for the Issue Fee and the Publication Fee	
☐ Charge fee(s) indicated below, except for the filing fee, the Issue Fee and the Publication Fee	
☒ Charge any additional fee(s), except for the Issue Fee and the Publication Fee, or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☒ Credit any overpayment of fees(s)	

FEE CALCULATION									
1. BASIC FILING, SEARCH, AND EXAMINATION FEES (U = undiscounted fee; S = small entity fee; M = micro entity fee)									
	FILING FEES			SEARCH FEES			EXAMINATION FEES		
Application Type	U(\$)	S(\$)	M(\$)	U(\$)	S(\$)	M(\$)	U(\$)	S(\$)	M(\$)
Utility	280	140*	70	600	300	150	720	360	180
Design	180	90	45	120	60	30	460	230	115
Plant	180	90	45	380	190	95	580	290	145
Reissue	280	140	70	600	300	150	2160	1080	540
Provisional	260	130	65	0	0	0	0	0	0

* The \$140 small entity status filing fee for a utility application is further reduced to \$70 for a small entity status applicant who filed the application via EFS-Web.

This Form Small Entity Status Application is further reduced to \$76 for a small entity status applicant who files the application via E-File.

2. EXCESS CLAIM FEES

<u>Fee Description</u>		<u>Undiscounted Fee (\$)</u>	<u>Small Entity Fee (\$)</u>	<u>Micro Entity Fee (\$)</u>
	Each claim over 20 (including Reissues)	80	40	20
	Each independent claim over 3 (including Reissues)	420	210	105
	Multiple dependent claims	780	390	195
<u>Total Claims</u>	<u>Extra Claims</u>	<u>Fee (\$)</u>	<u>Fee Paid (\$)</u>	<u>Multiple Dependent Claims</u>
11	- 20 or HP = 0 X	80	= 0	<u>Fee(\$)</u>
HP = highest number of total claims paid for, if greater than 20.				<u>Fee Paid (\$)</u>
				780
<u>Indep. Claims</u>	<u>Extra Claims</u>	<u>Fee (\$)</u>	<u>Fee Paid (\$)</u>	
4	- 3 or HP = 1 X	420	= 420	0
HP = highest number of independent claims paid for, if greater than 3.				

3. APPLICATION SIZE FEE	
If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$400 (\$200 for small entity or \$ 100 for micro entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).	
Total Sheets	Fee (\$)
35 - 100 = 0 / 50	0
35 *.75 26 - 100 = 0 / 50	0
(round up to a whole number) x	
EFS Fee Discount	400

4. OTHER FEE(S)		Fees Paid (\$)
Non-English Specification, \$140 fee (\$ 70 for small entity or \$35 for micro entity)		
Non-electronic filing fee under 37 CFR 1.16(t) for a utility application, \$400 fee (\$200 small or micro entity)		
Other (e.g., late filing surcharge):		

SUBMITTED BY			
Signature	/ Douglas E. Agopsowicz /	Registration No. (Attorney/Agent)	56,792
Name (Print/Type)	Douglas E. Agopsowicz	Telephone:	202.293.7060
		Date:	June 9, 2017